Section I. E. On-site Waste Hazard

Due to questions about the waste acceptance criteria prohibiting high-level waste at the Waste Isolation Pilot Project (WIPP) in New Mexico which receives some of INL stored Transuranic wastes (TRU), [WIPP,1/88] and DOE's inability to open the Yucca Mt. high-level repository in Nevada [1] , INL continues to be a defacto nuclear dump. Pursuant to the 1995 U.S. Federal Court settlement between Governor Andrus/Batt and DOE, all of INL's stored TRU waste, but only 10% of "targeted" of the buried SDA waste is shipped to WIPP. Legal dispute over this Settlement Agreement and subsequent 2006 "Agreement to Implement" [2] significantly undermined the original intent of the 1995 Agreement by limiting INL waste to be exhumed (only targeted waste) and reclassifying waste in order to reduce the amount DOE must ship out of Idaho.

In 2015, Idaho Attorney General Lawrence Wasden took a remarkable stand explaining why he had not yet signed a waiver to allow the two proposed shipments of spent nuclear fuel for research into Idaho. Only two signatures are needed in order to grant waivers to the 1995 Idaho Settlement Agreement: current Gov. Otter and Idaho Attorney General Lawrence Wasden. [3]

Former Idaho Governor Cecil D. Andrus who originally initiated the 1995 Settlement Agreement wrote: "The Department of Energy's culture of secrecy will not allow it to engage in a frank discussion about its plans for this state, writes Cecil D. Andrus.

> "Most Idahoans know that since January, former Gov. Phil Batt and I have been raising questions about a plan by the U.S. Department of Energy to bring additional shipments of commercial spent nuclear fuel (SNF) to the Idaho National Laboratory (INL) for "research."
>
> "Our opposition to these shipments involves several concerns including, most importantly, that the DOE action violates the historic agreement Gov. Batt negotiated with the feds in 1995 that specifically prohibits commercial SNF from coming to Idaho.
>
> "We also object to the fact that DOE still has no permanent disposal site for this material, which effectively means once it's here it will stay here for a very long time. The fact that DOE has also missed key milestones to treat highly radioactive liquid waste at INL further complicates the picture.
>
> "When I first learned of DOE's plans to bring additional SNF to Idaho back in January, I started to gather information and ask questions. It seemed a logical step to request under the Freedom of Information Act (FOIA) copies of correspondence, internal memos, etc., that I felt certain then - and still feel certain now - would shed light on just what the federal government has planned for Idaho.
>
> "My odyssey in search of those documents has been both eye-opening and disturbing. The fact that the federal government has refused to release information pertaining to its internal planning and how Idaho fits into its plans should raise red flags for the state and its citizens.
>
> "After taking months to respond to my request for information and finally producing page after page of redacted or blacked out, documents, I appealed the decision to stonewall on public information.
>
> "Perhaps not surprisingly, DOE rejected my appeal recently saying that releasing information about its plans in Idaho would "cause the harm of chilling open and frank discussion, limit government personnel's range of options … and detract from the quality of Agency decisions."
>
> "DOE simply decided the release of the information I requested and would have shared with Idahoans "would not be in the public interest."
>
> "But wait just a minute. It is hardly the job of a bureaucrat sitting in office in the Forrestal Building in Washington, D.C. to decide what information about nuclear waste management in Idaho is "in the public interest." What about our interest regarding what goes on within the borders of our state?
>
> "A careful reading of DOE's rationale shows the department wants to consider waste options in secret without involving or in any way consulting Idahoans and then tell us what they have decided. I can guarantee that public knowledge of DOE's "open and frank discussions" about its "options" would be

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[1] DOE has been blocked from opening Yucca Mt. thanks primarily due to the State of Nevada's litigation showing fatal the flaws in the EIS.

[2] Agreement to Implement, U.S. District Court Order Dated 5/25/ 06, Signed 2008.

[3] See more about Idaho's Settlement Agreement at https://www.deq.idaho.gov/inl-oversight/oversight- agreements/1995-settlement-agreement.aspx

"chilled" by public awareness in Idaho.

"DOE's culture of secrecy was, I believe, born during World War II when nuclear weapons where first developed and secrecy during wartime was a paramount consideration. But the agency never adapted, as the current situation in Idaho demonstrates, to a culture of transparency and engagement that engenders trust and confidence and, when warranted, public acceptance.

"I'm left to conclude that the agency does have plans for Idaho that likely would not pass muster in the sunlight. We do know that DOE has briefed the [Governor Otter's] LINE Commission on the possibility of future "research" at INL involving more than 20 metric tons of spent fuel. What else do they have in mind? They're not saying.

"Some DOE apologists have attempted to make this dispute about whether Idahoans "support the INL," but that is not the issue. The issues Gov. Batt and I have focused on are bigger and much more important: what ultimately happens to the significant quantities of nuclear waste already in Idaho, what is DOE's plan to honor commitments already made and what happens if we agree to take even more waste?

"DOE owes all of us a real discussion about those questions followed by real answers." [4]

Most Idahoans do not know that one fourth of all military nuclear waste is dumped at INL together with over one thousand metric tons total mass of commercial and military reactor spent fuel. DOE plans to add 15-20,000 metric tons of commercial spent fuel to its Complex wide inventory in the next decade. All the Three Mile Island contaminated Unit 2 reactor components (250,000 pounds) are stored at INL. [Deadly @ 50]

Little money has been spent on environmental restoration at the INL site relative to nuclear production spending. Current management practices indicate that adequate cleanup for volumes such as those dumped at INL require a financial commitment many times greater than currently allocated. Former Governor Andrus said; "This society has botched the job of managing by-products of nuclear energy and weapons production. It is our opportunity, perhaps our last opportunity, to make amends for this society's failures and treat with specific management plans the lasting curse of the nuclear age." [Idaho State Journal 8/27/94]

INL has four areas where high-level reactor spent fuel is stored – INTEC formerly Idaho Chemical Processing Plant (ICPP), Advanced Test Reactor Complex (formerly Test Reactor Area), Navel Reactor Facility, and Materials and Fuels Complex (formerly Argonne-West). Each area has numerous individual SNF storage facilities. The INTEC contains five facilities for spent fuel storage: the ICPP-603 Irradiated Fuel Storage Facility (IFSF), the ICPP-666 Underwater Fuel Storage Area (FSA), and the ICPP-749 Underground Storage Facility, and the INTEC dry Independent Spent Fuel Storage Facility. [DOE(a)]

Section I.E.1 Spent Nuclear Fuel (SNF) Inventory

a. INTEC/ICPP SNF Inventory

ICPP-603 Underwater Fuel Storage Facility (FSF); Prior to being recently closed, the FSF had three unlined concrete pools - north, middle, and south basins. The north and middle basins were built in 1951 and the south basin was added in 1959 and recently closed. The FSF was loaded to about 52% capacity, and 23% of the positions are currently considered unusable because of corrosion. Largely because of its age and past operating practices, the FSF had many deficiencies. The spent fuel, aluminum storage structures, and the carbon steel storage yokes and buckets have severely corroded over time. Numerous racking failures have caused fuel to fall to the bottom of the basin. Since the racks provide criticality spacing between fuel, failure of the racks poses significant risk of a criticality incident. The pools are unlined. Radionuclides have diffused into the pools' concrete walls and there is limited capability to monitor the pools for potential leakage. One hundred gallons per day was estimated to have leaked from the pools based on the water volume required to maintain the water levels. [AP(g)] CPP-603 Irradiated Fuel Storage Facility (IFSF) section for dry storage (discussed below) is still used.

Seismic evaluations have shown that there are weak areas in the storage facility superstructure, resulting in some potential for loss of confinement, release of radioactive materials, and decreased margins for preventing criticality from rack failure. This is due to the unique system of hanging the fuel from an overhead monorail supported by the building superstructure. The basin wall failure and

4 Post Register Guest column: A real problem for Idaho, Posted: September 13, 2015, By Cecil D. Andrus.

superstructure collapse due to a large seismic event poses a significant risk. Finally, the facility does not have a ventilation system for radionuclide confinement. [DOE(a)] Investigators noted that exposures and releases to the environment occurred during encapsulation of fuel in the CPP-603. The CPP-603 SNF pool was later D&D. The many decades of leaked radioactive coolant water into the soil and eventually the aquifer represents a long-term environmental hazard not addressed by DOE or Idaho.

ICPP-603 Irradiated Fuel Storage Facility (IFSF), built in 1974, is composed of shielded dry vaults for storage of graphite fuels. The spent fuel is stored in 636 carbon steel canisters, which are approximately 18 inches in diameter and 11 feet long. Decay heat is removed by a forced-flow ventilation system. DOE's assessment team noted that a potential Category l fire hazard may exist because a few graphite fuel assemblies are stored in cardboard fuel containers inside this facility and the ventilation system for maintaining cooling appears to be unreliable.[DOE(a)] Investigators found that in the event of a large seismic event, the IFSF roof would collapse and there would be control room equipment failure. [SNF Vulnerability] Also see Guide Section I (H).

A WINCO Standing Root Cause Committee Report dated 6/14/93 analyzed the history of safety problems at the ICPP-603 storage facility. This report cites a long history dating back to 1969 and volumes of documents outlining the severity of the corrosion and fuel disintegration problems. Corrective measures were never taken. The report notes:

> "The reason given by the supervisors was lack of time, people, and money. They indicated they knew of the problems and would like to have fixed them, but it was a continual battle with management over resources. They could not get the contractor priorities on fuel storage."
>
> "Operating contractor management was asked to provide DOE a plan and schedule to get the fuel out of CP-603. Plans and schedules were transmitted but the operating contractor did not follow the plan for fuel removal." [SPG-31-93 @ 14]
>
> "Even when the operating contractor was able to secure funding, the funds were spent on FDP start-up and other fuel reprocessing facilities, and fuel storage did not receive much priority." [Ibid.@15] "Some of the work performed at CPP-603 resulted in high radiation exposure and personnel contamination. This violated 'As Low As Reasonably Achievable' (ALAR) considerations and interviews indicated this may also have contributed to the reduction of the work in CPP-603. Between the 1970s and 1988 the worker exposure in CPP-603 had been decreased from an average of 90 mrem per month per individual to 10 mrem."
>
> "Management always thought that they could move the fuel out of the CPP-603 by processing or moving the fuel before a major problem would occur." "There was a perception among the ICPP management that keeping the Navy happy was their most important mission. The Navy was the main source of operating money, and they could always pull the funding and the mission of the ICPP if management did not continue to accept and process Navy fuel." [SPG-31-93 @ 16-17]

ICPP-749 Underground Storage Facility has 218 underground dry vaults, built between 1971 and 1987. One hundred twenty-eight of the 218 dry vaults contain fuel from Peach Bottom Core I and the Fermi Blanket stored in aluminum canisters. The carbon steel liners of the 61 first generation vaults have undergone significant corrosion due to seepage of moisture. Fifty-nine of these vaults contain fuel in aluminum canisters. Some of these canisters have been inspected and show moderate corrosion. Gas samples show some canisters may be breached but there is no current indication of failed fuel clad. Water that collects in these vaults may leek to ground. The dry well design offers limited confinement capabilities, since it must be opened during fuel handling and inspection. A significant hazard associated with the first generation wells is the potential for carbide-water reactions. If the fuel is damaged and water is allowed to contact it, the carbide-bearing fuels could react exothermal with water to produce acetylene and oxygen. Acetylene together with oxygen forms an explosive mixture.[DOE(a)] Other 1994 inspections found degraded Peach Bottom fuel and degrading aluminum fuel cans and baskets at ICPP-749. [SNF Vulnerability] Since INTEC is already in a flood-zone, the underground ICPP-749 SNF vaults are vulnerable to flooding the carbide-bearing fuels could react exothermal with water to produce acetylene and oxygen and the acetylene together with oxygen forms an explosive mixture.

The Summary table below showing spent fuel storage inventories are expressed in metric tons heavy metal (MTHM), which means only the weight of the plutonium, uranium, and thorium in the fuel is noted.

This MTHM nomenclature is new (post-1994) to DOE since previous fuel inventories were expressed in total mass (i.e. weight of fuel element fissile material, cladding and end caps). DOE's stated reason for this change in nomenclature is that it more accurately describes the hazardous constituents.

Notwithstanding the usefulness of the MTHM number, all parts (i.e., entire assembly) of the fuel represent a significant hazard, and therefore the total mass number should be predominately used because it more accurately describes the total hazard. Inventories of spent nuclear fuel can be expressed with at least six different nomenclatures. In addition to the previously discussed MTHM and total mass, there is volume, number of storage units, uranium mass, fissile mass. Of the total (1,373 cubic meters) spent nuclear fuel volume held by DOE in 1994, INL has 53.5%. Of the total (78 metric tons) spent nuclear fuel fissile mass held by DOE, INL has 49.9%.[Hoskins 7/11/94] Given that INL gets all of the Navy's SNF, the inventory is continually increasing.

Although INL fuels account for only ~12% of the MTHM in DOE's SNF inventory, they are expected to account for over half of the spent fuel canisters.

Under international treaty agreements, US reactor fuel supplied to foreign country reactors was returned to the US in an effort to avoid foreign reprocessing of the SNF into bomb grade material. Consequently, significant quantities of SNF ended up at INL in addition to the domestically generated SNF. So the above inventories are grossly outdated, and are significantly increased. Also, DOE implemented a complex plan to move all aluminum clad SNF to the Savannah River Site and all the Zirconium/stainless steel clad SNF to INL. This program was implemented to facilitate a major reprocessing program where the reprocessing could be specialized. In other words the chemical reprocessing of aluminum clad SNF is different from zirconium/stainless SNF that requires highly toxic acids.

> "**The INL stores 275 MTHM of spent nuclear fuel (SNF) consisting of 150 MTHM of commercial fuel including core debris from the Three-Mile Island Unit 2 (TMI-2); 56 MTHM of sodium-bonded fuels from EBR-II, FFTF, and Fermi reactors; and an additional ~69 MTHM from a variety of defense, government research, and commercial demonstration programs**. Although INL fuels account for only ~12% of the MTHM in DOE's SNF inventory, they are expected to account for over half of the spent fuel canisters.
>
> "Spent fuel at the Materials and Fuels Complex (MFC) is stored at the Radioactive Scrap and Waste Facility (RSWF). The RSWF, The RSWF operates under a HWMA/RCRA mixed waste storage permit. Other fuels at MFC are stored within a variety of hot cells. (See Section II. E for MDC details)
>
> "INTEC contains several SNF storage facilities, each with a monitoring and surveillance plan for ensuring the facility remains within its safety authorization basis. A summary of each of the spent fuel storage facilities at INTEC is provided below.
>
> on the left side of photo below.

"**CPP-1774** is an above-ground storage facility containing 30 concrete vaults storing ~82 MTHM of TMI-2 fuel and core debris. It is an NRC-licensed ISFSI and its current license is valid through 2019 seen in photo above on right side.

"CPP-2707 is a concrete pad storing six casks, with room available for another ~14. Two rail casks filled with SNF from the West Valley site, presently on a rail spur near CPP-603, may be relocated to CPP-2707 in the future." These pads can be seen on the left side of the above photo.

"**CPP-749 is a series of** underground storage vaults consisting of an array of 214 carbon steel pipes inserted into the ground with grouted bottoms. The first-generation vaults were constructed in the early 1970s. The first fuel was loaded in September 1971 and remains in storage. Accelerated corrosion of stored fuels has occurred as a result of moisture intrusion. The second-generation vaults were designed to prevent water intrusion and maintain an inert internal atmosphere. Some moisture has been observed even in these second-generation vaults. About 80 positions are available in the 2nd generation vaults." Seen on the right side of photo above. CPP-749 stores 884 fuel units consisting of 78.4237 metric tons heavy metal (MTHM). INTEC lies in a flood zone and as such these underground vaults are vulnerable to flood waters.

"CPP-603 Irradiated Fuel Storage Facility (IFSF) is a shielded cell containing 636 vertical tube storage positions. The storage vault was added on to a 1950s vintage fuel storage pool in the early 1970s to receive fuels from the Fort St. Vrain reactor. However, because much of the Fort St. Vrain fuel has remained in storage in Colorado, the IFSF has been used to store domestic and foreign research reactor fuels and to support consolidation of other INL fuels into dry storage. Approximately 90% of the 636 storage positions will be filled by the end of 2010. See photo below.

CPP-603 Idaho Fuel Storage Facility

"CPP-666 is a third generation wet basin with a stainless steel liner and leak detection system. It was placed in service in 1984 and contains 2911 fuel storage ports of 5 different sizes. CPP-666 also contains two deep unloading pools that provide the capability for cask unloading and transfer of commercial-length fuels.

"CPP-666 will reach the end of its 40-year design life in 2024. If properly maintained, it is reasonable to assume that life extensions would be achievable." [5] [6] "To date, the basin is nearly 95 percent empty. Experimental Breeder Reactor-II spent nuclear fuel is being transferred to two dry-storage locations at the Materials and Fuels Complex: the Radioactive Scrap and Waste Facility and the Fuel Conditioning Facility. Advanced Test Reactor spent nuclear fuel is being transferred to CPP-603 for dry storage. Fluor Idaho is tasked with treating sodium-contaminated debris in the Fluorinel Dissolution Process (FDD) cell of CPP-666 and inside a hot cell at Building CPP-659, the New Waste Calcining Facility (NWCF), to enable the debris to be shipped to the Waste Isolation Pilot

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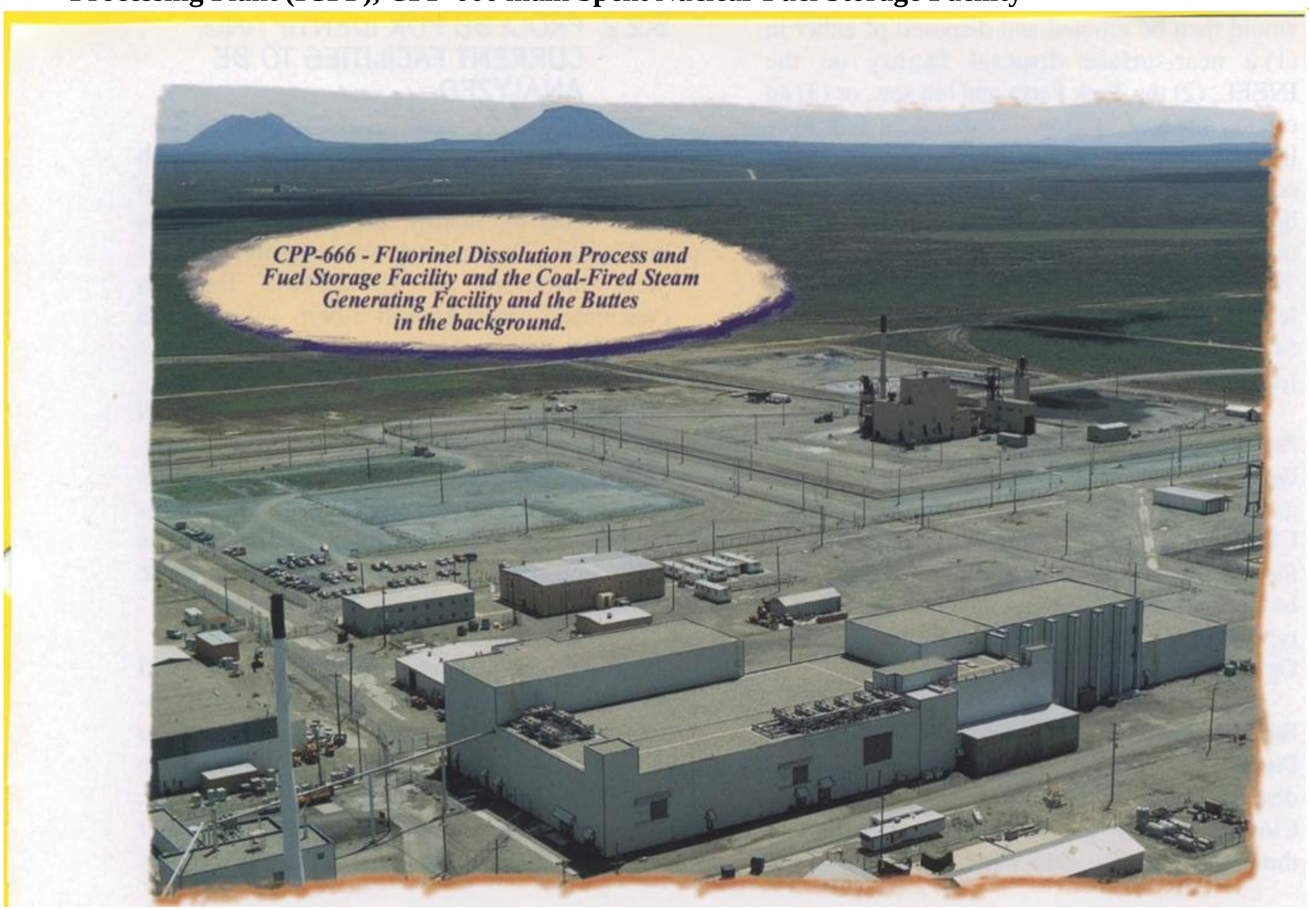
[5] Energy and Environment *Storage of DOE SNF at the Idaho National Laboratory DOE/EM*

[6] DOE-INL Energy and Environment, Fact Sheet, Storage of DOE SNF at the Idaho National Laboratory. The above INL SNF inventory numbers are understated when compared to independent assessments by the Blue Ribbon Commission 2012 Report. DFNSB states CPP-666 built in 1984 confirms the 2024 end-of-life.

Plant (WIPP)." [7]

CPP-666 Storage Basin

Idaho Nuclear Technology and Environmental Complex (INTEC) formerly Idaho Chemical Processing Plant (ICPP), CPP-666 main Spent Nuclear Fuel Storage Facility



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[7] DOE-EM Fluor 11/3/20

Defense Nuclear Safety Board Review of CPP-666

DNFSB Recommendations 2000-2 INEEL Priority Facility Phase I Safety Class, Ventilation and Fire Protection Systems Assessment Report. Below are excerpts of this report:

"No systemic, recurring or significant issues or trends were identified which would require corrective actions. However, the Ventilation System is degrading due to facility aging. This degradation could result operational down time, radiological contamination and personnel.

"The ventilation system is the first line of worker defense in the event of an accident and therefore should be classified as health critical.

"As of 2002 INL SNF is stored in 6 configurations:

- CPP-2707 –Cask Storage Pad
- CPP-749 –Underground Fuel Storage Facility
- CPP-603 –Irradiated Fuel Storage Facility
- CPP-666 –Fuel Storage Area (Basin)
- CPP-1774 –TMI-2 Independent Spent fuel Storage Installation (NRC licensed)."

Exhibit C.7 - INTEC EM-Owned Spent Nuclear Fuel Inventories

INTEC only and does not include MFC, PBF or NRF SNF

		Amounts		10/01/04 Location	
	Fuel Description	Fuel Units	MTHM	Onsite	Offsite/ Previous
1	ATR	1,816	1.5245	CPP-666	
2	ATR FY05 Receipts	120	0.1008	TRA-670	
3	Univ of Washington	26	0.0039	CPP-666	
4	HFBR	220	0.0585	CPP-666	
5	MURR	32	0.0219	CPP-666	
6	FERMI Driver	214	3.9321	CPP-666	
7	TRIGA (STD & FLIP)	280	0.0519	CPP-666	
8	BORAX V	36	0.0208	CPP-666	
9	Shippingport PWR	40	0.5217	CPP-666	
10	Pathfinder	417	0.0534	CPP-666	
11	SNAP	31	0.0291	CPP-666	
12	TORY-IIA	146	0.0486	CPP-666	
13	ANP	2	0.0011	CPP-666	
14	APPR & SPSS	2	0.0008	CPP-666	
15	BMI	3	0.0018	CPP-666	
16	GCRE	2	0.0010	CPP-666	
17	VBWR (Geneva)	4	0.0124	CPP-666	
18	GETR Filters	70	0.0044	CPP-666	
19	SM-1A	93	0.0658	CPP-666	
20	Pulstar - Buffalo	24	0.2522	CPP-666	
Subtotal	**CPP-666**	**3,578**	**6.7067**		
21	TORY-IIC	655	0.0591	CPP-603/ IFSF	
22	Peach Bottom (Unit I Core II & FECF)	786	1.2821	CPP-603/ IFSF	

23	Peach Bottom (Core II & PTE-1)	5	0.0105	CPP-603/ IFSF	
24	Ft. St. Vrain Reactor	744	8.6273	CPP-603/ IFSF	
25	Rover UBM FY-98	65	0.1198	CPP-603/ IFSF	
26	Ber-II TRIGA	21	0.0092	CPP-603/ IFSF	

Source:DE-AC07-05ID14516 Page 1 of 4

		Amounts		10/01/04 Location	
	Fuel Description	Fuel Units	MTHM	Onsite	Offsite/ Previous
27	TRIGA AL (CPP-603)	558	0.1025	CPP-603/ IFSF	
28	TRIGA FRR (stored)	951	0.1723	CPP-603/ IFSF	
29	TRIGA High Power	267	0.0056	CPP-603/ IFSF	
30	ARMF/CFRMF	71	0.0129	CPP-603/ IFSF	
31	Aluminum Plate	189	0.1235	CPP-603/ IFSF	
32	Core Filter	1	0.2185	CPP-603/ IFSF	
33	WAPD (Na/K Bonded) & SPEC (ORME)	25	0.0090	CPP-603/ IFSF	
34	MTR Canal Test Fuel	105	0.2613	CPP-603/ IFSF	
35	PBF Driver Core (2003)	2,425	0.5616	CPP-603/ IFSF	
36	Oak Ridge (2003)	62	0.2080	CPP-603/ IFSF	ORR
37	General Atomics (2003)	2	0.0052	CPP-603/ IFSF	DRR
38	FRR Japan (2003)	71	0.0138	CPP-603/ IFSF	FRR
39	FRR Indonesia (2004)	240	0.0459	CPP-603/ IFSF	FRR
40	Cornell Univ (2004)	122	0.0228	CPP-603/ IFSF	DRR
41	Univ of Illinois (2004)	210	0.0375	CPP-603/ IFSF	DRR
Subtotal	**CPP-603/IFSF**	**7,575**	**11.9084**		
42	Peach Bottom (Unit 1 Core 1)	814	1.6465	CPP-749	
43	LWBR Reflector	15	17.3314	CPP-749	
44	LWBR Blanket	12	16.7857	CPP-749	
45	LWBR Seed	12	5.1105	CPP-749	
46	LWBR 15681-C	1	0.7735	CPP-749	
47	LWBR Scrap	6	2.3489	CPP-749	
48	LWBR Scrap Module	1	0.2451	CPP-749	
49	Fermi Blanket	14	34.1715	CPP-749	
50	ORR Peach Bottom (2003)	9	0.0106	CPP-749	ORR
Subtotal	**CPP-749**	**884**	**78.4237**		

Exhibit C.7 – Continued INTEC EM-Owned Spent Nuclear Fuel Inventories

INTEC only and does not include ATRC, MFC, PBF or NRF SNF

		Amounts		10/01/04 Location	
	Fuel Description	Fuel Units	MTHM	Onsite	Offsite/ Previous
51	GNS V/21 Cask (VEPCO)	21	9.2722	CPP-2707	TAN-791
52	MC-10 Cask (BCD B-17- TURKEY POINT 3)	1	0.4118	CPP-2707	TAN-791
53	MC-10 Cask (TURKEY POINT)	5	2.2216	CPP-2707	TAN-791
54	MC-10 Cask (VEPCO)	12	5.3135	CPP-2707	TAN-791
55	VSC-17 Cask (DRCT)	17	15.0060	CPP-2707	TAN-791
56	TN-24P Cask (DRCT)	7	6.1450	CPP-2707	TAN-791
57	LOFT Center Fuel Module	4	0.8149	CPP-2707	TAN-791
58	LOFT Corner Fuel Module	4	0.2791	CPP-2707	TAN-791
59	LOFT Square Fuel Module	4	0.8130	CPP-2707	TAN-791
60	LOFT FP-2 (epoxied remains)	2	0.0999	CPP-2707	TAN-791
61	LOFT FP-1 (202 rods)	1	0.2017	CPP-2707	TAN-791
62	35 Encapsul. Tubes	3	0.0939	CPP-2707	TAN-791
63	Connecticut Yankee (S004)	1	0.3938	CPP-2707	TAN-791
64	H.B. Robinson (B05)	1	0.2292	CPP-2707	TAN-791
65	Loose Fuel Rod Storage Basket (LFRSB)	1	0.3111	CPP-2707	TAN-791
66	Peach Bottom (PH0006 & PH0462)	2	0.2853	CPP-2707	TAN-791
67	Dresden I (E00161)	1	0.1099	CPP-2707	TAN-791
68	Dresden I (UN0064)	1	0.0573	CPP-2707	TAN-791

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Exhibit C.7 – Continued INTEC EM-Owned Spent Nuclear Fuel Inventories

INTEC only and does not include ATRC, MFC, PBF or NRF SNF

		Amounts		10/01/04 Location	
	Fuel Description	Fuel Units	MTHM	Onsite	Offsite/ Previous
69	VEPCO Surry (9 rods)	1	0.0197	CPP-2707	TAN-791
70	TMI Core Debris (D-153 & D-388 epoxy)	2	0.0188	CPP-2707	TAN-791
Subtotal	**CPP-2707**	**91**	**42.0977**		
71	WV BRP-B	85	11.1880	INTEC RR Siding	WVDP
72	WV ROBERT E. GINNA	40	15.1270	INTEC RR Siding	WVDP
Subtotal	**INTEC Rail Siding**	**125**	**26.3150**		
73	TRA Various (Table C.7)	<13	0.0045	TRA Various	
Total EM-Owned SNF*		**12,266**	**165.4560**		

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* ***Does not include 15.3 metric tons heavy metal (MHTM) of EBR-II and Navy SNF in CPP-666, comprised of 7,857 fuel units. Does not include Post FY2005 ATR SNF receipts and does not include ATRC, MFC, PBF or NRF SNF.***

**** Inventories are pre-2005 which explains the difference between above totals and previous stable totals.***

Early INL Spent Nuclear Fuel DRY Storage Facilities

INTEC (ICPP)	CPP-603 (IFSF) 636 Slots 573 Fuel slots full	10.00 MTHM
	CPP-749 (underground 218 vaults)	78.40 MTHM
	CPP-1617 (MWSF) (RH-TRU)	?
Test Area North	TAN-SFCTSP (above ground cask dry pad)	38.40 MTHM
Materials and Fuels Complex	HFEF (hot cell)	11.90 MTHM
	RSWF (underground dry steel pipes)	11.30 MTHM
	ZPPR (dry cask storage in concrete)	9.50 MTHM
	TREAT (concrete pits)	0.01 MTHM
Naval Reactor Facility	400 SNF Assemblies	?

Total Dry Storage	159.51 MTHM
Total Wet and Dry Storage	275.55 MTHM

1994 figures in metric tons heavy metal (plutonium, uranium, and thorium) [Hoskins 7/11/94] DOE-INL Energy and Environment, Fact Sheet, Storage of DOE SNF at the Idaho National Laboratory

Earlier 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

Source for above table: 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).

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. [8] [9]

Section I.E. 2. INTEC High-Level Waste Tank Farm

The reprocessing of used reactor fuel, called spent nuclear fuel (SNF), at INTEC (formerly ICPP) involves dissolving the metal rods in highly acidic and solvent solutions from which select radioactive isotopes (highly-enriched uranium for military) are extracted. The remaining high-level/hazardous radioactive and toxic liquid waste (raffinate) was then stored in eleven 300,000 gallon underground tanks

8 EGG-WM-10903 @ 2-30.

9 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.

currently reduced to three using extensive evaporation operations explained in more detail below.

Definitions:
"reprocessing: dissolving used nuclear reactor fuel (spent nuclear fuel) in acid (typically nitric acid) and performing chemical separations and extractions to remove the valuable (reusable) materials such as plutonium and uranium.
recovered product: reusable materials such as plutonium (for nuclear weapons) and highly enriched uranium extracted from the dissolved SNF for Nuclear Navy fuel .
generation: In nuclear fuel reprocessing, several cycles (generations) may be required to extract all of the usable material from acid-dissolved fuel. The liquid waste from the first generations will have nearly all of the radioactivity in it.
liquid waste not related to reprocessing: radioactive liquids produced during activities like decontamination of equipment (wash water) and during laboratory analyses (lab drain water). At INEEL, some of these liquids were stored in the same tanks as high-level waste.
sluice or sluicing: moving a solid or sludge by flushing or rinsing out with liquid.
tank heels: the stuff that remains in storage tanks after as much of the liquid has been removed as can be using the available equipment and technology. This includes liquids, suspended solids and sludges that have settled out of the liquid. Tank heels are typically highly radioactive as the solids and sludges tend to concentrate the radioactive material.
derived solid waste: a solid waste (i.e. calcine) generated from the treatment of reprocessing liquid waste.
fission products: in this case, highly radioactive isotopes produced as a result of the splitting (fission) of uranium or plutonium in a nuclear reactor. Example: A uranium atom in nuclear fuel can absorb a neutron and split (fission) into two smaller atoms and produce fission products like cesium and strontium." [10]

"The tanks are encased in concrete vaults which have sumps and leak detection. Seven tanks have been cleaned to *[questionable]* RCRA standards and have been grouted in place for final closure. The remaining four tanks (three full and one spare) will be cleaned and grouted once the sodium-bearing waste has been removed. Some leaks from transfer lines outside the tanks have occurred, and this drives the current cleanup program. Crews have transferred material from tank WM-190 to WM-187 and washed and grouted inactive lines." [11] [emphasis added see discussion below]

"In 2003, a federal judge told the U.S. Department of Energy it can't make high-level nuclear waste into something else simply by giving it a new name. In response to the court ruling, then DOE Secretary Spencer Abraham asked Congress to change the law so it can do just that.

"The ruling applies to high-level waste at several DOE facilities: INL, Hanford in Washington, Savannah River in South Carolina, and West Valley in New York.

"At issue is the definition of high-level waste, the highly radioactive material left over from reprocessing (recycling) of spent nuclear fuel. **There are three types of high-level waste at INL: a granular form called calcine, liquid waste, and the residuals (heels) left in the tanks after most of the liquid waste is removed.**

"Removing high-level waste from tanks and treating it for disposal presents an enormous and expensive challenge. Unlike Hanford and Savannah River, most of INL's nearly **10 million gallons of liquid high-level waste** has already been converted [via incineration] into a solid form (calcine). But we still have to find a way to treat the calcine and the remaining one million gallons of liquid waste so they can be disposed appropriately. And we have to find a way to deal with residuals so

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[10] INEEL 8/03 Oversight *Monitor* newsletter published by the state INEEL Oversight program, which monitors activities at INEEL on behalf of the citizens of Idaho.www.Oversight.state.id.us.
[11] DOE/EM Flour 11/3/20

INEEL's Tank Farm area doesn't pose a threat to people or the environment.

"Tank residuals [sludge/heels] high-level waste is tougher to get this out of the tanks. Residuals can be a sludgy mix of chemical and radioactive elements. The tanks have pipes and other equipment in them that is hard to rinse off.

"DOE's legal and legislative actions at the national level have caused Idaho and other states concern about DOE's future plans for managing high-level waste. In response to a lawsuit brought by the Natural Resources Defense Council, EDI, numerous activist groups and Shoshone-Bannock Bannock Tribes challenging DOE's internal process for reclassifying high-level waste, DOE argued it could reclassify waste based on economic, technical or other undefined alternative requirements. DOE also argued that the federal law requiring disposal of high-level waste in a repository didn't apply to DOE waste.

"Troubled by these [NRDC] arguments, states affected by DOE high-level waste facilities; Idaho, South Carolina, Oregon and Washington joined the case as friends of the court **to protect their interests in safe, cost-effective, cleanup and responsible use of repository capacity**. Idaho representatives felt the court ruling supported the states' position, saying the federal court decision only confirmed long-standing national policy, which requires disposal of high-level waste in a geologic repository **while allowing properly treated, less radioactive wastes to be disposed elsewhere**." [12] [emphasis added]

Tragically, Judge Windmill's decision was problematic because it allowed DOE to effectuate an end-run around the law – with the states concurrence - by coming up with plant designs to "properly treat" the high-level (HLW) waste into two waste forms (one HLW and one LLW). That was back in 2003. Now >14 years later and DOE still has no functioning treatment plants at any of the three DOE sites.

Judge Windmill decision stated:

"NRDC seeks injunctive relief prohibiting DOE from taking any actions inconsistent with NWPA, including plans for grouting with concrete for permanent disposal any HLW in Washington, Idaho, and South Carolina. There is no indication, however, that DOE will ignore this decision and continue with any plan inconsistent with NWPA. Thus, the court finds no need at this time to issue injunctive relief. Should that need arise in the future, plaintiffs are free to re-open this case and pursue that relief." [13]

The states who claimed to be; "Troubled by these [NRDC] arguments - states affected by DOE high-level waste facilities - Idaho, South Carolina, Oregon and Washington," affectively blocked any possible reopening of the case to hold DOE accountable. The states' claims "to protect their interests in safe, cost-effective, cleanup and responsible use of repository capacity" were nothing but a smoke screen for the federal government to obfuscate the law. Moreover, the aging and leaking tanks daily put Idaho's sole-source aquifer at risk by failing.

DOE's Legacy One Million Gallon High-level Waste

Radioactive decay of the short-lived isotopes reduces the total activity levels over time. DOE's 1997 *Linking Legacies* credits INL's high-level liquid waste at 300 curies per cubic meter, or 2,430,000 curies in one 8,100 cm tank of waste.[DOE/EM-0319@38] Plutonium concentrations of wastes discharged to the tanks can reach 30 milli-curie of alpha activity/liter.[IDO-14532 @ 13] . Another DOE report found this HLW raffinate can range in concentration between several to12,000 Ci/gal to 5 million Ci/gal. depending on the batch. [IDO-14532 @18&24]

This waste is so radioactively toxic, if a person was exposed to even a small cup, it would be lethal. Previously, ICPP-601 spent fuel raffinate waste went to the tank farm for temporary storage before being sent to the ICPP New Waste Calcine Facility incinerator. Raffinate from the 1950's that contains sodium is still in the underground storage tanks because of incompatibility with the Calciner.

[12] INEEL 8/03 Oversight *Monitor* newsletter published by the state INEEL Oversight program, which monitors activities at INEEL on behalf of the citizens of Idaho.www.Oversight.state.id.us.

[13] U.S. District Court for the District of Idaho, CIV. No. 01-0413-S-BLW, 2003 July 3, NRDC, et al v. Spencer Abraham, DOE.

Also EDI forced DOE to shut-down both Calciner for emissions violations. [14] The current plan is to send tank waste to the Integrated Waste Treatment Unit (IWTU) if/when it starts operation. As previously discussed, DOE has been trying for >14 years to get IWTU operational. See Section E.2.b for more discussion on the IWTU.

The ICPP underground tank farm had eleven 300,000 gal. (1100 cm) tanks, eight of which have cooling lines; four 30,000 gallon (113 cm) tanks. Three additional 18,000 gal. (70 cm) tanks are located in the Waste Treatment Building (CPP-604). [ICPP RI/FS] Coolant is required because the highly radioactive waste also generates considerable thermal heat that must be cooled. The rate of decay heat in a tank is 373,000 btu per hour. [IDO-14502 @9] Other documents quantify decay heat generation at 100 watts/cubic meter. [DOE-EA-0831]

As of this writing DOE has emptied 7 of the original 11 (300,000 gal tanks) by concentrating the waste and leaving 3 (300,000 gal tanks) yet to remediate the 900,000 gal. using the Integrated Waste Treatment Unit (IWTU) as treatment process discussed more in Section E.2.b

The tanks are at risk of failure from age and other factors. "The [1100 cm] tanks are, however, slightly over stressed in compressive bending, according to criteria of the [American Society Mechanical Engineers] ASME Code, Section VIII, Division 2 regarding buckling." [RE-A-80-102 @ 7] This assessment did not allow for a full tank, or corrosion which has occurred in the tanks, some of which are 58 years old. [ENICO-1131@13] Also see Earthquake Section below.

Corrosion resulting from the highly toxic acids, solvents, and radiation has been documented as high as 1.0 mil. [ENICO-1131 @ 15] This represents a reduction of the original steel in addition to the more vulnerable welds at the seams. The welds were a large concern, after testing showed high corrosion rates at the welds.

Another tank analysis found; "Three welds were cut from welded coupons which were prepared at the fabrication site using the process that was used to fabricate the tanks. In the as-welded condition, these specimens suffered high corrosion rates at the end of the third cycle; and average corrosion rate of 0.0211 inches per month being observed."... "The corrosion resistance of these welds was revealed by Heuy(sic) test rates indicates extremely poor resistance. Further, these tests indicate that the actual tank welds are susceptible to intergranular attack."... "In order to prolong the life of the tanks, type 316 ELC stainless steel plates were welded over the inside surface of the original welds by the fabricator. The cover plate dimensions were 4 inch wide strips cut from 1/4 inch sheet." ... "Huey tests were conducted on five metal-arc process fillet deposits cut with a grinding disk from the cover plate edges." "... specimens Y-80 and Y-83 exceeded (0.0096 & 0.0087) the rate of 0.003 inches per month average of five 48 hour periods which is the specification allowance." [IDO 14364 @ 49]

The tanks "largest compressive stress is the longitudinal stress in element 1 and has a value of 2163 psi. The ASME Code, Section VIII, Division 2, however, allows a compressive stress of only 2117 psi (for 347 and 304L [steel]) because of potential for buckling. This suggests that the tank is slightly over stressed." [Additionally, the tanks will only sustain an earthquake] "with a ground acceleration slightly less than 0.24 g, providing that no corrosion is assumed." [RE-A-80-102 @ 6] Connecting systems to the tanks can only sustain a 0.18 g ground acceleration. [DOE/EA-0831] A 1977 INL Environmental Impact Statement used the May 18, 1940 El Centro, CA earthquake to evaluate the ICPP's waste tanks. "Even when subjected to the 1940 El Centro earthquake record scaled to a peak ground acceleration of 0.5 g, the waste tanks were stressed only to 21,300 psi." [ERDA-1536@II-77] The unscaled 1940 El Centro earthquake record would generate a peak ground acceleration of 0.33 g. "This latter acceleration, 0.33 corresponds to the acceleration expected at the ICPP from a hypothetical earthquake of Richter magnitude 7-3/4 on the Arco fault at a point 15 miles from ICPP." [Ibid.]

Comparing the previous engineered stress analysis of the tanks (without the corrosion factor) to sustain less than 0.24 g with even the unscaled hypothetical earthquake of 0.33 g reveals a striking 38%

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[14] May 5, 2000 EDI Notice of Intent to Sue --New Waste Calcining Facility (NWCF); (1) Petition for Declaratory Ruling; (2) Request for Imposition of Financial Sanctions Against DOE for Failure to Furnish a Closure Plan as Mandated by the Second Modification to the Consent Order and by the Resource Conservation and Recovery Act ("RCRA")

over stressed tank scenario. The 1983 Borah Peak quake's epicenter, only 40 miles northwest of Arco, registered 7.3 on the Richter scale. The 1959 and 1975 Yellowstone quakes registered 7.5 and 6.1 respectively on the Richter scale. The combined risk of old over stressed and corroded tanks with earthquake hazard is significant. Moreover, DOE has negotiated a sweetheart Consent Order with the State to replace the tanks in the next 20 years. The design life of the tanks is 20 years. They have already been in use for nearly 40 years. When DOE complies with the Consent Order, they will be 60 years old, assuming they have not ruptured in the meantime. Should such an accident occur, it would be a catastrophic disaster with extensive impacts on the entire northwest because the Snake River is a tributary of the Columbia River.

The State of Idaho commissioned a limited study by Boise State University seismologist James Zollweg who found that "if a large earthquake struck, the biggest worry would be those tanks". Zallweg's assessment was endorsed by U.S. Geological Survey's Larry Mann who said, "that would be a catastrophic release. It couldn't be intercepted before reaching the aquifer". Zollweg calculated that, "if an earthquake of 7 on the Richter scale hit the fault closest to the tanks, a ground acceleration of about 0.24 G could hit the vaults". [Statesmen (b)] A catastrophic risk exists with these sixty-year-old tanks which DOE refuses to address. The tanks are 400 feet above the Snake River Plain Aquifer that provides drinking water for over 275,000 Idahoans. Scientists also believe that if the tanks fail, then the acids in the tanks will react with the concrete in the vaults and release large amounts of radioactive gases into the atmosphere. See Section I for more information on volcanic hazards.

DOE contends that a spare tank is available in the event a problem arises; waste can be transferred to the spare tank. This contingency relies heavily on there being no more than one tank failure, that the service lines needed to pump out the failed tank remain intact, that the pump capacity is sufficient to remove the waste in minutes, and that operators can respond quickly in a multiple event accident scenario. DOE's 1993 assessment shows that the tank service lines could not survive greater than 0.18 g and the pumps to transfer the waste to another tank can only deliver 50 gallons/minute. [DOE/EA-0831] That means it would take 100 hours to transfer 300,000 gallons assuming the transfer lines survive. This does not qualify as a credible rapid emergency response to prevent tank contents from leaking into the ground.

Of particular concern is the long-term reliability of tanks WM-185, 187, and 188, whose corrosion rate is "definitely increasing". [ENICO-1131 @ 19] The 9,000 feet of underground piping used in transfer of radioactive waste does not meet RCRA standards for continuous secondary containment. Some lines are encased in concrete. "The concrete encasement is found in the immediate vicinity of valve boxes and around about 5% of the underground piping." [Ibid. @ 2] According to the General Accounting Office these underground pipes have leaked substantial quantities of high-level waste to the ground. [GAO/RCED/91-56] Also in March 1962, two tanks discharged to their vaults due to poorly designed service lines. Twelve INL tank or waste line leaks are documented through 1976. [ERDA-1536@II-79] DOE is currently replacing some of these service lines.

The tanks also do not meet Resource Conservation Recovery Act (RCRA) requirements for secondary containment of hazardous wastes. "A Notice of Noncompliance was issued on January 29, 1990 by the EPA because the secondary containment (concrete vaults) is subject to attack by the acidic solutions stored in the tanks", and "the pillar and panel construction style of the vaults has insufficient seismic resistance." [Spent Fuel Plan @ 8&11] Indeed, the 30,000 gal. tanks do not even have any vaults or secondary containment. In 1995, these un-vaulted tanks were emptied and taken out of service.

The vaulted tanks also support 10 feet of earth plus a 12,000 pound concrete structure for radiation shielding of the vent pipes. That puts the bottom of the tank over 32 feet in the ground generating considerable earth loads. In an earthquake scenario, a collapsing vault would compound the stresses on the weak tanks and add to the likelihood of a total tank failure. The integrity of the vaults and their ability to hold the tank contents if it ruptured are further challenged because five of the 11 (300,000 gal.) tanks get water "in-leakage" that must be periodically pumped out. [ERDA-1536@II-79]

The State Oversight Program disclosed that an average of more than 2,400 gallons per month was pumped from the concrete vaults enclosing the high-level waste tanks. This compares to a maximum of 100 gallons per year that normally would be expected to seep into the tank vaults. [Oversight 92 @ 17] Another uncertainty is how much of the 2,400 gallons pumped out of the vaults is tank leakage and how much is ground/surface water migration into the vaults.

"Major discrepancies were discovered between recorded volumes of water pumped from the aquifer for [ICPP] production use when compared with water used and disposed or lost from February 1990 to December 1990. Approximately 20 million gallons were unaccounted for in June 1990 alone."..."Since 1988, water level in a perched body of water approximately 370 feet below the tank farm rose nearly six feet. Measurements were taken in a well about 500 feet southwest of the tank farm." [Oversight 92]

ERDA documents show a long history of tritium plume migration under the ICPP. In 1960 the plume registered 1,000,000 pCi/L and was expected to migrate 12 miles south of the boundary. [ERDA@III-69] Significant spills and leaks have frequently occurred over INL's history. "Most spills have been the result of line and tank failures, leaking valves, and equipment and tank overfilling. [Spill and/or leak] volumes range up to 45,000 gal.." [DOE/EH/OEV-22-P,p.3-166] DOE sources cite that high-level tank wastes can range in concentration between 12,000 Ci/gal or 5 million Ci per batch [IDO-14532 @18&23] to 25,000 Ci/gal. [IDO-14414] One gallon is equal to 3.79 liters. Converting the previous concentrations to metric would be 3,166.22 Ci/L and 6,596.3 Ci/L respectively. Plutonium concentrations can reach 30 millicurie of alpha activity per liter. [Ibid @ 13] There is no doubt that these figures characterize an extremely radioactive witch's brew which when released to the environment via leaks represents a significant hazard. Also see Section IV(H) for more discussion of groundwater contamination under the ICPP.

INTEC/ICPP Tank Farm High-Level Sodium Bearing Liquid Waste

Tanks WM-180, 181,182, 183, 184, 185 and 186 were emptied using a series of evaporators (High-level Waste Evaporator) with the remaining concentrate flushed to the three remaining tanks that include; WM-187, 188, 189. DOE's High-level Waste EIS puts the total tank volume at 1,400,000 gal. [15] A later DOE EIS Supplement put the curie content of the 11 tank waste at 3,500,000 curies. [16] It is important to note that the waste curie content has been transferred to the remaining 3 tanks (WM-187, 188, 189). Tank WM-190 is kept empty as a spare.

"Additional samples of the heel in several tanks have been taken this year and will help resolve present uncertainties in the estimates of total tank solids. However, in light of the above indications that there could be more solids than originally estimated, the following estimates are proposed for the quantity of solids that will be present in the tanks at commencement of SBW treatment." [17] The volume of solids in the three remaining open tanks (WM-187, 188, 189) is between 120,000 kg and 200,000 kg. [18]

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[15] Idaho High-level Waste and Facilities Disposition Draft Environmental Impact Statement December 1999 DOE/EIS-0287D Pg. 4-99. [BEMR @26] By January 1998 the non-sodium liquid portion is to be calcined and the sodium bearing waste is to be reduced by 330,000 gallons (1250 cm) to comply with a court order. However, as of this writing the total volume is ~ 900,000 gallons.

[16] SUPPLEMENT ANALYSIS For The Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement June 2005 United States Department of Energy Idaho Operations DOE/EIS-0287 -SA-Ol; Figure 2. Sodium Bearing Waste--Total Curie Inventory Versus Time Comparison of Current-2005-Composition to FEIS, pg 9.

[17] Feed Composition for the Sodium-Bearing Waste Treatment Process, September 2003, INEEL/EXT-2000-01378, Pg. 54.

[18] Ibid.

Section I.E.2.a

INTEC High-Level Tank Farm Residual Stabilization andTank Grout Filling

"Residual radioactivity in small amounts of solids and contaminated flush water that could not be removed from the tanks by the cleaning process or technically practical means was stabilized in the tank with cement based grout….The residual inventories for each of the cleaned tanks are given in Table II."

Table II Residual Inventory in "Cleaned" Tank Farm Facility Tanks [19]

Tank	Residual Inventory Gigga /Becquerel (GBq)*	Volume in kilo grams [20]
WM-103-106	5,300	?
WM--180	39,000	542
WM—181	28,000	246
WM—182	89,000	1,238
WM—183	50,000	702
WM—184	40,000	558
WM--185	51,000	720
WM—186	24,000	334
Total	**281,300 G/Bq**	**4,340 kg**
*Cesium-137 / Ba-137m accounts	for ~95% of total activity	

1 Giga Becquerel (GBq) = 1 Billion Becquerel (Bq); 1 Curie = 37 billion Becquerel; 281,300 GBq = 7,603 Curies

INTEC Tank Farm soils: "Concentrations of strontium-90 (Sr-90), technetium-99 (Tc-99), iodine-129, and nitrate-N currently exceed State of Idaho groundwater quality standards (maximum contaminant levels [MCLs]) in the Snake River Plain Aquifer (SRPA). The baseline risk assessment concluded that Sr-90 concentrations in the SRPA would exceed MCLs beyond the year 2095 and that cesium-137 concentrations in the soil will exceed risk-based levels after 2095. It also concluded that the other aquifer contaminants will meet MCLs by 2095.

Remedial Investigation/Baseline Risk Assessment (RI/BRA) and Feasibility Study (FS) for tank farm soil and groundwater: "The BRA concluded that cesium-137 (Cs-137) concentrations in the soil will continue to exceed risk-based levels after 2095 for soil inside the tank farm boundary but will meet risk-based levels before 2095 for the two sites outside the boundary. The groundwater beneath INTEC currently exceeds State of Idaho groundwater quality standards at one or more monitoring wells for strontium-90 (Sr-90) and iodine-129 from the former injection well and for technetium-99 and nitrate measured as nitrogen from historical tank farm releases. Modeling results predicted that Sr-90 concentrations in the SRPA would continue to exceed the State of Idaho groundwater quality standard beyond the year 2095, but all other contaminants would meet the standards before 2095. Remedial action objectives and preliminary remediation goals are defined in the FS based on the BRA predictions."

"The performance assessment for the Tank Farm Facility predicted peak concentrations of Tc-99 in the SRPA of 9.3E-09 pCi/L **150 years after tank closure** from the sand pads, and 116 pCi/L from the tanks and 0.27 pCi/L from the piping **14,600 years after closure**. The maximum Tc-99 groundwater concentration predicted from the WCF was 82 pCi/L **790 years after closure**. The peak Tc-99 concentration in the OU 3-14 model is predicted to exceed MCLs briefly in 1999 and is predicted to be 10 pCi/L in **92 years**. Because the predicted peak concentrations from each non-CERCLA source are much less than the MCL of 900 pCi/L and **occur post-2095**, and the peak predicted concentration post-2095 from CERCLA sources (10 pCi/L) is also much less than the MCL, there would be no

[19] *Recent Progress in DOE Waste Tank Closure*, WM Symposium 2008 Paper 8396, 2/24-28, 2008, Phoenix, AZ, WSRC-STI-2007-00686, 1/31/08, Pg.8-9.

[20] Basis for Section 3116 Determination for the Idaho Nuclear Technology Center Tank Farm Facility, November 2006, DOE/NE-ID-11226, pg 33.

concerns for cumulative risk, even if the maximum predicted concentrations from the non-CERCLA INTEC sources occurred at the same place and time and were summed. [pg. 1-20] [21]

DOE sources cite that INTEC/ICPP high-level tank wastes can range in concentration between 12,000 Ci/gal or 5 million Ci per batch [IDO-14532 @18&23] to 25,000 Ci/gal. [IDO-14414] One gallon is equal to 3.79 liters. Converting the previous concentrations to metric would be 3,166.22 Ci/L and 6,596.3 Ci/L respectively. Plutonium concentrations can reach 30 millicurie of alpha activity per liter. [Ibid @ 13] If one were to apply the previous concentrations (3,166.22 & 6,596.3 Ci/L) to the 7,582 cubic meters (7,582,000 L) in the waste tanks, the curie content might be in the range of 2.4 x 10^{10} (24 billion) to 5.0 x 10^{10} (50 billion) curies at the time of internment in the tank. (DOE-RW-0333P)." [22]

The residuals from the incineration of the high-level liquid waste in the New Waste Calcine Facility (NWCF) are combined with a calcine material and stored in huge underground silos which must be mechanically cooled because of the heat generated by the radiation. Between 1992 and when the first Calciner (WCF) was built at the ICPP in 1962, more than 7.5 million gallons of high-level liquid waste have been incinerated in the Calciner. The 7.5 million gallons (28,000 cm) calcined plus 2.1 million gallons (8,100 cm) in the tanks makes a total of 9.6 million gallons (36,100 cm) of high-level liquid waste generated. The calcine volumes include 3 campaigns of the NWCF. 1993 calcine volumes in 5 silos are 123,000 cubic feet (3500 cm). Two additional silos are ready for additional calcine campaigns. [Spent Fuel Plan @ 49] As of 1995, the calcine volume is 3,700 cm.[BEMR© @26] Calcine entering the silos is over 200 degrees generated from the radioactive decay heat of the waste, and thus requires continuous cooling.

Due to process restrictions in the calcine process, only acid based high-level liquid (raffinate) waste from reactor fuel reprocessing is incinerated. Earlier high-level liquid sodium-bearing raffinate waste and system decontamination solutions are chemically not readily compatible for the Calciner without dilution. The sodium raffinate must be either blended with non-sodium raffinate or mixed with large quantities of aluminum nitrate "nanohydrate" before it can be calcined. In order to calcine the existing 1.8 million gallons of sodium-bearing high-level waste, the Department estimates it will have to dilute it with about 5.4 million gallons of aluminum nitrate. The Calcine plant can process about 3,000 gallons per day. [Times News(g) 7/27/92]

Therefore, this waste has remained in the holding tanks since the ICPP first started operations in 1952. DOE, in a particularly misguided attempt to write off high-level liquid waste volumes, now states that: "... sodium-bearing waste, which has been primarily generated from decontamination chemicals used to clean tank farm piping, is not legally considered to be HLW, so it will be considered separately." [EMSSAB @ 7][BEMR© @26]

Review of the ICPP early reactor fuel reprocessing, "... involved dissolution of [Materials Test Reactor] MTR assemblies in a sodium hydroxide-sodium nitrate solution, leaving a precipitate of sodium diuranate [sic] and fission products." [IDO-14445 @ 14][IDO-14300@5][IDO-14307@8][IDO-14362@5][IDO-14295@27][IDO-14567@4&15]

These Phillips Petroleum Co. (ICPP operating contractor) documents show without a doubt that ICPP sodium-bearing waste in the Tank Farm includes appropriately designated high-level waste from reprocessing reactor fuel and any recent attempt by DOE to delist this waste as "not high-level waste," is illegal. The nine year RaLa program (1954-1963) focused on the recovery of Barium-140 from reactor fuel, and required different chemical processes from highly enriched uranium reprocessing programs. Some RaLa runs involved four cycles. The first two cycles were for Barium-140 extraction and the third and fourth were for uranium extraction. Even more outrageous is the fact that State and EPA, as regulators, are willing to go along with DOE on this delisting initiative. See Section I.D for more on the RaLa runs.

"In order to cut costs in the early years of the Cold War, the US Government built carbon steel tanks for the wastes, which were first made alkaline by adding sodium hydroxide. This has had a number

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[21] Operable Unit 3-14 Tank Farm Soil and Groundwater Feasibility Study May 2006, DOE-ID-11247

[22] DOE-INL Energy and Environment, Fact Sheet, Storage of DOE SNF at the Idaho National Laboratory. The above INL SNF inventory numbers are understated when compared to independent assessments by the Blue Ribbon Commission 2012 Report. DFNSB states CPP-666 built in 1984 confirms the 2024 end-of-life.

of consequences. First of all, as soon as a solution is no longer acidic, many of the substances which were dissolved in the acid precipitate out (settle to the bottom) as sludge. Thus, instead of a well-mixed liquid, the waste becomes a combination of liquid and sludge, this can lead to uneven distribution of materials, resulting in hot spots (if radioactive materials build up in one area) and introducing the risk of criticality (if plutonium materials build up in one area). It also makes it more difficult to determine the actual contents of the tanks, because samples are less representative of the whole than in the case of an evenly mixed liquid solution.

"Also, alkaline wastes are more difficult to solidify into glass than are acidic wastes. Acidic wastes tend to pose fewer problems since they can more easily be solidified for long-term management and the potential hazards introduced by making the waste alkaline are avoided. However, acidic wastes also can pose dangers. For example, since the stainless steel tanks necessary for storing acidic wastes are very expensive, there are strong economic incentives to minimize waste volumes. This means that the concentration of radioactivity tends to be much higher, and consequently the wastes also generated much more heat. Continuous cooling of the waste is crucial. The importance of the tank cooling system is illustrated by an accident at the French reprocessing plant at La Hague in 1980. La Hague experienced a plant-wide electrical failure in April 1980, when a fire and subsequent complications at the reprocessing plant knocked out both the regular and the emergency power supplies. Among the systems affected was of course the cooling system for the waste tanks, which contain radioactive wastes that are typically orders of magnitude more radioactive and therefore generate more heat than the average wastes stored in the US Tanks. A cooling failure of three to ten hours could result in these wastes boiling at which point they would begin releasing cesium-137 and ruthenium-106. The releases would contaminate the site and possibly the environment. The uncooled tanks could boil completely dry in a few days, possibly resulting in an explosion." [IEER(e);Plutonium: Deadly Gold of the Nuclear Age @ 96]

DOE acknowledges 13 pounds of plutonium and 1,000 pounds of uranium are in the INL tank farm wastes. [Times News(g) 7/27/92] US Senate Government Affairs Committee investigative team warned DOE that a nuclear waste tank at the INL could explode like the April 1993 Russian Tonsk-7 tank explosion that spewed radioactivity over a 47-square-mile area. [Times(b) 12/10/93] Hydrogen build-up in the tanks has been of particular concern with the high-level waste tanks at Hanford. The explosive nature of hydrogen coupled with the potential criticality of tank constituents poses a significant risk. This is in addition to the previously mentioned structural and seismic risks of INL tanks. Collectively, these present a formidable and unacceptable hazard.

The magnitude of the hazard warrants a comprehensive, independent, engineering, structural, and seismic analysis of the tanks that includes a full assessment of the current and projected corrosion factors. These studies must identify a priority sequence for decommissioning and decontamination (D&D) starting with the worst tanks. An integral part of this study also must fully characterize the waste constituent composition of each tank. A time table of not more than five years must be imposed on DOE to decommission and decontaminate these high-level waste tanks.

The Notice of Non-compliance issued by EPA on January 28, 1990 and the resulting Notice of Non-compliance Consent Order signed April 3, 1992 outlines a schedule that will result in the permanent cession of use of the ICPP five pillar and panel (segmented) high-level tanks before March 31, 2009 and the remaining six cast in place (monolithic) tank vaults before June 30, 2015. This time line for the ICPP high-level waste tanks WM-182 through 186 fails to prioritize this project based on the significant risk these old tanks pose. Seventeen years to D&D the first five tanks and twenty-three years for the other six 300,000 gal tanks makes a mockery of hazard prioritization and the Federal Facility Compliance Act. Admittedly, the State is partially at fault for accepting that time line. Had the State provided the appropriate documentation to the US District Court, the time line would have been appreciably shorter. Additionally, the enforceable time line and the project description in the INL EIS provide no action on the three 70 cm tanks WM-100, 101, and 102 that had high-level liquid wastes and no containment vaults.

These engineering studies by definition also must include the tank concrete vaults. DOE has been fully aware of the problem for decades and has chosen to maintain its spending priorities with nuclear materials production projects as opposed to spending on immediate environmental and safety hazards.

DOE's new INL Spent Fuels Plan will only increase the load on the tanks thereby increasing the risk of catastrophic contamination of Idaho's sole source aquifer underlying the site. DOE plans (in the next 20 years) to replace five of the 300,000 gallon high-level tanks with four new 500,000 gallon tanks, which will result in a net increase in storage capacity of 500,000 gallons. Presumably, the five tanks slated for replacement are the ones with segmented vaults which do not meet seismic or containment standards. This investment is the best indicator of DOE's intentions to expand production capacity at INL. Given that existing tank capacity, coupled with calcine campaigns, has been able to meet full scale ICPP production needs for four decades, it begs the question of why is additional capacity needed?

The unstated hidden agenda is to build new production capacity under the guise of waste management programs designed to process spent fuel for final disposal in a repository. Again, as former Governor Andrus has correctly stated, spent fuel requires no processing prior to internment in a nuclear waste repository. Approximately, 20,000 metric tons of commercial spent fuel from 112 reactors must be disposed. DOE has agreed to take possession of this spent fuel by 1998. By the year 2030, there will be four times more spent fuel to be disposed. This issue is more fully discussed in the Spent Fuel Plan Section II(A).

ICPP Waste Tank Leak Incidents [23]

Date	Site	Description	Activity Released
December 1958		service line leak	?
March 3, 1959		leak to vault	?
1974	CPP-15	Solvent tank leak	2000 L 3 R/hr. 43,400 pCi/g
January 1976	CPP-16	transfer line rupture tank 181	3,000 gal 9.66 R/hr.
1978	CPP-20	Tank truck loading station	100 gal.
February 1954	CPP-24	Tank 181 condensate line	1,470 Ci/gal. 280 mR/hr.
August 1960	CPP-25	transfer line rupture to CPP-604	10 gal. 9 cm soil contam./330 pCi/g
March 1962		2 tanks leaked into vaults	?
May 10, 1964	CPP-26	15 gal. service line leak	22,400 pCi/g Ce-144/10 acres contaminated
April 1974	CPP-27/33	tank vent failure	540 gal./1,000 to 3,000 Ci
October 1974	CPP-28	Transfer Line leak	230 gal./ 3,000 Ci/46 cm soil contam.
October 1974	CPP-33	service line leak	6,000 Ci
June 1975	CPP-30	valve box leak	12 cubic meters soil contaminated
September 1975	CPP-31	18,600 gal service line leak	8,990,000 pCi/g/30,000 Ci
January 16, 1976		12 gal leak in diversion valve	1,130 Ci
December 1976	CPP-32	service valve leak	8 cubic meters soil contaminated
July 1989		Condenser Transfer Pipe Leak	?
March 1992		2 tanks discharged to vaults	?
1975	CPP-58	service line leak	20,000 gal./63.1 pCi/g soil contaminated
1954	CPP-58W	PEW service line leak	1,000 gal./72*u*Ci Cs-137
September 1976	CPP-79	20,000 gal service line leak	.06 Ci

Other DOE documents cite that, "Most spills have been the result of line and tank failures, leaking valves, and equipment and tank overfilling. [Spill and/or leak] volumes range up to 45,000 gal.." [DOE/EH/OEV-22-P @3-116] N.S. Nokkentved reports a 30,000 gal. leak plus a 20 year leak starting in 1955 and discovered in 1975 which contaminated 1,800 yards of soil. [Times News, 8/29/89] The ICPP Remedial Investigation Feasibility Study lists 13 release sites related to the tank farm out of 100 total chemical and radiological release sites at the ICPP. This study estimates that 23,041 curies (decayed to 1992 values) were released to

[23] Operable Unit 3-14 INTEC Tank Farm Soil and Groundwater Risk Assessment, DOE/NE-ID-11227,

the soil at the ICPP, and 22,200 curies (decayed to 1992 values) were dumped down the ICPP injection well. [INL-95/0056 @ 2-139; 2-13] See ICPP cleanup section IV part H for more details.

"And as Carroll Wilson, the first general manager of the Atomic Energy Commission, acknowledged in 1979: Chemists and chemical engineers were not interested in dealing with waste. It was not glamorous; there were no careers; its was messy; nobody got brownie points for caring about nuclear waste. The Atomic Energy Commission neglected the problem .... The central point is that there was no real interest or profit in dealing with the back end of the fuel cycle." [IEER(e) @ 111] Also see Section IV(I)(1) ICPP Tank Remediation.

Section I.E.2.b INL's IWTU High-Level Radioactive Liquid Waste Treatment Plant Having Major Startup Problems

The Integrated Waste Treatment Unit (IWTU) is designed to convert ~900,000 gallons of previously classified high-level liquid waste generated over decades of nuclear fuel reprocessing to a solid form suitable for final disposal in a geologic repository. DOE's Occurrence Reports document serious malfunctions of the IWTU.

"On Saturday, June 16, 2012, the Integrated Waste Treatment Unit (IWTU) was performing startup and testing activities when an unexpected pressure transient caused a loss of vacuum in the Carbon Reduction Reformer (CRR) vessel activating the Rapid Shutdown System (RSS). IWTU Operations were in the process of performing the system lineup to transfer Off-Gas Filter (OGF) material to the Product Receiver Filter/Product Receiver Cooler-1 (PRF/PRC-1) when the CRR began losing vacuum needed to maintain established operating parameters and to continue heat-up of the steam reforming process. Control room operators backed out of the product transfer lineup, exited the transfer procedure and continued to operate the plant under the IWTU startup procedure. IWTU Operations personnel, with engineering support, continued to monitor the system and make adjustments throughout the evening attempting to restore CRR heat up and to maintain vacuum. During the adjustments, the pressure in the CRR rose to approximately 14 inches of water column. The RSS trip point is 14.0 inches of water column. Downstream temperature and differential pressure problems became evident in the HEPA filters, 260 and 240 blower systems. A pressure increase in the Off-Gas Cooler (OGC) caused a rupture of the rupture disk on the OGC and an increase in the OGC outlet temperature which tripped Safety Instrumented Function (SIF)-2. The failure of the rupture disk and the tripping of SIF-2 are the initiating events for this ORPS occurrence. Timeline: 11:57 - A Hi CRR pressure alarm was received. Operators responded per procedure by raising the Off-Gas Blower speed. CRR pressure responded as expected and pressure returned to normal. 12:08 CRR pressure began to rise. Operators responded per procedure and pressure became erratic. 12:20 - CRR pressure began to rapidly rise passing through the Hi and Hi-Hi alarm set-points. 12:24 - A Hi-Hi-Hi CRR pressure alarm was received along with the corresponding Distributed Control System (DCS) - RSS activation. 13:05 - The shift supervisor commenced plant shutdown per procedure. During shutdown a dark plume was noted coming from the stack. 13:35 - The OGC rupture disc pressure alarm was received indicating Rupture Disc PSE-SRC-160-003, a design feature SSC, had ruptured. 13:59 - Following rising temperatures at the outlet of the OGC, SIF-2 High-Temperature Protection System (a Safety Significant System) activated.

"Immediate Action(s): All applicable Emergency Action Response procedure steps were verified completed and a plant shutdown/cool-down was initiated. Notifications were made to DOE-ID and CWI Corporate." [24]

"On March 13, 2012, a Hot Work Permit was authorized and a Fire Safety Watch was present for workers to weld and grind brackets in Room 109 South Corridor at IWTU. At 1430 hours MST, the Fire Safety Watch observed smoke coming out of the fume extractor unit, disconnected the unit and took it outside of the facility. After taking the smoking unit outside the Fire Safety Watch removed the spark trap cover and observed a small flame in the pre-filter which self-extinguished.

"The workers were performing hot work (welding and grinding) installing supports on an electrical

[24] DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0008

cable tray. The workers were in compliance with the hot work permit. Due to the restricted work area the intake funnel on the fume extractor hose was located below the hot work area, pointed up and positioned close to the welding location, but not directly under. The cable tray is approximately 10 feet above the ground with the fume extractor, ACE Industrial Products, Model No 73-200 M, located on a cart below. It appears that a hot spark was sucked into the funnel and down the hose into the spark trap portion of the fume extractor. The spark was drawn onto the surface of the pre-filter where it caused the pre-filter media to smolder generating the smoke observed by the fire watch." [25]

July 17, 2012: A potential inadequate safety analysis was declared as part of the investigation into the pressure event that occurred during start-up of the Integrated Waste Treatment Facility. It was determined that the potential for "blinding" filter systems in the facility with unburned charcoal had not been adequately analyzed in the current safety documents. The facility was shut down after the June 16 pressure event, and an investigative team was commissioned to determine the root causes of the event and how to correct them. (EM-ID—CWI-IWTU-2012-0009).

Waste Treatment Progress: Progress continues in the effort to resume start-up activities for the Integrated Waste Treatment Unit, after the "pressure event" halted start-up activities last summer. The IWTU is designed to treat the remaining 900,000 gallons of liquid waste stored at the Idaho Nuclear Technology and Engineering Center tank farm. With the completion of the IWTU main process piping flush, the project can now start reassembling the process gas filter, off gas filter and the carbon reduction reformer. Restart activities are anticipated to resume this summer. [26]

In 2013 an investigation was initiated into the adequacy of controls for relief valves and a rupture disk at the Integrated Waste Treatment Unit (IWTU). If the valves are not properly controlled, pressure could increase downstream of the rupture disks during process heat-up. This increase could cause a condition where the rupture disks would not rupture at the required pressure to protect the process off-gas system. IWTU operations have been shut down and will not resume until the necessary changes have been made to the facility or procedures. (EM-ID—CWI-IWTU-2012-0013). [27]

In 2012 operators at the Integrated Waste Treatment Unit were performing start-up testing when an unexpected pressure transient caused a loss of vacuum in the Carbon Reduction Reformer vessel, activating the Rapid Shutdown System. All applicable emergency action procedures were followed, and a plant shutdown was initiated. A team has been formed to evaluate the cause of the incident and recommend corrective actions. (EM-ID—CWI-IWTU-2012-0008). [28]

Also in 2012 a potential inadequate safety analysis was declared as part of the investigation into the pressure event that occurred during start-up of the Integrated Waste Treatment Facility. It was determined that the potential for "blinding" filter systems in the facility with unburned charcoal had not been adequately analyzed in the current safety documents. The facility was shut down after the June 16 pressure event, and an investigative team was commissioned to determine the root causes of the event and how to correct them. (EM-ID—CWI-IWTU-2012-0009). [29]

Waste Treatment: Startup testing was suspended on June 16, 2012, at the Integrated Waste Treatment Unit (IWTU), which is designed to treat about 900,000 gallons of liquid radioactive waste stored at the Idaho Nuclear Technology and Engineering Center. Testing was suspended and plant heat-up was terminated to allow detailed evaluation of the process temperature, pressure and flow excursion observed on June 16. Facility startup testing has been ongoing for the past month, evaluating system and component operation and response during operating conditions. Radioactive waste has not been introduced into the facility, pending successful completion of startup testing. [30]

The Integrated Waste Treatment Unit was built to treat about 900,000 gallons of liquid sodium

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[25] DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0004

[26] DOE-ID Operations Summary -13 4-1; For the Period Feb. 12 to Feb. 25, 2013

[27] DOE-ID Operations Summary 13.01; For the Period Dec. 11, 2012-Jan. 2, 2013

[28] DOE-ID Operations Summary; For the Period June 19 to July 12, 2012

[29] DOE-ID Operations Summary; For the Period July 13 to Aug. 2, 2012

[30] DOE-ID Operations Summary; For the Period June 5 to June 18, 2012

bearing radioactive waste sitting in three 50-year-old steel tanks on the desert site. Luke Ramseth reports in the Post Register:

> "Idaho environmental regulators have started fining the U.S. Department of Energy $3,600 per day after the agency failed to start a radioactive waste treatment facility before a Friday deadline.
>
> "DOE officials said in May they expected to miss the Sept. 30 deadline after facing continued technical problems at the Integrated Waste Treatment Unit. The first-of-its-kind facility, located 50 miles west of Idaho Falls, was built to treat 900,000 gallons of radioactive sodium-bearing waste, but it has been unable to get past the testing phase without breaking down. The project is at least $200 million over the original $571 million budget.
>
> "Last year, after DOE missed a 2014 state-mandated deadline to start the facility, the two parties negotiated a new set of deadlines. The new agreement required starting waste treatment by Sept. 30, and finishing the job by 2018.
>
> "Safety is our overarching concern and we will not begin radioactive waste treatment until we are convinced we can do it safely and efficiently," DOE spokeswoman Danielle Miller said in an email.
>
> "The liquid waste resides in three underground stainless steel tanks. Federal officials have said the tanks are not at risk of leaking, despite being more than 50 years old. But environmental regulators want the tanks emptied as soon as possible, as a leak could threaten the Snake River Plain Aquifer below.
>
> "Department of Environmental Quality Director John Tippets on Sept. 23 sent a letter to DOE, reminding the agency that fines of $1,200 per tank, per day, would start to accrue after the Sept. 30 deadline. After 180 days, the fines could increase up to $2,000 per tank — or $6,000 total per day.
>
> ""While DEQ recognizes the complexities associated with the design, construction, and operation of the IWTU, we have an obligation under law to ensure that enforceable agreements are met to resolve violations of (hazardous waste and environmental) statutes and rules," Tippets wrote.
>
> "In previous letters, DOE officials had requested that DEQ consider not assessing the fines, citing a provision that said DOE wouldn't be fined if an "upset or breakdown" required treatment to be stopped. But Tippets pointed out treatment of waste never started, and the current issues are "nearly identical" to the ones that caused the agency to miss the 2014 deadline.
>
> "Several problems have plagued the plant. One is the accumulation of a substance called "wall scale," which looks like tree bark, inside the facility's main processing vessel. Another problem is associated with replacing a faulty component called a "ring header." There also have been issues with an "auger/grinder" component.
>
> "Last year and earlier this year, officials tested the facility with a material that mimics real radioactive waste, called simulant. But it has more recently been in an outage mode as further testing occurs at a smaller-scale Colorado facility run by Hazen Research, Miller said.
>
> "New cleanup contractor Fluor Idaho, which took over for CWI on the project in June, has made several significant steps toward fixing the plant, Miller said. The company has experience working with similar "fluidized bed" technology, its president Fred Hughes told the Post Register in July. Three specialized teams are working to fix the facility, he said.
>
> "A Fluor spokeswoman did not return a call seeking comment." [31]

As of November 2019, INL reports: "In the two most recent demonstrations, IWTU filters became plugged with fine particulates. Testing at a Colorado facility called Hazen Research helped EM and Fluor Idaho select new filters to improve the efficiency of IWTU's process gas filters. Further testing will refine new operating parameters and installation requirements for the new filters.

"IWTU engineers are working with a company to test a robotic arm for decontaminating stainless steel canisters that would be filled with treated waste once IWTU begins operating.

"Testing continues on a new system to allow operators to decontaminate a cell, vessel, and piping without disassembling and cleaning them. A sump system would transfer the liquid decontamination solution from the cell for processing.

"Crews also are working with a mock-up of the IWTU's primary reaction vessel — called the Denitration Mineralization Reformer — to test the ability to enter the vessel and replace its internal parts once radioactive waste treatment begins. A mock-up has also been fabricated for the process gas filter and

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[31] lramseth@postregister.com

off-gas filter vessels to test removal and replacement of filter bundles and associated equipment in a radiological environment." [32]

U.S. Nuclear Waste Technical Review Board

"The NWTRB is an independent agency of the U.S. Federal Government. Its sole purpose is to provide independent scientific and technical oversight of the Department of Energy's program for managing and disposing of high-level radioactive waste and spent nuclear fuel." [33]

According to Dr. Darryl Siemer, former INL scientist, "the people on the NWTRB Board are supposed to serve as totally independent advisors/counselors to DOE on its "technical' issues - kinda like what the folks at the National Academy of Sciences & Defense Nuclear Facility Safety Board are also supposed to be doing for it (us?). Frankly, I think that DOE has made captives of all of its "advisors" because 1) it's both fun & lucrative (about $165K/yr for part time work) to be one of DOE's pet independent experts, and 2) they don't really have to do all much for it (their support staff does all the scut work). The main problem is that DOE usually dictates what its independent experts are supposed to "think" about & provides them with carefully rehearsed dog & pony shows/selected documents to "bring them up to speed" on each such issue. Most of these experts don't seem to question what they're being told & therefore usually end up not spotting/fixing the real problem(s)."

Additional Occurrence Reports on IWTU Problems

7/30/12; ITWU – Failure to Follow Confined Space Entry Process; [34]

5/2/12; ITWU Potential Inadequacy of Safety Analysis (PISA) – Inadequacy of Technical Safety Requirements TSR-level Controls for Fire Detection in Granular Activated Carbon Beds; [35]

4/25/12; ITWU Hazardous Energy Control Process Violation; [36]

2/27/12; IWTU – Safety Significant Pressure Safety Disk PSE- SRH-141-001A Discovered Ruptured; [37]

"July 17, 2012: A potential inadequate safety analysis was declared as part of the investigation into the pressure event that occurred during start-up of the Integrated Waste Treatment Facility. It was determined that the potential for "blinding" filter systems in the facility with unburned charcoal had not been adequately analyzed in the current safety documents. The facility was shut down after the June 16 pressure event, and an investigative team was commissioned to determine the root causes of the event and how to correct them." [38] (EM-ID—CWI-IWTU-2012-0009).

I.E.3. INL Plutonium Vulnerabilities

DOE's Office of Environmental, Safety, and Health convened a Plutonium Working Group to evaluate plutonium vulnerabilities associated with the Department's plutonium storage. This group's report noted that; "Most Argonne National Laboratory-West (ANL-W) [at INL] vulnerabilities stem from packages of scrap/residues shipped to this site from Argonne-East and Lawrence Livermore National Laboratory as a result of their consolidation activities. In decreasing order of priority, the most significant ANL-W vulnerabilities are:

> "ZPPR and Fuel Manufacturing Facility (FMF) vaults hold 193 packages of plutonium metal that are susceptible to oxidation, container failure and plutonium release."
>
> "The FMF vault has canisters of decontamination rags containing plutonium metal particles (fines) that might pose a fire hazard."

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[32] INL EM Idaho Site Improves Waste Treatment Facility After Successful Demonstration
[33] http://NWTRB.gov
[34] DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0011
[35] DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0007
[36] DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0006
[37] DOE Occurrence Report; EM-ID-CWI-IWTU-2012-0002
[38] EM-ID—CWI-IWTU-2012-0009

"Current safety analyses do not fully consider plutonium accidents in the ZPPR [reactor] and FMF faults." [DOE/EH-0415 p.45]

"These vulnerabilities are associated with plutonium metal, oxide, and scrap/residues packages stored in the FMF and ZPPR vaults. Consequences would mainly be limited to worker exposures. The majority of the ANL-W plutonium is in the form of ZPPR stainless steel clad fuel; no vulnerabilities were identified for this rugged fuel. The Mark III sodium test loops in the Transient Reactor Test Facility at ANL-W have not been inspected in over five years. However, the loops represent an insignificant potential for worker exposure." [DOE/EH-0415 p.45-46]

"ZPPR and FMF vaults contain plutonium metal in 193 food pack cans. Plutonium in 49 of these cans has oxidized and could rupture the cans. Oxidation has occurred due to packaging failures and in leakage of air. Packaging involved placing plutonium metal inside food pack cans, the cans inside plastic bags, and the bags inside larger food pack cans. This packaging configuration is similar to those that have failed or bulged at LANL and Hanford. Oxides and ash are also stored in this manner and pose hazards for workers involved in routine inspections or repackaging." [DOE/EH-0415 p.46]

"Oxide removed from the surface of plutonium metal during repackaging is collected on synthetic 'tack cloths'. These cloths are then placed into storage containers and held in the FMF vault pending disposal in Transuranic waste drums. The radio lyric decomposition of organic cloth in contact with plutonium metal particles (fines) and resultant hydrogen generation could lead to fires or explosions within drums. The plutonium metal particles could also ignite combustibles within the waste drums. The consequences could be worker injuries and exposures." [DOE/EH-0415 p.46] See Section IV Part J more discussion on ANL-W.

INL Facilities Storing Plutonium		**Quantity**
ANL-W/MFC		
ZPPR fuel	4,000.00 kilograms	
Metal Feed Stock	200.00 kilograms	
Other	29.02 kilograms	4,229.0200 kilograms
Naval Reactors Facility		0.2720 kilograms
Test Reactor Area/ ID Chemical Processing Plant		0.7836 kilograms
Plutonium in EBR-II fuel		?
Plutonium in Transuranic Waste		1,800.0000 kilograms
Total Pu at INL		6,030.0756 kilograms

[Hull][DOE/EH-0415 p.A-22][DOE-2/6/96@52

More recent reports by the Defense Nuclear Facilities Safety Board (3/10/05) "Recommendation 2005-1 Nuclear Packaging" confirms that DOE's ability to deal with these major plutonium storage vulnerabilities remain unresolved and continue to threaten site workers and the general public. [www.dnfsb.gov/pub_docs/dnfsb/rec_2005.html]

Materials and Fuels Complex formerly Argonne National Laboratory-West (ANL-W) has a solid high-level waste site called the Radioactive Scrap and Waste Facility (RSWF) that is seldom acknowledged. It has 12-foot-deep steel walled underground repositories (27 rows on 12 ft centers and 40 rows on 6 ft. centers for a total of 1200). According to DOE, the existence of severely corroded storage wells coupled with the lack of a monitoring program for soil contamination was identified as a vulnerability. RSWF had, as of 1981, 81 cubic meters containing 9,823,000 Ci of radioactive materials, including 40.73 grams of plutonium. [ID-10054-81@19]

Responding to pressure, Materials and Fuels Complex (formerly ANL-W) upgraded 1,016 of the

RSWF vaults in 1995 and plan on upgrading another 350 in the next three years.[RSWF] Even the new upgrades do not meet regulatory requirements for spent fuel storage because the contents cannot be inspected due to the welded cap on the top of the vault. However the regulators granted ANL-W a variance.

ANL-W radioactive airborne releases for the 1952-81 period were 44,580 Ci. [ID-10054-81@19] The 1977 radioactive content of ANL-W's annual waste generation sent to the RSWF or RWMC was 1,300,126 curies. [ERDA-1552 @V-23] DOE claims that ANL-W dumped 1.1 million curies at the RWMC between 1952 and 1983. [EG&G-WM-10903] ANL-W's Zero Power Physics Reactor fuel is releasing fission product because the uranium has oxidized and hydrided on approximately 25% of the plates, causing stainless steel cladding to bulge. In a few isolated cases, the cladding is breached. A total of 83,276 spent fuel elements/assemblies are stored at ANL-W. [DOE Spent Fuel Working Group Report, p.25]

I.E. 4. Highly Enriched Uranium Vulnerabilities

In December 1996, DOE released a Highly Enriched Uranium Vulnerability Assessment Report [DOE/EH-0525] that identified problem areas within the Complex were unsafe conditions exist. The report acknowledged 11 sites at the INL that pose significant safety hazards.

ICPP-604/SAT/01; "A few large volume vessels of unsafe geometry in the Mechanical Handling Cave and in cells 3 and 4 of the ROVER Facility contain large amounts of uranium. While dry, these vessels are critically safe. The addition of moderator [i.e. water] to a vessel, however, could create a critical system. Also, the addition of moderator into a process cell, combined with a spill of material from one of the vessels, could result in a criticality on the cell floor. Tight control of the amount of moderator present is essential for critically safety. The roof of the facility leaks. Water exists in the lower level of the fire sprinkler system but the system is isolated from the upper level."[DOE/EH-0525@3]

ICPP-604/SAT/02; "CPP-604, which houses the ROVER process system is not seismically qualified to current standards (built in 1961). The ROVER process cells have thick, reinforced concrete shielding walls that appear to be structurally sound. A severe earthquake could cause structural damage, compromising the process vessels and other confinement features, and resulting in a localized spread of contamination. The CPP-640 roof is not qualified to withstand extreme winds, and wind failure of the roof could cause damage to confinement features in the Mechanical Handling Cave, resulting in a localized spread of contamination and loss of strict moderator control."[DOE/EH-0525@3]

Another CPP-640 vulnerability is criticality, spread of radioactive contamination under fire. Fire is related to two vulnerabilities because water used to fight a fire would spread contamination and could contribute to a criticality by moderating and reflecting the fissile material in the ROVER cells. In 1997 DOE launched the Rover Deactivation Project to collect, package and transfer the HEU in CPP-640 to the Irradiated Fuel Storage Facility (CPP-603). Unfortunately, CPP-603 is not a compliant storage facility because of other safety deficiencies. The ROVER burn cell was grouted to stabilize the residual HEU that was not removed. Some 800 entries into the highly contaminated areas through the course of the project and one of which resulted in a contamination incident.

ICPP-651/SAT/03; "Fuel storage racks containing LANL material in Room 102 do not meet design requirements of KEFF <0.95 for cans fully flooded and containing the maximum U-235 allowable."
[DOE/EH-0525]

ICPP-651/SAT/04; "Seismic qualifications of the inner building (north and south vaults) and the south vault fuel storage racks have not been verified. A seismic event could cause a failure of the inner building, which supports all fuel storage racks. Damage to the fuel storage racks and rack supports and a consequent loss of geometry could result in criticality." [DOE/EH-0525]

INL/Site/SAT/05; "Numerous aging facilities throughout the INEL contain small amounts of inactive HEU that collectively enhance the probability of an HEU incident and a consequent increase in contamination within the next 5-10 years." [DOE/EH-0525]

RWMC/SAT/06; "Drums of U-233 are currently stored inside cargo shipping containers and located in a concrete shielded storage arrangement on the ILTSF Pan. Since the containers are in the open yard, corrosion and potential compromise of container spacing is possible, potentially resulting in a criticality."[DOE/EH-0525]

RWMC/TSA/SAT/07; "U-233 containers stored under earthen cover at the TSA Pad are subject to corrosion and loss of integrity due to age and storage conditions. This can potentially lead to a loss of drum spacing and a criticality."[DOE/EH-0525]

ICPP-640/WGAT/01; "Fire is possible on the operating floor area of the ROVER Fuel Processing Facility. The operating floor contains a significant combustible loading, the sprinkler system has been disabled in this area, and housekeeping is very poor. An operating floor fire could breach confinement barriers and release contamination to the environment. The emergency fire response procedure does not reflect the correct facility mission as it does not identify the potential for criticality and does not prohibit the use of water for manual fire suppression. Inadvertent criticality is possible."[DOE/EH-0525]

INEL/SITE/WGAT/02; "Inconsistent or incomplete implementation of the INEL Fire Protection Program increases as the potential for a fire involving HEU holdings and the severity of the consequences of such a fire. Typical of the problems in CPP facilities are deficient controls on the fire protection equipment, housekeeping, facility modifications, and the storage of combustible material."[DOE/EH-0525]

RWMC/WGAT/03; "Drums of U-233 are collected with thousands of drums of TRU waste in the RWMC. Over 200 drums (containing more than 40 kilograms of material) of U-233/232 waste from the Bettis Atomic Power Laboratory Light Water Breeder Reactor are in storage in the RWMC. This material did not originate from a typical waste stream, but is being stored and handled in the RWMC as waste in compliance with a DOE declaration. Owning to the high-level gamma field created by the U-232 contaminates, these materials pose severe radiological hazards uncommon for materials declared as waste."[DOE/EH-0525]

RWMC/WGAT/04; "In ASB-II, U-233 drums are collocated with TRU waste drums and stacked five high with no restraints. Many of the drums show signs of corrosion that could compromise their structural integrity. In the event of drum mishandling, a forklift accident, or a seismic event, drums containing TRU waste and U-233 could fall from the stack and rupture, thereby releasing and exposing workers to radiological and hazardous materials."[DOE/EH-0525]

There is a radical difference in the HEU inventories at INL noted in the Vulnerability Study (2,797 kilo grams) because the exact inventory was "classified." However, then DOE Secretary O'Leary's 1996 Openness Press Conference Fact Sheets acknowledges HEU at INL at 23,400 kilo grams (23.4 metric tons). [DOE-2/6/96]

In March 1996 the Idaho Department of Environmental Quality issued 135 individual counts of environmental violations and a fine of $892,725. The violations were based on September 1995 and January-February 1996 investigations. [Star 9/2/97]

See Section IV.C for more information on INTEC high-level Waste Tanks

Section I.E. 5. Advanced Test Reactor Complex (ATRC)

Advanced Test Reactor Complex (ATRC) formerly Test Reactor Area (TRA) has spent fuel largely stored at three locations. These are TRA-603 Materials Test Reactor, TRA-660 Advanced Reactivity Measurement Facility (ARMF), and the Coupled Fast Reactivity Measurement Facility (CFRMF), and the TRA-670 Advanced Test Reactor (ATR).

TRA-603 Materials Test Reactor (MTR) recently D&D [39] facility design (i.e.., canal cleanup, seismic design, ventilation, leak detection, monitoring, and chemistry control) neither supports nor was intended for long-term fuel storage. Although it is stainless-steel-lined, the canal does not have a leak detection system. There is no programmatic ownership for this facility. In addition, the facility is not adequately funded for upgrades, analysis, and/or documentation update. Minor corrosion of the canisters has occurred. [DOE(a)]

TRA-660 ARMF and the CFRMF reactors, along with the neutron radiography facility, share a single

[39] D&D refers to decontamination/decommissioning and remediation.

canal. The facility is not designed to support long-term storage. It lacks leak detection and water cleanup systems. Corrosion monitoring is also inadequate at ARMF. Presently, preventive maintenance and surveillance activities by the M&O contractor are being performed with limited overhead funds and staff. Because these facilities have no active programs or funding, the facility has no qualified operating personnel that can manipulate the fuel that is currently in the reactors. For similar reasons, no program office oversight was observed by DOE inspection teams. [DOE(a)]

The ATRC (Test Reactor Area) (TRA) is second to the Navy by INL facility areas in radioactive solid waste disposal relative to curie content. DOE summary data between 1952 and 1991 cite 5 million Ci. of solid waste disposed. [EGG-WM-10903 @6-25] TRA supports the Advanced Test Reactor, Advanced Reactor Critical Facility Reactors, Hot Cell Facility, Nuclear Physics Research Program, Advanced Reactivity Measurement Facility, and Coupled Fast Reactivity Measurement Facility Reactors. TRA also leads the list of INL facilities for radioactive liquid waste discharges (83%). Between 1952 and 1981 TRA released 50,840 Ci. to the soil. This figure does not include "short-lived radioactivity less than 2-3 day half-life. [DOE(a)@ 14] This remains a long term environmental hazard. **For more discussion on ATRC see Section IV.D.61.**

Section I.E.6. Test Area North (TAN)

TAN had two areas for spent fuel storage: TAN-607 Pool and the TAN-607 Cask Storage Pad. TAN-607 pool and supporting facilities were constructed in the 1950's. "TAN's North Hot Shop storage pool currently contains greater than 7.5 million curies of spent fuel and fuel debris consisting primarily of 342 canisters of core debris from the Three Mile Island reactor accident." [INL DEIS @ OP1-1] The pool is unlined and does not comply with leak detection and control requirements specified for new, stainless steel lined, concrete pools. Investigators found that there was not even a leak trending (tracking amount of additional water required to keep the pool full) of the Storage Pool Water Inventory. The positive pressure ventilation system at this facility was inappropriate for preventing airborne radioactive material release to the environment. Vulnerability was identified with respect to the seismic inadequacy of the pool. Failure of the pool during an earthquake would cause a criticality due to the loss of spacing between the fuels. Investigators also found that corrosion monitoring was inadequate at TAN spent fuel storage units. [SNF Vulnerabilities] This remains a long term environmental hazard.

By mass, 75% of all U.S. buried transuranic waste is at INL. [Deadly Defense, p.50] Additionally, the site stores 68% of the retrievable stored waste. [GAO/RCED-91-56] The waste comes from all over the country: Argonne, Betts, Battelle-Columbus, Mound and Rocky Flats. [Deadly Defense, p.50] Waste is also being shipped from commercial reactor facilities such as Peach Bottom Reactor, Fort St. Vrain in Colorado in addition to the Nuclear Navy's reactor spent fuel. INL has 368 separate CERCLA (Superfund) hazardous waste cleanup sites. [DOE/ID/10253(FY91)@ 30] Between 1952 and 1970, 16 billion gallons of radioactive waste water containing 70,000 curies of radioactivity were pumped into the Snake River Aquifer using injection wells. [Deadly Defense, p.51] *Nuclear Legacy* also offers independent summary of INL waste:

"The service wastes are discharged to the water table through [ICPP] a 600-foot deep waste [injection] well. These wastes are monitored for radioactivity; when levels become too high, operations are halted until the source of the trouble is located and corrected. There is a discharge limit of three times drinking water tolerance, plus limits of 0.22 beta, except for a limit of 7 curies of iodine-131 per million gallons. Limits are based on known or assumed geo-hydrological conditions and are set to insure dilution and/or decay to drinking water tolerance levels before effluent reaches either the site perimeter or the nearest downstream water well at Central Facilities Area." [IDO-14532,p.13] See Section I(F), Snake River Contamination. For more discussion on TAN see Section IV.D.61.

Section I.E.7 Radioactive Waste Management Complex (RWMC)

RWMC is where most of the [solid] wastes at INL were dumped at the RWMC in cardboard boxes [IDO-14532,p.25] and pose such a significant threat to workers during excavation that DOE considers it "impracticable" to clean up. "Burial of high level waste [at INL] continued until 1957 with no upper limit for the level of radiation. Items of up to 12,000 rems per hour were buried [at INL]." [Deadly Defense@50] Standard operating practice throughout INL's history was to cut off the metal ends of all spent nuclear reactor fuel that was shipped to the site or generated at the site. These highly radioactive fuel element parts were then sent to the RWMC for burial as "low-level" waste.

DOE's early public documents acknowledge that there are at least 800 pounds of plutonium dispersed throughout the buried waste at the Radioactive Waste Management Complex (RWMC). [DOE\ID-10253(FY91),@33] Other independent analysts cite "nearly 1000 pounds of plutonium, more than 200 tons of uranium, and 90,000 gallons of contaminated organic solvents were dumped into shallow trenches at the RWMC. [Facing Reality @ 6] N.S. Nokkentved cites 431,700 pounds (216 tons) of uranium including 250 pounds of U-235, and 808 pounds of plutonium including 757 pounds of Pu-235, and 33 pounds of americium. [Times News, 7/29/89] More recent DOE revelations acknowledge 3,208 pounds (1,455 kg) of plutonium were dumped at the RWMC or enough for over 70 Nagasaki-type bombs. [ER-BWP-82] The reason for these varying numbers is because plutonium inventories have been secret, and early numbers were based on DOE's misinformation. DOE's 1988 *Environmental Survey Preliminary Summary Report of the Defense Production Facilities* ranks INL first in its critical data category "A", and third in its ranking units of most concern from potential public hazard perspective, after Rocky Flats and Pantex. [DOE/EH-0072,p.ES-2] For more discussion on RWMC see Section IV.F.

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. [40] 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. [41] **For more information on RWMC see Section IV.F.**

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
Source EG&G-WM-10903 @ 6-26	

40 DEIS @ A-9

41 EGG-WM-10903 @ 6-26.

Section I. E. 8 Naval Reactors Facility

U.S Department of Energy - Idaho National Laboratory Photo

2 Naval Reactors Facility Background

This Section 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. [42]

Despite the fact that Naval Nuclear Propulsion Program operations include INL's Advanced Test Reactor [43], 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.

1. 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)." [44] The Naval Reactors Facility at INL part of the NNPP is operated under contract by Westinghouse Electric Co. Pittsburg, PA, for the Naval Reactors of the U.S. DOE. [45] INL is operated under contract by Battelle Energy Alliance. [46]

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 [47] 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.

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) [48] 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); d.) Expended Core Facility (ECF).

"The Submarine Thermal Reactor Prototype (S1W) was the first prototype of a submarine nuclear

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

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

[44] 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.

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

[46] 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).

[47] 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.

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

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 data. During this period, NRTS (now INL) where running reactors deliberately to meltdown to determine the operating parameters of that design reactor. [49]

"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." [50]

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. [51] The current director of the program is Admiral Donald. He's the fifth director of the program.

2. 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. [52] 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. [53] 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:

> "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

[49] 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.

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

[51] 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.

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

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

dangers associated with its activities." [54]

"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." [55]

"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." [56]

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.

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 former 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. [57]

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[54] 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.

[55] Ibid, Ryan; pg. 37

[56] Ibid, Ryan; pg. 39.

[57] 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

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.

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." [58]

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)." [59] [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] [60]

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] [61]

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

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58 Cecil D. Andrus, 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.

59 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.

60 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.

61 FY-2013 Congressional Budget, Naval Reactors, Pgs. 480-489.

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." [62]

"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." [63]

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." [64] [65]

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).

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

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

64 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."

65 Wikipedia, SS Thrasher

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." [66] 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:

" 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." [67] 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, [68] under Section VI of the

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[66] 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."

[67] Wikipedia, SS Thrasher.

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

2008 Addendum the Remedies includes the following:

> "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.
>
> "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." [69]

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 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." [70]

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.

Former 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 <u>non-policy</u>. 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

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69 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.

70 https://www.deq.idaho.gov/inl-oversight/oversight-agreements/2008-navy-addendum/

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.

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] [71]

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. [72] [73]

"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). " [74]

As discussed below, the Navy's dumping of radioactive waste currently at the INL Radioactive Waste Management Complex (RWMC), [75] will soon be dumped at the new Remote-Handled Low-Level Waste Disposal Project adjacent (south-east) of Advanced Test Reactor Complex (ATRC) that is also in the Big Lost River flood zone. DOE's own assessment of the "Surface Water Features, Wetlands, and Flood Hazard Areas at INL" and DOE's aerial photo shows the location of the new Remote-Handled Low-Level Waste Facility (RHWF) between ATRC and INTE shows flood hazard. Comparing these two maps puts the RHWF in the flood zone which must disqualify it.

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 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) [76]

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

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

72 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.

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

74 "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.

75 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

76 DOE/EIS-0453-D.

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."

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 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.

"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 repository for the United States and the rest of the world,' Ryan said." [77]

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] [78]

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

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

[78] 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.

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 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." [79]

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. [80] 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.

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[79] Nuclear Waste Board, pg. 91

[80] 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.

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. [81]

3. Naval Reactor Facility's Expended Core Facility (ECF)

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

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

ECF leaks "Alternative methods would be to discharge the water from leak testing the pools (up to 18,927,000 liters (5 million gallons)) to the sewage lagoons or to the [Industrial Waste Ditch] IWD during the last year of construction. This discharge would occur over a short period of time (about 6 days) but is not expected to exceed the infiltration capacity or the maximum flow distance (2.9 kilometers (1.8 miles)) previously recorded for the IWD. The permitted annual discharge rate for the IWD of 113,600,000 liters (30,000,000 gallons) would not be exceeded. Section 4.4.3 reflects this potential discharge of water for pool leak testing." [FEIS Pg. 1-21] [82] See Section I.E.1 below for more on NRF.

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." [83]

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. [84] 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

[81] 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.

[82] See EDI's Comments on NRF EIS ; http://environmental-defense-institute.org/publications/EDINNPPFEIS.pdf

[83] 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.

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

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." [85] 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.

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." [86]

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

According to Thereon Bradley, [88] 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

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85 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.

86 DOE/EIS-0453-D, pg. 1-4

87 DOE/EIS-0453-D pg. 1-6

88 Thereon Bradley has since died of a brain tumor.

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%." [89]

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. [90] 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 unlined holes or "soil vaults" at the RWMC Subsurface Disposal Area (SDA). DOE's shows (in color) where the Transuranic (TRU) and Soil Vaults are located and 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. 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 <u>High Level Waste</u>.**" [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)." [91]

It's tragically ironic that the Navy is finally being honest after decades of denial that any of the

[89] 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

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

[91] DEIS Pg. 1-13

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. [92]

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 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." [93] 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.

DOE data shows that individual NRF waste shipments to the RWMC containing greater than 81,000 curies are not uncommon. The reader must understand only two pages of RWMIS that includes

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[92] Chuck Broscious, Comments on the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling at the Idaho National Laboratory, DOE/EIS-0453D Draft DOE/EIS-0453D, Chuck Brocious, 8/17/15 http://environmental-defense-institute.org/publications/EDINNPPFEIS.pdf Report attachments http://environmental-defense-institute.org/publications/EDINNPPFEISATTCH.pdf

[93] 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

more than 12 (10 inch thick) ring binders of printouts are cited. 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 an 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 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." [94] Over 4,450 specimen shipments to and from the ECF have occurred to date. [95]

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 within 6 kilometers of the Mackay Dam" [96] 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. show; "Flood Area for the Probable Maximum Flood Indicated Over-topping Failure of Mackey Dam." [97]

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." [98] 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. [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

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94 Department of Energy Programmatic Spent Nuclear Fuel Management and INEL Environmental Restoration and Waste Management Draft Environmental Impact statement June 1994, DOE/EIS-0203D, Pg.B-12

95 DEIS @ A-9

96 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, Pg. B-17.

97 DOE/EIS-0453-D, pg. 3-38

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

support of scheduled Navel nuclear-powered vessel refueling and inactivation's." [99]

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. [100] 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 for band aid epoxy patches NNPP claims they will do to keep ECF in service for the next 3-4 decades.

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. [101] 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. [102] 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 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".

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99 DOE Budget FY-93

100 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.

101 ID-10054-81@15

102 RWMIS, P61SH090

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.

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.” [103]

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

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[103] Letter to Richard Poeton, EPA Region 10 from Chuck Broscious 9/26/96. This list – gleaned from FOIA RWMIS print outs - 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.

is a Notation that states; "Trench 55 still available on east end for high-level waste." [104] 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.

For more discussion on NRF see Section IV.K.

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,

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

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.

NRF 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 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 (IEER) 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)." [105]

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

[105] IEER @ 74&75

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'". [106]

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 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 1983 NRF S1G Reactor vessel	39,035 5,579
1984	372,614
1985	141,784

[106] IEER(c)

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, 1993	**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
Ba-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. [107] 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 cells. The end boxes may contain some fuel, but generally only activation products". 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. 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.

Shipments of "irradiated fuel" during the same period to the RWMC Transuranic Storage Area

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[107] 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.

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.

NRF 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 ..." [108] 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. [109]

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. [110]

Prior to construction of the diversion dam, NRF was in the Big Lost River 100 year flood plain. 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 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. [111] A long history of Basin leaks assures

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

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

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

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

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 1957, 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. [112] "[T]hree separate milling machines in the water pools are used to separate spent fuel components into smaller sections for examination in the shielded cells" [113]

NRF suggests that significant contaminates are released to the water in the pools. Contaminates would include cuttings from these milling machines which would be classified either as high-level if parts of the fuel cut or Greater-than Class C Waste. These contaminate generating 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,

[112] 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.

[113] 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.

6.6 x 10(-5) curies nickle-63, 1.2 x 10(-6) strontium-90, 1.2 x 10(-5) yttrium, 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 rarely indicated the presence of radioactive contamination.** The release occurred about 30 feet below ground level." [114] [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. [115] The Plan offers no data to substantiate the "risk management decision" to exclude the lagoons.

NRF intends to continue to use these unlined 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

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/l) - 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. [116] Appendix H of the RI/FS however credits the S1W Leach Pit with a maximum detected cesium-137 concentration of 149,759 pCi/g. [117] 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

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

[115] 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.

[116] NRF Plan@25

[117] Comprehensive NRF RI/FS pg.5-2

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.

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). [118]

1971 Samples NRF Leaching Bed Mud [119]

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. [120]

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

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118 NRF Plan@14

119 NRF Remedial Investigation/ Feasibility Study (RI/FS) @H6-14

120 NRF Remedial Investigation/ Feasibility Study (RI/FS) @I-59).

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 confirms the contaminates do migrate, contrary to the Navy's claims. The Plan's "remediation goals" that set risk-based soil concentrations for contaminates of [121] 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.

Then 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." [122]

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

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

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[121] NRF Remedial Investigation/ Feasibility Study RI/FS@ pg. H6-13

[122] Opening Statement, Senator Dirk Kemthorne, July 28, 1993, Subcommittee on Nuclear Deterrence, Arms Control and Defense Intelligence, pages 3 and 4. Kemthorne later became Idaho's Governor.

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." [123]

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 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

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[123] See 42 U.S.C. § 7385s-15(e).

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."

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.

NRF and INL 2003 -2020 Cleanup Costs

FY-Year	Including NRF/Regulatory Support $	Excluding NRF/ Regulatory Support $	Source
2003		484,709,000	FY-05 P.34
2004	567,310,000		FY-05 P.34
2005		534,600,000	FY-05 P.34
2006		538,083,000	FY-07 P.144
2007		519,604,000	FY-07 P.144
2008		522,838,000	FY-07 P.144
2009		489,239,000	FY-07 P.144
2010		469,168,000	FY-07 P.144
2011		412,000,000	FY-14 P.59
2012		389,800,000	FY-14 P.59
2013		355,766,000	FY-15 P.29
2014		393,593,000	FY-16 P.127
2015		404,929,000	FY-17 P. 121
2016		401,919,000	FY-17 P. 121
2017		370,088,000	FY-17 P. 121
2018	595,198,000		FY-20 P. 29
2019	638,805,000		FY-20 P. 29
2020	553,225,000		FY-20 P. 29
Totals	2,354,538,000	8,640,874,000	
Total 2003-2020		10,995,412,000	

Sources:
Department of Energy FY (for each year + PG.#) Congressional Budget Request Environmental Management, Volume 5. DOE's Budget reports are difficult to obtain monies for the Navy (NRF) INL cleanup.
DOE FY 2014 Congressional Budget Request Environmental Management, DOE/CF-0088, Volume 5
Department of Energy FY 2015 Congressional Budget Request, DOE/CF-0100, Volume 5
Department of Energy FY 2016 Congressional Budget Request DOE/CF-0111 Volume 5
Environmental Management Department of Energy FY 2017 Congressional Budget Request DOE/CF-0123, Volume 5
DOE FY 2020 Congressional Budget Page 28 of 129