Public Comment Submittal on the U.S. Department of Energy Draft Environmental Assessment for Expanding Capabilities at the National Security Test Range and the Radiological Response Training Range at Idaho National Laboratory (DOE/EA-2063)

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These comments address the draft environmental assessment by the U.S. Department of Energy to allow the DOE to release long-lived radionuclides to air and soil at the Idaho National Laboratory, DOE/EA-2063 at https://www.energy.gov/sites/prod/files/2019/09/f66/draft-ea-2063-expanding-capabilities-nstr-rrtr-inl-2019-09.pdf

Inadequate time (30 days) was provided for public comment and DOE withheld important reference documents. A complete review of the draft EA was not possible due to the EA's inadequate publicly available documentation.

1. Summary of Draft DOE/EA-2063 Inadequacies

The Department of Energy's draft Environmental Assessment is inadequate and deceptive. The Department of Energy must prepare a full Environmental Impact Statement. The communities near the proposed action have already suffered far more harm that the DOE has admitted.

Historical and current radiological monitoring programs omit INL releases, and are designed to hide, not reveal, the level and the source of radiological contamination.

The draft EA implies detailed evaluations but then admits that the DOE will release additional radionuclides and in any amount it chooses. The hoax of an EA will result in continued harm to nearby communities.

The draft EA implies detailed evaluations which it has not made public and then states that additional radionuclides can be released that are not listed in the EA, "based on ALARA."

The INL radiological emissions are currently inadequately monitored and rarely attribute INL's releases to the INL even when there is no other reasonable explanation.

The draft EA fails to address the existing contamination levels in communities and drinking water. The draft EA fails to acknowledge that current INL radiological airborne monitoring is woefully inadequate because (1) emissions from the INL are usually based on estimates and not the reality, (2) the current environmental monitoring programs are designed to be inadequate, (3) the reports are tardy by nearly a year and are increasingly tardy, and (4) the quarterly and annual environmental monitoring reports are not reliable and are prone to "lost samples" or "air monitor not functioning" excuses.

The draft EA fails to truthfully discuss the multitude of INL CERCLA cleanup sites that cannot be released in 2095, as it goes about creating more CERCLA sites at the INL.

Historical soil monitoring showed that radionuclides unearthed by flooding at the Radioactive Waste Management Complex blew miles away to the farming community of Howe, Idaho, many

miles north of the RWMC. The 1998 report, EML-599, study found that transuranic waste from RWMC has blown miles from RWMC. [1] [2]

Our air and water cannot remain suitable for human use if radiation levels increase by a factor of 170 that this EA discusses. This draft EA blows off the real issues of radionuclide buildup in our air, soil and water. The draft EA is deceptive, misleading, and is simply a tool for DOE pretending, again, to not be the source of cancer, illness, birth defects in our communities.

2. DOE's public outreach has been inadequate and deliberately misleading, the draft Environmental Assessment is not bounding or representative of the proposed expansion, and a full Environmental Impact Statement is needed

In all summaries and brief descriptive material by the DOE, the DOE deliberately omits the most important information about this proposed test range expansion. The DOE deliberately fails to mention in each brief narrative that they will be releasing short and long-lived radionuclides to the environment. The deliberate omissions show that the Department of Energy is more engaged in deception than transparency. No other part of Idaho nor another state would accept such unnecessary intentional release of long-lived radionuclides into our air, soil and water. [3]

Here is what the Department of Energy states for public consumption:

"The draft environmental assessment provides DOE's analysis of the proposed expansion which evaluates activities aimed at offering new and relevant capabilities to confront changing threats to military personnel, national and homeland security, and first responders. Capability enhancements include constructing a new explosives test pad and access road, ballistic tunnel, a downrange target area, and supporting infrastructure at the National Security Test Range (NSTR). Also included are expanded capability to support radiological training and technology test and evaluation at both the Radiological Response Training Range (RRTR) and NSTR and fencing the north and south training ranges of the RRTR."

Citizens were not told that the expansion of the Idaho National Laboratory's National Security Test Range and Radiological Response Training Range proposed test range expansion, for at least the next 15 years, will be releasing to the winds various long-lived radionuclides to further the contaminate the INL and to blow to nearby communities. The single Post Register article

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[1] T. M. Beasley et. al, Environmental Measurements Laboratory, *Heavy Element Radionuclides (Pu, Np, U) and Cs-137 in Soils Collected From the Idaho National Engineering and Environmental Laboratory and Other Sites in Idaho, Montana, and Wyoming*, EML-599, October 1998.

[2] See EML-599, page 37 and Figure 14 on page 46 describing the way SDA windblown radionuclides could be distinguished from global weapons testing fallout, Nevada Test Site fallout and stack releases from INTEC. See page 45 describing how elevated Americium-241 to 239+240 Plutonium ratios observed near the SDA differ from weapons testing.

[3] Military training ranges on the southwest side of the state are extensive, although not shown on many highway maps. The names keep changing, but include Salmon Creek Air Force Range (or Saylor Creek), the Idaho Army National Guard Orchard Training Range, and an extensive training range over the Owyhee desert. Various past National Environmental Policy Act (NEPA) reports have extracted commitments to not release radionuclides in these test ranges.

about it says only that the expanded capabilities would involve radioisotopes for testing and training, but did not say the radioisotopes would be released to blow to nearby communities. [4]

DOE has conducted the limited draft Environmental Assessment (EA) because it knows that if the public understood this proposed expansion of activities, it would be opposed.

3. **DOE's use of ALARA, which means "As Low as Reasonably Achievable" is nothing but a pretense to con the public, has no legal or specified meaning, and should not be used to imply some sort of commitment or reasonableness in the draft EA**

The draft EA implies meticulous radiation dose estimation, but is coupled with stating that **DOE may decide to release additional radionuclides that are not listed in the draft EA**. The draft EA states that the additional but as of yet unidentified radiological releases will be "based on ALARA." But for the DOE, ALARA, which means "As Low as Reasonably Achievable" can mean anything DOE wants it to mean.

The draft EA's underlying analyses have not been publicly available. [5] [6]

The draft EA actually says on page 26 (Table 8) that "Multiple dispersals in accordance with releases listed in Table 4; additional radionuclides evaluated using the environmental ALARA process." This means the DOE intends to release any radionuclide, i.e., plutonium-239, they want to release during the training and in any amount.

4. **Weak commitments in the draft EA reveal DOE's objectives – which appear to be "bait and switch" in regard to the amount and specific radionuclides released**

The DOE claims that predicted radiological doses from the expansion of the radiological training range will be low, lower than the releases expected from current and new operations. But the loose commitments made in the draft EA about how infrequent and weak the efforts will be made to ensure that what is released is within what the EA has assumed, signals to me that the DOE fully intends to release additional radionuclides in whatever amounts DOE chooses.

Table 1 lists the radionuclides that the draft EA lists, which are primarily beta particle emitters. This is not typical of radiological releases that the military or emergency responders would encounter. So, I have to think that DOE has deliberately left out of the draft EA the alpha emitters such as plutonium in order to make the whole thing seem more palatable.

[4] Nathan Brown, *Idaho Falls Post Register*, "Work could start soon on test range expansions," September 24, 2019.
[5] Sondrup, A.J. (2019a, May 30). Assessment of Potential Dose and Environmental Impacts from Proposed Testing at the INL Radiological Response Training Range, ECAR No. 3533.Idaho Falls: Idaho National Laboratory
[6] Sondrup, A. J. (2019b). Assessment of Potential Dose and Environmental Impacts from Proposed Testing at the INL National Security Test Range ECAR 3565.Idaho Falls: Idaho National Laboratory

Table 1. Proposed annual Radiological Test Range radionuclide releases listed in the draft EA.

Radionuclide (Symbol) and Half Life (years)	Main Decay mode, Energy (MeV)	Total Annual Release[b] (Ci)	Federal Drinking Water MCL, pCi/L	Inhalation Limit, pCi/L (NRC effluent concentration limit)
Beryllium-10 (Be-10) 1,510,000 years	Beta, 0.56 MeV	3.44E-19	7.43	0.02 pCi/L (Y class)
Carbon-14 (C-14) 5,730 years	Beta, 0.156 MeV	2.56E-08	2,000	3 pCi/L (compounds)
Chlorine-36 (Cl-36) 300,000 years	Beta, 0.027	8.23E-07	700	0.3 pCi/L (W class)
Potassium-40 (K-40) 1,250,000,000 years	Beta, 1.33 MeV	4.16E-05	2.12	0.6 pCi/L
Nickel-63 (Ni-63) 101 years	Beta, 0.017 MeV	2.47E-13	50	1 pCi/L
Zinc-65 (Zn-65) 0.668 years [Information for beta energy is http://hpschapters.org/northcarolina/NSDS/65ZnPDF.pdf]	Beta, 0.330 MeV (2 % abundance) Gamma, 1.116 MeV (51 % abundance) Annihilation photons, 0.511 MeV (3 % abundance)	1.46E-07	300	0.4 pCi/L
Selenium-79 (Se-79) 327,000 years	Beta, 0.056 MeV	1.92E-09	7.55	0.8 pCi/L
Rubidium-87 (Rb-87) 49,700,000,000 years	Beta, 757 MeV	6.34E-10	300	2 pCi/L
Palladium-107 (Pd-107) 6,500,000 years	Beta, 0.033 MeV	3.91E-20	202	0.6 pCi/L
Cadmium-109 (Cd-109) 1.26 years [Information for decay energy from https://ehs.princeton.edu/laboratory-research/radiation-safety/radioactive-materials/radioisotope-fact-sheets/cadmium-109 Very hard to detect.]	X-ray 0.022 MeV	4.41E-16	600	0.07 pCi/L
Silver-110m (Ag-110m) 0.684 years	Beta decay to Cd-110, which is stable but toxic.	2.02E-08	90	0.1 pCi/L

Radionuclide (Symbol) and Half Life (years)	Main Decay mode, Energy (MeV)	Total Annual Release[b] (Ci)	Federal Drinking Water MCL, pCi/L	Inhalation Limit, pCi/L (NRC effluent concentration limit)
Note: Silver-110m and Zinc-65 known to bioaccumulate in oysters. https://inis.iaea.org/search/search.aspx?orig_q=RN:19082488 Spiders and other fauna concentrating radioactive silver in higher than expected amounts https://www.ncbi.nlm.nih.gov/pubmed/25864469	Beta, 0.53 MeV (30 %), 0.083 MeV (57 %), Photons, various.			
Cesium-135 (Cs-135) 2,300,000 years	Beta, 0.067 MeV	3.25E-18	900	2 pCi/L
Cesium-137 (Cs-137) 30 years	Beta, 0.51 & 1.18 MeV	2.22E-18	200	0.2 pCi/L
Lanthanum-137 (La-137) 60,000 years	Electron capture, Energies not found.	1.38E-13	148	0.1 pCi/L
Lanthanum-138 (La-138) 102,000,000,000 years [Information from http://www.nucleide.org/DDEP_WG/Nuclides/La-138_com.pdf]	Electron capture and Beta, 0.205 and 0.370 MeV.	1.14E-09	14.7	0.005 pCi/L

Table notes: MeV is million electron volts. Ci is curie. Annual release is from draft Environmental Assessment DOE/EA-2063 and please note that 15 years of releases, at least, are expected. Federal drinking water maximum contaminant level (MCL) where available; otherwise from Environmental Protection Agency (EPA) Preliminary Remediation Goal (PRG) from DOE/EA-20163. pCi/L is picocurie/liter or 1.0E-12 curie/liter. Beta decay energies, when available, from https://cds.cern.ch/record/1309915/files/978-3-642-02586-0_BookBackMatter.pdf and NRC effluent concentration limits for air (selecting the most conservative limit when varied due to chemical form) at https://www.nrc.gov/reading-rm/doc-collections/cfr/part020/appb/index.html

5. **The public needs transparency concerning the ever increasing "normal background" radiation levels at and near the Idaho National Laboratory**

DOE expects to continue increasing the "normal background" radiation levels both on and off the Idaho National Laboratory site until our communities all receive unhealthy levels of radionuclide ingestion and inhalation.

The draft EA says that hazardous chemicals and radiological materials may disperse outside the detonation site. "Boundaries (e.g., ropes, signs, and barricades) are then installed to control access to these areas until the activity returns to normal (i.e., background) levels.

For long-lived radionuclides, returning to normal levels means blowing around until further dispersed or simply raising the "normal background level" to a new high.

"Normal background levels" are already elevated above what was naturally occurring and continue to rise. By selecting a contaminated area to determine "normal background," it appears to me that this is how some radiological facilities can claim to operate within "normal expected background" no matter what radiological release incident just occurred.

The DOE continues to not disclose what it considers "normal background levels" on and off the INL or to trend how the "normal background levels" have changed over time.

The INL's past practices of inflating "normal background levels" meant that employees worked in contaminated areas that when assessed independently during CERCLA cleanup investigations in 1995, these facilities had to be disposed of as radiological waste. Various INL areas had been highly contaminated for decades, and yet not monitored or controlled as such. See the Administrative Record for CERCLA cleanup at the Idaho National Laboratory at https://ar.icp.doe.gov .

6. **DOE's allowable radiation level of 100 mrem/yr would devastate public health**

The draft EA emphasizes the DOE's allowable radiation level of 100 mrem/yr and implies that reaching such high levels would not be a devastation to the health of people in our communities.

Department of Energy "regulatory radiological dose limits for member of the public" (see draft EA Table 34 on page 76) is 100 mrem/yr for onsite controlled areas and offsite or onsite outsider of controlled areas, no matter the age and gender of the member of the public.

By no means is the DOE's 100 mrem/yr dose limit protective of human health. DOE ignores the epidemiology that shows that a few years of an average 400 mrem/yr to adult radiation workers increases cancer risk. Exposure of pregnant women to DOE's allowed 100 mrem/yr dose would greatly harm fetal health. The DOE ignores all modern epidemiology studies for human health effects that show harm greater than DOE chose to believe decades ago, especially to the unborn, and to females and children.

The public as well as radiation workers need to keep in mind that, despite what they may have been taught:

- The cancer risk is not reduced when radiation doses are received in small increments, as the nuclear industry has long assumed. [7]
- Despite the repeated refrain that the harm from doses below 10 rem cannot be discerned, multiple and diverse studies from human epidemiology continue to find elevated cancer risks below 10 rem and from low-dose-rate exposure. [8]
- The adverse health effects of ionizing radiation are not limited to the increased risk of cancer and leukemia. Ionizing radiation is also a contributor to a wide range of chronic illnesses including heart disease and brain or neurological diseases.

The public and radiation workers take cues from their management that they should not be concerned about the tiny and easily shielded beta and alpha particles. DOE-funded fact sheets often spend more verbiage discussing natural sources of radiation than admitting the vast amounts of radioactive waste created by the DOE. The tone and the meta-message from the DOE, the nuclear industry, is that if you are educated about the risks, then you'll understand that the risks are low. Yet, these agencies continue to deny the continuing accumulation of compelling and diverse human epidemiological evidence that the harm of ingesting radionuclides is greater than they've been claiming.

The biological harm that ionizing radiation may cause to DNA is mentioned sometimes but it is emphasized that usually the DNA simply are repaired by the body. And the training to radiation workers will mention that fruit flies exposed to radiation passed genetic mutations to their offspring but workers are told that this phenomenon has never been seen in humans even though, sadly, the human evidence of genetic effects has continued to accumulate. Birth defects and children more susceptible to cancer are the result.

Gulf War veterans who inhaled depleted uranium have children with birth defects at much higher than normal rate. The same kinds of birth defects also became prevalent in the countries were citizens were exposed to DU. There are accounts to suggest that the actual number of birth defects resulting from the World War II atomic bombs dropped on Japan and by weapons testing over the Marshall Islands have been underreported. The Department of Energy early on made the decision not to track birth defects resulting from its workers or exposed populations. But people living near Hanford and near Oak Ridge know of increased birth defects in those communities.

In radworker training, there may be discussion of the fact that international radiation worker protection recommends only 2 rem per year, not 5 rem per year. There is no mention of recent

[7] Richardson, David B., et al., "Risk of cancer from occupational exposure to ionizing radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States (INWORKS), BMJ, v. 351 (October 15, 2015), at http://www.bmj.com/content/351/bmj.h5359 Richardson et al 2015 This cohort study included 308,297 workers in the nuclear industry.

[8] US EPA 2015 http://www.regulations.gov/#!documentDetail;D=NRC-2015-0057-0436 . For important low-dose radiation epidemiology see also John W. Gofman M.D., Ph.D. book and online summary of low dose human epidemiology in "Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis," Committee for Nuclear Responsibility, Inc., 1990, http://www.ratical.org/radiation/CNR/RIC/chp21.txt And see EDI's April 2016 newsletter for Ian Goddard's summary and listing of important human epidemiology concerning low dose radiation exposure.

human epidemiology showing the harm of radiation is higher than previously thought and at low doses, below 400 mrem annually to adult workers, increased cancer risk occurs.

There is no mention of the oxidative stress caused as ionizing radiation strips electrons off atoms or molecules in the body at energies far exceeding normal biological energy levels. And there is no discussion explaining the harm of inhaling or ingesting radioactive particles of fission products such as cesium-137, strontium-90, or iodine-131; of activation products such as cobalt-60; or transuranics such as plutonium and americium; or of the uranium itself.

The volatile or gaseous radionuclides, some of which can't be contained even with air filters — include technetium-99, tritium, carbon-14, iodine-129, argon-39, krypton-85, and radon-222 as the volatile radionuclides dominating the proposed Greater-Than-Class C radioactive waste disposal for the Andrews County, Texas facility. In Idaho, it appears that the DOE fails to adequately address these gaseous emissions from waste and other sources.

Often radionuclides with low curie levels dominate the harm to human health from radioactive waste disposal. So, when DOE states an overall curie level without stating which radionuclides and their specific curie levels, neither the radiotoxicity nor the longevity of the radioactive waste has been indicated.

Uranium and thorium and their decay products may be natural but in concentrated form in drinking water, soil or air, they are harmful. Radioactive waste disposal classification has often left out concentration limits for these radionuclides. Massive amounts of depleted uranium are considered Class A radioactive waste but won't be safe at the end of 100 years but will actually be more radioactive through decay progeny. The DOE has typically ignored its extensive releases of uranium and transuranic radionuclides to Idaho communities.

Plutonium-238, plutonium-239, and other transuranic radionuclides in radioactive waste in what appear to be low curie amounts also pose health harm. Is DOE planning to say that they stayed below some curie amount, while not disclosing the actual radionuclides released?

Cancer rates for uranium are typically based on natural forms for uranium and not chemically altered forms that may be more soluble in the human body. The internal radiation cancer harm is not based on solid epidemiological evidence and there are experts from Karl Z. Morgan to Chris Busby to Jack Valentine that understand that the accepted models may understate the cancer harm by a factor of 10, 100 or more. The nuclear industry continues to ignore the epidemiological evidence that implies tighter restrictions are needed.

Importantly, the chemical forms released at the proposed INL test range may be more harmful than predicted because of particle size, temperatures during processing or releases, or other factors which may affect retention in the human body.

So, when the draft EA states a curie limit without specifying the specific radionuclides **that will actually be released**, the radiotoxicity nor the longevity of the radiological release has been specified. Neither does the draft EA address the harm is radiological contamination already in place or of DNA damage from past airborne releases. Thus, the harm to people in these communities is continued and the deception continues, despite the appearance of disclosure in the draft EA.

7. DOE's radiation health model focuses only on cancer and leukemia, ignoring infant mortality, birth defects, and other illnesses and the draft EA underestimates the harm

In the U.S., the officialdom radiation protection models are wrong — and they underestimate the health harm of ionizing radiation. Differing vintages of International Commission on Radiological Protection (ICRP) methods are used by the Environmental Protection Agency, Nuclear Regulatory Commission, and Department of Energy to estimate the radiation doses to workers and the public. Internal radiation dose harm is underestimated more than external radiation dose harm. And the health harm from ionizing radiation is not limited to cancer incidence and mortality.

The foundation of U.S. radiation protection standards come from the ICRP. In ICRP 60, it is stated that "The primary aim of radiological protection is to provide an appropriate standard of protection of man without unduly limiting the beneficial practices giving rise to radiation exposure." **Their aim in not the protection of human health; their aim has been and continues to be the protection of the nuclear industry. This cannot be emphasized too strongly.** The ICRP is populated by nuclear industry and radiologists [9] which may explain why evidence that strongly indicates that people are not adequately protected by existing radiation standards is often ignored.

The EPA's Federal Guidance Series reports, FGR 11, 12, and 13 are based on ICRP 26/30, 38 and ICRP 60. [10] [11] OSHA regulations use ICRP Publication 2 and the EPA and NRC still have regulations that require the use of ICRP 2. Along with differing methods, there is tremendous latitude in the selection of assumptions that dramatically alter the estimated radiation dose received, particularly by a worker. The Department of Energy has adopted an ICRP 60 approach for calculating the doses to workers, yet the methods allow tremendous latitude in the selection of assumptions. The U.S. DOE and NRC have never adopted the ICRP radiation dose limit for workers, of 2 rem/yr, preferring the 5 rem/yr limit. This is despite epidemiology that shows an elevated cancer risk from an average 0.4 rem/yr (400 millirem/yr) to radiation workers. [12]

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[9] Thomas Dersee and Sebastian Pflugbeil, *A Foodwatch Report*, German Society for Radiation Protection in cooperation with the German Section of the International Physicians for the Prevention of Nuclear War (IPPNW), "Calculated Fatalities from Radiation: Officially Permissible Limits for Radioactively Contaminated Food in the European Union and Japan," September 2011. https://www.foodwatch.org/uploads/tx_abdownloads/files/fw_report_CalculatedFatalitiesfromRadiation11_2011.pdf p. 6.

[10] EPA powerpoint presentation by Michael Boyd, "The Role of Federal Guidance in Radiation Protection," November 20, 2017. See *llwforum.org*

[11] This link describes the EPA's radiation modeling https://www.epa.gov/radiation/tools-calculating-radiation-dose-and-risk

[12] Richardson, David B., et al., "Risk of cancer from occupational exposure to ionizing radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States (INWORKS), BMJ, v. 351 (October 15, 2015), at http://www.bmj.com/content/351/bmj.h5359 Richardson et al 2015 . This epidemiology study that included a cohort of over 300,000 nuclear industry workers has found clear evidence of solid cancer risk increases despite the average exposure to workers being about 2 rem and the median exposure was just 410 millirem. Also see December 2015 EDI newsletter.

Internal dose methods range from critical organ dose, as determined using ICRP Publication 2 published in 1959 to the most recent method for determining effective dose, based on ICRP Publication 103, published in 2008. [13] ICRP models are always evolving but not necessarily getting more accurate. Tissue weighting factors and the selection of tissues to include have gyrated up and down. The ICRP is always working on a revision that will come out in a few years. [14]

Once the radiation dose has been estimated, cancer risk is only focus for U.S. agencies and this is based on the 1990 ICRP Publication 60. Here, the risk coefficients, average the genders — which leave women less protected than men both leaves both genders inadequately protected. When cancer incidence or mortality dictate the radiation protection standard, the elevated illness and death statistics from the premature aging and the genetic and reproductive effects caused by ionizing radiation are not downplayed or ignored.

The exclusive focus on cancer incidence and mortality from ionizing radiation fails to protect adults and does not adequately protect the unborn or children.

"After the Chernobyl reactor catastrophe, not only were many people afflicted with cancer, but there was also a sharp increase in other somatic illnesses such as a weakening of the immune system, premature aging, cardiovascular disease even in younger patients, chronic diseases of the stomach, the thyroid gland and the pancreas (diabetes mellitus), as well as in neurological-psychiatric disorders and genetic or teratogenic disorders as a result of low-level doses of radiation." [15]

The ICRP models and hence U.S. regulations are based largely on the cancer and leukemia risk obtained from the Life Span Study of World War II Japan's bombing survivors. The problem is that this study has been manipulated by adjusting the estimated radiation dose of external gamma and neutron radiation to the survivors in order to reduce the estimated harm of ionizing radiation. [16] [17] [18] And the effects of internal radiation from inhalation and ingestion of radionuclides are

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[13] Michael A. Boyd, U.S. EPA, "The Confusing World of Radiation Dosimetry," WM2009 Conference, March 1-5, Phoenix, AZ. http://www.wmsym.org/archives/2009/pdfs/9444.pdf

[14] Sora Kim et al., *Journal of Radiation Protection and Research*, "The System of Radiation Dose Assessment and Dose Conversion Coefficients in the ICRP and FGR**,"** 2016; 41(4): 424-435. Published online: December 31, 2016. DOI: https://doi.org/10.14407/jrpr.2016.41.4.424

[15] Thomas Dersee and Sebastian Pflugbeil, *A Foodwatch Report*, German Society for Radiation Protection in cooperation with the German Section of the International Physicians for the Prevention of Nuclear War (IPPNW), "Calculated Fatalities from Radiation: Officially Permissible Limits for Radioactively Contaminated Food in the European Union and Japan," September 2011. https://www.foodwatch.org/uploads/tx_abdownloads/files/fw_report_CalculatedFatalitiesfromRadiation11_2011.pdf p. 9.

[16] John W. Gofman, M.D., Ph.D., Committee for Nuclear Responsibility, Inc., "Radiation-Induced Cancer from Low-Dose Exposure: An Independent Analysis," 1990.

[17] Other books by John W. Gofman, M.D., Ph.D.: *Radiation and Human Health*, Sierra Club Books, 1981; and *Preventing Breast Cancer: The Story of a Major, Proven, Preventable Cause of this Disease*, Committee for Nuclear Responsibility, Inc., 1996.

[18] Gayle Greene, "The Woman Who Knew Too Much – Alice Stewart and the Secrets of Radiation," The University of Michigan Press, 2003.

canceled out of the study. [19] Japan's bomb survivors in the city during the bombing and the control group — people outside the city during the bombing but who returned soon after the bombing — were both exposed to the radioactive fallout and internal radioactivity from inhalation and ingestion of radionuclides. So, the Life Span Studies reflect only the gamma and neutron external dose and not the effects of radioactive fallout on internal dose. The dose estimates from the ICRP for external radiation may underestimate the dose by a factor of 2 to 5 or more. But the dose estimates from the ICRP for internal radiation dose from inhalation or ingestion by underestimate the dose by a factor of 100 or more because the simplistic emphasis on the imparted energy from the radionuclide decay does not consider the highly concentrated damage to cellular tissue where the radionuclide is concentrated.

The estimates of radiation dose for the Life Span Studies were made years following the bombing and manipulated after cancer results were available. **An important aspect of the inadequacy of the current radiation model, ICRP 60, [20] is that it underestimates the human health harm, especially to the developing embryo or young child**. The BEIR VII report [21] which **acknowledges higher levels of vulnerability of women and children** to radioactivity, certainly higher than DOE assumes, has not evaluated the growing evidence concerning elevated childhood leukemia from Chernobyl fallout and from other nuclear facilities. [22]

The European Committee on Radiation Risk (ECRR) 2010 report [23] discusses how in 2009, the Scientific Secretary of ICRP, resigned. He stated that the ICRP risk model could not be employed to predict or explain the health effects of exposures to human populations, largely because the underestimation of internal exposures, by a factor of 100.

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[19] Chris Busby, *The Ecologist*, "The ICRP's radiation risk model is bogus science," October 2014. https://theecologist.org/2014/oct/22/icrps-radiation-risk-model-bogus-science

[20] International Commission on Radiological Protection, "Compendium of Dose Coefficients Based on ICRP Publication 60," ICRP Publication 119, Volume 41 Supplement 1 2012. http://www.icrp.org/docs/P%20119%20JAICRP%2041%28s%29%20Compendium%20of%20Dose%20Coefficients%20based%20on%20ICRP%20Publication%2060.pdf

[21] "Health Risks from Exposure to Low Levels of Ionizing Radiation BEIR VII – Phase 2, The National Academies Press, 2006, http://www.nap.edu/catalog.php?record_id=11340 The BEIR VII report reaffirmed the conclusion of the prior report that every exposure to radiation produces a corresponding increase in cancer risk. The BEIR VII report found increased sensitivity to radiation in children and women. Cancer risk incidence figures for solid tumors for women are about double those for men. And the same radiation in the first year of life for boys produces three to four times the cancer risk as exposure between the ages of 20 and 50. Female infants have almost double the risk as male infants.

[22] C. C. Busby and A. V. Yablokov, European Committee on Radiation Risk (ECRR), "Chernobyl: 20 Years On. Health Effects of the Chernobyl Accident," 2006. p. 3 http://www.ratical.org/radiation/Chernobyl/chernobylebook.pdf

[23] European Committee on Radiation Risk, Edited by Chris Busby with Rosalie Bertell, Inge Schmitz-Feuerhake, Molly Scott Cato and Alexey Yablokov, *2010 Recommendations of the ECRR – Health Effects of Exposure to Low Dose of Ionizing Radiation*, Green Audit Press, 2010. p. 5. http://euradcom.eu/ordering-3/ Free available download of report.

8. DOE's allowable limits for terrestrial animals and biota are far too high

The draft EA on page 60 states that 0.1 rad/day or 100 rad/day is deemed acceptable for animals:

"The DOE dose limits for protecting terrestrial biota (DOE, 2019a) are 1 rad/d(10 mGy/d)for terrestrial plants and 0.1 rad/d (1milligray [mGy]/d) for terrestrial animals. These dose limits represent expected safe levels of exposure; dose rates below these limits cause no measurable adverse effects to populations of plants and animals (DOE, 2019a)."

Note that by using rad instead of rem, it appears that the added harm of alpha emitters and neutrons is not included in estimating these radiological limits.

9. The draft EA statements concerning the 100 Year removal of CERCLA institutional controls is misleading and must be corrected

The draft EA claims that "most of the INL's CERCLA contamination areas can be released in 2095." [24] But the lion's share of the mess by curie and over 55 of INL's CERCLA contamination areas are "forever" contamination sites already where DOE had to argue that people cannot live there or drink the water, in to perpetuity, in order to claim the lack of cleanup was not harmful to human health. Various INL sites that DOE had previously claimed could be released in 100 years were later discovered to required long-term institutional controls far longer.

The INL cleanup sites that will remain contaminated DOE summarizes in a "Long Term Stewardship Database." This database lists cleanup sites known as "operable units" that require institutional controls to restrict human use. The estimated duration of time that the sites require institutional control is specified either as a specific year such as "2310" or simply as "indefinite." By this rather word, "indefinite," the DOE hopes the public won't understand that what this actually means is "into perpetuity" or forever.

Because these contaminated forever sites are a bummer, the DOE never seems to give a link to or full title of the actual institutional control database. However, I was able to find it on an Environmental Protection Agency website. [25] The database date for as of February 2016, yet the error reported last fall regarding the ATR Complex date for removing institutional controls remained uncorrected. Ah, 2310 or an added 24,000 years or an several 5 million or so years: "Who cares?" they say, "we won't be here."

For many years the public was told by DOE that needed institutional controls could be removed by the Year 2095 and at that time, uncontrolled public access would be allowed to the Idaho National Laboratory. But while this falsehood has been quietly walked back, except in this draft EA, and the INL's "long-term stewardship" list of areas requiring much longer institutional control has continued to grow. The list of INL areas needing thousands of years and more of so-called long-term stewardship may be hidden out of view and not mentioned, and not necessarily

[24] The draft EA states on page 68: "Year 2095 is the end of the 100-year institutional control period assumed for most INL Site CERCLA investigations (DOE-ID, 2009)."

[25] INL Waste Area Group Institutional Controls Report. Dated February 16, 2016. https://cleanup.icp.doe.gov/ics/ic_report.pdf from the EPA page: https://cleanup.icp.doe.gov/ics/

accurate or kept up to date, but the INL's long-term stewardship document lists over 55 INL sites requiring institutional control into perpetuity. The draft EA cites in this statement an that is misleadingly optimistic and such incomplete and misleading statements have no place in a document for a National Environmental Policy Act (NEPA) decision, as this draft EA is supposed to provide.

The Department of Energy issued a report in 2016 summarizing a review of the mandated cleanup of the Idaho National Laboratory's chemically and radiologically contaminated areas. [26] In some cases, the DOE earlier had claimed, before 2015, that these sites would be available for human contact in a hundred or so years. [27] The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) cleanup that began in the late 1980s continues today. The Five-year review admits that measures to lower chemical contamination in the aquifer at Test Area North (TAN) are not going well. Aside from that admission, the 2016 report fails to mention the numerous new added sites or the bungling of the date for ending institutional control of an area at the ATR Complex.

New information reported for the ATR Complex, formerly called the Test Reactor Area was reported in 2015. [28] In that new information notice, it was admitted that thousands of years need to be added to the previously date of 2310. While this contamination is under the surface by 10 ft or more, it can migrate to the aquifer. The measured soil contamination included elevated strontium-90, cesium-237, nickel-63, cobalt-60, and europium-152/154/155, all expected to decay to unrestricted use levels within 400 years. But the soil also contained high concentrations of plutonium-238, plutonium-239/240, and Americium-241. While the plutonium concentrations were double the unrestricted concentrations and needed a single half-life to decay to unrestricted levels, the Am-241 concentration of 3210 pCi/g would require about 4 half-lives to decay to the unrestricted concentration of 187 pCi/g, according to the New Site Information (NSI) report. Am-241 has a 432 year half-year, but because Am-241 decays to Neptunium-237 which has a seriously long half-life of 2.14 million years, but DOE added only an additional 24,000 years.

When the DOE contractor inadvertently discovered the release, they covered up contaminated soil with 1 ft of soil without any transparency or accountability to Idaho citizens what-so-ever. [29] CERCLA cleanup standards promised by the DOE are 11 ft depth, while DOE reneged to a 3 ft depth cleanup at the ATR Complex.

Long-lived radionuclides are present but usually not mentioned by the DOE not only at INL's INTEC facility where naval and research spent nuclear fuel was reprocessed, but also at the ATR

[26] Department of Energy Idaho Operations Office, *Five-Year Review of CERCLA Response Actions at the Idaho National Laboratory Site*, Fiscal Years 2010-2014, DOE/ID-11513, December 2015.

[27] Department of Energy Idaho Operations Office, *Five-Year Review of CERCLA Response Actions at the Idaho National Laboratory Site*, Fiscal Years 2010-2014, DOE/ID-11513, December 2015.

[28] Federal Facility Agreement and Consent Order New Site Identification (NSI), "TRA-04: TRA-712 Warm Waste Retention Basin System (TRA-712 and TRA-612), NSI-26002, signed by the Department of Energy in August of 2015. See Idaho National Laboratory Federal CERCLA Cleanup documents at www.ar.icp.doe.gov

[29] See EDI newsletters on ATR Evaporation Pond release in August and September 2017 at www.environmental-defense-institute.org

Complex where long-lived radionuclides including americium-241 have been present in the environment but absent from U.S. Geological Survey and DOE reports. [30] [31]

Because of the habitual omission of long-lived radionuclides, even the Department of Energy had not properly determined the number of years that institutional controls limiting access to contaminated areas would be required. **When the DOE found that the 2095 date was incorrect, then in 2010, 300 years was added to create the later 2310 date, which was also incorrect. Then NSI-26002 stated an additional 24,100 years needed to be used.** But the number of years that needed to be added was actually far larger because more than one half-life of americium-241 decay was needed and they forgot that americium-241 must decay through several radioactive decay progeny before reaching a stable non-radioactive isotope. [32]

10. Inadequate soil monitoring is built-in to the EA

Historical soil monitoring showed that radionuclides unearthed by flooding at the Radioactive Waste Management Complex blew miles away to the farming community of Howe, Idaho, many miles north of the RWMC. The 1998 report, EML-599, study found that radionuclides from transuranic waste from RWMC has blown miles from RWMC. [33] [34]

The draft EA cites a report, Rood et al, 1996 that is not in the list of references. I presume INEL-94-0250 is meant by the cited report on page 69 of the draft EA. I have not checked for other errors.

The EA addresses doses to people in 100 years but does not appear to address radiological doses from soil contamination and ingestion via crops, farm animals, and harvesting wild game during the next 15 years or the following decades. Nor are existing contamination levels in these communities addressed.

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[30] Federal Facility Agreement and Consent Order New Site Identification (NSI), "TRA-04: TRA-712 Warm Waste Retention Basin System (TRA-712 and TRA-612). NSI-26002, signed August 2015. See the CERCLA Administrative Record at ar.icp.doe.gov

[31] Federal Facility Agreement and Consent Order New Site Identification (NSI), "TRA Courtyard Area," NSI-26011, signed April 2014. See the CERCLA Administrative Record at ar.icp.doe.gov. Table 9 includes extensive americium-241 contamination in soil along with europium-152, cesium-137, and cobalt-60.

[32] Federal Facility Agreement and Consent Order New Site Identification (NSI), "TRA-04: TRA-712 Warm Waste Retention Basin System (TRA-712 and TRA-612). NSI-26002, signed August 2015. See the CERCLA Administrative Record at ar.icp.doe.gov See page 7 of Rev. 1. showing americium-241 contamination at 3210 pCi/g yet the unrestricted use concentration is 187 pCi/g.

[33] T. M. Beasley et. al, Environmental Measurements Laboratory, *Heavy Element Radionuclides (Pu, Np, U) and Cs-137 in Soils Collected From the Idaho National Engineering and Environmental Laboratory and Other Sites in Idaho, Montana, and Wyoming*, EML-599, October 1998.

[34] See EML-599, page 37 and Figure 14 on page 46 describing the way SDA windblown radionuclides could be distinguished from global weapons testing fallout, Nevada Test Site fallout and stack releases from INTEC. See page 45 describing how elevated Americium-241 to 239+240 Plutonium ratios observed near the SDA differ from weapons testing.

11. **Inadequate air monitoring is built in to the draft EA because of inadequate monitoring by DOE Contractors and by the Idaho Department of Environmental Quality means the various statements in the EA are unreliable and the public cannot be assured of the magnitude of the releases from the expanded test range activities**

As I study historical and current INL radiological emissions, I find that radiological emissions continue to be inadequately monitored. And reported monitoring rarely attributes INL's releases to the INL even when there is no other reasonable explanation. The environmental monitoring seems to be centered on monitoring in such a way that the results are ambiguous.

I find that current INL radiological airborne monitoring is already inadequate because (1) emissions reporting from various INL facilities are usually based on estimates and not measurements, (2) extensive time-averaging rather than instantaneous monitoring, and (3) increasingly tardy quarterly and annual environmental monitoring reports that are prone to "air monitor malfunctioning" or other excuses to avoid revealing the peak levels of contamination.

The U.S. Environmental Protection Agency has radiological air monitoring in Boise and in Idaho Falls. But strange gaps and lapses in monitoring occur in RadNet. When the explosion in 2018 at the US Ecology Grandview facility occurred, which is a state permitted hazardous waste burial facility that accepts radioactive waste, including Special Nuclear Material, RadNet went down that day and stayed down for weeks. [35] [36]

The Idaho DEQ addresses radionuclide emissions via Permit to Construct licenses which the Idaho DEQ does not make public and does not enforce, based on DEQ's failure to investigate the unplanned disposal of radionuclides at the Advanced Test Reactor Complex radioactive waste pond.

The Idaho Department of Environmental Quality Oversight Monitoring page has removed two decades of citizen-paid-for monitoring. [37] See https://www.deq.idaho.gov/inl-oversight/monitoring/reports/

The INL is required to provide radionuclide air emissions reporting in accordance with federal National Emission Standards for Hazardous Air Pollutants (NESHAPS) [38] means unmonitored guessimated and not-publicly-available rationale for radionuclide estimates are used to make

[35] Environmental Protection Agency RadNet (that went down in 2018 the day of the US Ecology Grandview, Idaho explosion and stayed down for two weeks after the accident so there are no radiological monitoring data in the Boise area during that time that are publicly available other than radon measurements) at https://www.epa.gov/radnet/near-real-time-and-laboratory-data-state and choose the state, https://www.epa.gov/radnet/radnet-air-data-boise-id or https://iaspub.epa.gov/enviro2/erams_query_v2.simple_query

[36] Environmental Defense Institute March 2019 newsletter article by Tami Thatcher "Serious Flaws in the Radiological Monitoring in the Boise Area and the US Ecology Idaho Disposal and Transfer Facilities," and "Two Explosions at Idaho DEQ RCRA-Permitted Facilities in Idaho in 2018 Suggest Idaho DEQ Doing a Bang-Up Job of RCRA Permitting at http://environmental-defense-institute.org/publications/News.19.March.pdf

[37] See May 2017 Environmental Defense Institute newsletter which discusses the Idaho Department of Environmental Quality Oversight Monitoring page where the monitoring for two decades prior to 2010 has been removed. See the Idaho Department of Environmental Quality website at https://www.deq.idaho.gov/inl-oversight/monitoring/reports/

[38] https://www.epa.gov/compliance/national-emission-standards-hazardous-air-pollutants-compliance-monitoring

estimated radiological dose estimates all while ignoring the buildup of long-lived radionuclides in the air, soil and water. The NESHAPS report locations frequently change and are difficult to locate. Most of NESHAPs reporting for the INL is not based on monitored emissions; it is based on estimated releases computed in documents that are not identified and are not available for public review. In fact, no one at DOE will discuss whether or not the years of "accidental" resin releases from the Advanced Test Reactor to the open air evaporation pond has been included in NESHAPs reporting. These resins are highly radioactive and a not a permitted release to the evaporation pond. The Idaho Department of Environmental Quality refused to investigate the release and the Idaho National Laboratory refuses to answer any questions about it.

The public needs to be aware of the inadequate environmental monitoring as well as deliberately manipulated data to minimize peak contamination levels that appears to me to be prevalent.

According to the air filter analysis conducted by a Department of Energy contractor for environmental monitoring on the IdahoESER.com website, "Alpha-emitting radionuclides ^{238}Pu, $^{239/240}$Pu, and ^{241}Am were detected in the Van Buren Gate filter composite at elevated levels compared to historical measurements by the ESER program." [39] "This was also one of the infrequent times americium and plutonium isotopes have been detected together in an ESER Program filter composite. Thorough examination of quality assurance and control data, including analytical results from blanks and performance evaluation samples, does not suggest inadvertent contamination of the filter in the field or laboratory. Although the measurements were elevated, they are well below public health standards (i.e., DCSs) and therefore do not represent a public health concern."

The 2018 Second Quarter report, further states: "A possible source of the radionuclides measured in the Van Buren Gate sample is the Radioactive Waste Management Complex (RWMC). Plutonium isotopes and ^{241}Am are often detected in low-volume air filters collected around the Subsurface Disposal Area, as well as in soil contaminated from past flooding (in 1962 and 1969) of pits and trenches containing transuranic waste originating from the Rocky Flats Plant. The Van Buren Gate is also situated in the predominant downwind direction from the RWMC. This and other possible sources will be investigated further."

Curiously, the four drums exploded at the RWMC in the second quarter of 2018. Also, the Mound Box Project with plutonium-238 and transuranic radionuclide contamination was moving the waste between facilities.

And more curiously, this year the quarterly reports are not timely issued by idahoeser.com.

The environmental reporting by DOE includes trending of airborne contamination that have large lapses in the reporting, of days and weeks.

[39]INL Environmental Surveillance, Education and Research Program, Managed by Veolia Nuclear Solutions – Federal Services, www.idahoeser.com, Second Quarter 2018 INL Quarterly Site Environmental Report, VNS-ID-ESER-SURV-058, http://www.idahoeser.com/Quarterlies/2018Q2/air.html

12. Buildup of radiological contamination in our public drinking water supplies not addressed in the EA because not all basic mechanisms for contamination are addressed

The draft Environmental Assessment blow off the issue of the buildup of long-lived radionuclides in Idaho communities from historical and ongoing releases. But long-lived radionuclides are building up and our public water drinking supplies are one indicator of increasing radionuclides, when the levels from historical nuclear weapons testing had been tapering off. Radiological contaminants can arrive in drinking water from groundwater and also from airborne contamination.

Airborne radiological contamination is breathed into water wells and water tanks, where it tends to dissolve and stay in the water, but the DOE and other radiological polluters ignore this.

The INL chose to not monitor radionuclides in its public drinking water and the Idaho Department of Environmental Quality consented to this change, the more lax non-community drinking water sampling requirements were applied to the INL's public drinking water. If Idaho's Department of Environmental Quality had kept requiring radiological monitoring of INL's non-community public drinking water wells, as it had originally, the water sampling for radionuclides would have had been less prone to manipulation because of independent lab analysis and reporting requirements. Sample results for public water systems would also be available on public data bases. Instead, the DOE claims that simply by stating that no DOE limits were violated, there is no need to report actual data results for the INL drinking water supplies.

On the southwest side (Boise) side of Idaho, levels of non-naturally occurring radioactivity are increasing and he Idaho Department of Environmental Quality is aware of it.

The source of increasing radioactive contamination on the Boise side of the state is not being investigated by the Idaho Department of Environmental Quality. The ongoing importation of radioactive waste from around the country to the US Ecology Idaho Grandview site appears to have a role in the increasing airborne radiological contamination. Some of this radioactive waste is from Formerly Utilized Sites Remedial Action Program (FUSRAP) sites around the United States contaminated from the early years of nuclear weapons production and the atomic energy program.

The last 20 plus years the gyrating levels of gross alpha and gross beta (when sampled) in Boise area drinking water, from Kuna to Boise, and Murphy to Marsing, are not from naturally occurring uranium and thorium in the soil. [40]

The intermittently elevated levels of gross alpha in the southwestern portion of the state have been identified in public drinking water sampling and some studies have been conducted. But from what I see, no analysis has seriously tried to answer what the source of the radioactivity is. I say this because no trending over time of radionuclides has been conducted. No identification of all radionuclides in soil and water has been published. No assessment of the potential sources of

[40] Environmental Defense Institute newsletter article for October 2018, "Idaho DEQ Reports Concerning the Elevated Radioactivity in Drinking Water in the Boise Area Don't Identify the Source of the Radioactivity."

the radioactivity have been identified. Basically, the Idaho DEQ actively fails to be curious about and seek the answers. Is it the airborne FUSRAP radionuclides? Is it from historical INL aquifer injection wells and percolation ponds that disposed of large amounts of "low-level" waste?

After contacting the Idaho Department of Environmental Quality to ask why the drinking water on the southwestern side of the state is so radioactive, the Idaho DEQ could not identify anyone at the agency who understood the issue. But the Idaho DEQ did say that there was a report on its website that looked at the issue. It was implied that the report solved the mystery.

The report "Isotopic and Geochemical Investigation into the Source of Elevated Uranium Concentrations in the Treasure Valley Aquifer, Idaho," in 2011 [41] does look at the issue — but does not identify the source of the elevated radioactivity. The report confirms the widespread occurrence of sometimes very high uranium concentrations, up to 100 micrograms/liter. The report does conclude that the source is not from agricultural fertilizer. The report suggests that the source is a near-surface source of contamination.

The mystery is not solved by the report and the report does not conclude that the source of the elevated uranium is natural. The report simply concluded that more work was needed — and there is no evidence that any work has continued since 2011.

There is another effort afoot to study the issue by Boise State University but so far it has not provided any answers. [42] It states that "The Treasure Valley Aquifer System (TVAS) in western Idaho contains documented uranium and arsenic concentrations, up to 110 microgram/liter and 120 micrograms/liter, respectively…" And "The contaminants historically show elevated concentrations with high spatial variability throughout the region."

See also our Environmental Defense Institute February newsletter article "What's Up With The Radionuclides in Drinking Water Around Boise, Idaho?" [43]

The DOE has failed to be truthful about past aquifer contamination migration to the south of the Idaho National Laboratory, as I describe in *Tritium at 800 pCi/L in the Snake River Plain Aquifer in the Magic Valley at Kimama: Why This Matters*. [44]

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[41] Brian Hanson, Dr. Shawn Benner, Dr. Mark Schmitz, Dr. Spencer Wood, Department of Geosciences, Boise State University., "Isotopic and Geochemical Investigation into the Source of Elevated Uranium Concentrations in the Treasure Valley Aquifer, Idaho," Submitted to the Idaho Department of Environmental Quality, April 2011. http://www.deq.idaho.gov/media/563327-uranium_treasure_valley_0411.pdf listed at http://www.deq.idaho.gov/regional-offices-issues/boise/water-quality-plans-reports/

[42] Gus Womeldorph and Shawn Benner, Boise State University, "A Study of Uranium and Arsenic in the Treasure Valley Aquifer System, Southwestern Idaho, Year 1, 2017-2018," 2018 at https://www.idwr.idaho.gov/files/publications/201807-GWQ-GW-Study-of-Uranium-in-TV-Aquifer-System.pdf

[43] Environmental Defense Institute February 2018 newsletter article by Tami Thatcher "What's Up With The Radionuclides in Drinking Water Around Boise, Idaho?"at http://environmental-defense-institute.org/publications/News.18.Feb.pdf

[44] Thatcher, T.A., Environmental Defense Special Report, *Tritium at 800 pCi/L in the Snake River Plain Aquifer in the Magic Valley at Kimama: Why This Matters*, 2017. www.environmental-defense-institute.org/publications/kimamareport.pdf

On the southeast (INL) side of Idaho, the DOE along with the Idaho Department of Environmental Quality are also pretending they don't know the source of radiological contamination — even when they do know. The public drinking water laws require periodically monitoring for gross alpha levels in drinking water. If the levels of gross alpha are high enough, often even, then the evaluation of uranium and radium levels are required. But often, in Idaho's public drinking water, the intermittently elevated levels of gross alpha are not explained by naturally occurring uranium and thorium. The regulations actually make it impossible to answer what radionuclides are in the water because methods to use gamma spec analysis have not been delineated for public drinking water use. Public water drinking municipals lose profits when laboratory sampling requirements are increased.

The DOE and the draft Environmental Assessment blow off the issue of the buildup of long-lived radionuclides from historical and ongoing releases, not just at the specific proposed sites but to surrounding communities, part by ignoring all of the mechanisms for drinking water contamination from radiological airborne releases. Ignoring the science is not the proper way to prepare a draft EA.

Failure to address the buildup of long-lived radionuclides shows the disregard for human health and the environment now and long into the future.

13. Incomplete and inaccurate list of other expected INL radiological releases (Table 35 of draft EA)

Presumably the facilities that are operating are contributing to the current radiological airborne releases — but because the releases are based on fictional estimates generated in documents the public is not allowed to see and not confirmed by environmental monitoring, that really isn't the case. Systematic understatement of the actual airborne radiological releases is perhaps the normal and expected behavior by the DOE, but it is not sufficient for a NEPA Environmental Assessment.

Because DOE assumes that all of the long-lived radionuclides released each year vanish — disappear — aren't anywhere any more, each year's emissions omits the resuspension of previous many years long-lived airborne radionuclides.

The long-lived radionuclides that the Idaho National Laboratory does not admit it has been releasing for years to the open air evaporation pond at the ATR Complex are not included in the draft EA or NESHAPS reporting. This is likely the tip of the iceberg of unreported radiological releases by the INL.

The draft EA includes a table that shows INL's airborne releases increasing by a factor of more than 170, yet sees no cause for alarm. See my uppercase and bold additions to the table comments regarding the unreliability of the estimated air emissions data.

Table 2. Estimated annual air pathway dose (mrem) from normal operations to the maximally exposed offsite individual from proposed projects, including the estimated dose from expanding capabilities at the Ranges based on DOE/EA-2063.

Current and Reasonably Foreseeable Future Action	Estimated Annual Air Pathway Dose (mrem)
National Security Test Range	0.04[e]
Radiological Response Training Range (North Test Range)	0.048[d]
Radiological Response Training Range (South Test Range)	0.00034[a]
HALEU Fuel Production (DOE-ID, 2019)	1.6[a]
Integrated Waste Treatment Unit (ICP/EXT-05-01116)	0.0746[h]
New DOE Remote-Handled LLW Disposal Facility (DOE/ID 2018)	0.0074[a]
Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling (DOE/EIS 2016)	0.0006[c]
TREAT (DOE/EA 2014)	0.0011[a]
DOE Idaho Spent Fuel Facility (NRC, 2004)	0.000063[a]
Plutonium-238 Production for Radioisotope Power Systems (DOE/EIS 2013)	0.00000026[b]
Total of Reasonably Foreseeable Future Actions on the INL Site	1.77[g]
Current (2018) Annual Estimated INL Emissions (DOE2019a)	0.0102[f]
Total of Current and Reasonably Foreseeable Future Actions on the INL Site [**DOE WOULD INCREASE INL'S AIRBORNE RELEASES BY OVER 170 TIMES**]	1.78[g]

Table notes:

a. Dose calculated at Frenchman's Cabin, typically INL's MEI for annual NESHAP evaluation.

b. Receptor location is not clear. Conservatively assumed at Frenchman's Cabin.

c. Dose calculated at INL boundary northwest of Naval Reactor Facility. Dose at Frenchman' Cabin likely much lower.

d. Dose calculated at INL boundary northeast of Specific Manufacturing Capability. Dose at Frenchman's Cabin likely much lower.

e. Sum of doses from New Explosive Test Area and Radiological Training Pad calculated at separate locations northeast of MFC near Mud Lake. **Dose at Frenchman's Cabin likely much lower. PLEASE NOTE THAT THE PUBLIC AT MUD LAKE IS CLOSER TO THE RELEASE THAN TO FRENCHMAN'S CABIN.**

f. Dose at MEI location (Frenchman's Cabin) from 2018 INL emissions (DOE 2019a). The 10-year (2008 through 2017) average dose is 0.05 mrem/year. **PLEASE NOTE THAT MANY RADIOLOGICAL RELEASES ARE IGNORED AND NOT INCLUDED IN THE RELEASE ESTIMATES IN NESHAPS REPORTING.**

g. This total represents air impact from current and reasonably foreseeable future actions at INL. It conservatively assumes the dose from each facility was calculated at the same location (Frenchman's Cabin), which they were not.

h. Receptor location unknown.

14. DOE is hiding, still, the magnitude of radionuclide releases from past decades to Idaho communities

The DOE's radiological monitoring of its waste disposal sites, nuclear facility emissions, nuclear fuel melt testing, accidents, and cleanup activities was and continues to be an ongoing coverup of radiological contamination no matter that the DOE claims to be within limits protective of human health and the environment.

DOE has failed to disclose the full extent of past radiological releases and the DOE continues to coverup ongoing intentional and accidental releases. Extensive americium-241 contamination at the ATR Complex was known long ago but the DOE and the U.S. Geological Survey deliberately withheld the information about this and other Snake River Plain Aquifer contamination.

The DOE has long given presentations to the public that deliberately withheld information about long-lived radionuclide contamination. Even now, when filters are evaluated and found to have americium-241, plutonium-238 and plutonium-239, for example, the DOE and State of Idaho usually pretend to not know the source of the radionuclides.

Monitoring of waste burial sites for CERCLA at INL has often been inadequate and biased to hide contamination findings by reduced monitoring and reduced reporting. Spotty monitoring of land and the aquifer means "no discernable trend could be found."

At the Idaho National Laboratory, formerly the Idaho National Engineering and Environmental Laboratory, the Idaho National Engineering Laboratory, and the National Reactor Testing Station, historical releases were monitored yet not actually characterized as to what and how many curies were released. When asked by the governor in 1989 to provide an estimate of the radionuclides released from routine operations and accidents, the Department of Energy issued the "INEL Historical Dose Evaluation." [45] [46] It has been found to have underestimated serious releases by sometimes 10-fold. Furthermore, the past environmental monitoring used all along to claim no significant releases had occurred were not used in the INEL Historical Dose Evaluation. The environmental records that could have been used against the Department of Energy or its contractors were destroyed.

The Center for Disease Control commenced reviewing the DOE's radiological release estimate that were the basis for denying that any epidemiological study was needed in Idaho communities near the site. The CDC in 2007 issued its review of the 1989 study and found many releases, some of the largest ones, underestimated by a factor of 7. [47] Errors causing underestimation of the INL releases continue to be found as energy worker compensation studies have continued.

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[45] US Department of Energy Idaho Operations Office, "Idaho National Engineering Laboratory Historical Dose Evaluation," DOE-ID-12119, August 1991. Volumes 1 and 2 can be found at https://www.iaea.org/inis/inis-collection/index.html

[46] Environmental Defense Institute's comment submittal on the Consent-based Approach for Siting Storage for the nation's Nuclear Waste, July 31, 2016. http://www.environmental-defense-institute.org/publications/EDIXConsentFinal.pdf

[47] Center for Disease Control, CDC Task Order 5-2000-Final, Final Report RAC Report No. 3, by Risk Assessment Corporation, October 2002. https://www.cdc.gov/nceh/radiation/ineel/to5finalreport.pdf

The INL was originally called the National Reactor Testing Station, later called the Idaho Engineering Laboratory, and then the Idaho National Engineering and Environmental Laboratory before being named the Idaho National Laboratory.

Much of the early monitoring was ignored but the Department of Energy, formerly the Atomic Energy Commission, monitored air, water (via the US Geological Survey), rabbit thyroids, agricultural products, milk, and so forth. Milk sampling results were reviewed in the INEL HDE for Idaho Falls or other offsite milk sampling for iodine-131, Elevated levels of I-131 in local milk was found that could not be explained by known INL and weapons fallout.

Sources of iodine-131 other than the INL that were considered were regional weapons fallout (typically from the Nevada Test Site), global weapons fallout from US weapons testing outside the contiguous states, and global weapons tests conducted by foreign countries including the former Soviet Republic, China, France and others.

The past conducting of human research at the Idaho National Laboratory has included workers swallowing incapsulated radioactive materials in order to calibrate whole-body counters (from 1965 to 1972) and the Controlled Environmental Radioiodine Tests (CERTS) where volunteers agreed to stand downwind from intentional iodine-131 airborne releases (from 1963 to 1968), according to the portion of the Human Research Experiments collection for the Department of Energy. [48] [49] The role of this radioactive research was tame compared to some of the thousands of other human radiation research experiments, but one of the problems was the lack of follow-up with the volunteers to see if health problems occurred after the brief study ended. Health effects showing up months or years after the study have been be missed, perhaps deliberately, because of lack of follow-up.

The estimates of the 1991 INEL Historical Dose Evaluation [50] continue to be found in error and to significantly underestimate what was released. [51] [52] [53] Theoretical and idealized modeling of

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[48] DOE Human Radiation Experiments, List of Experiments for Idaho Sites at https://ehss.energy.gov/OHRE/roadmap/experiments/0491doca.html

[49] See also the Idaho National Laboratory Human Radiation Experiments Collection of documents for the Idaho site online at the "inldigitallibrary" at https://inldigitallibrary.inl.gov/SitePages/INL%20Research%20Library%20Digital%20Repository.aspx and general library online information at https://www.inl.gov/about-inl/general-information/research-library/

[50] US Department of Energy Idaho Operations Office, "Idaho National Engineering Laboratory Historical Dose Evaluation," DOE-ID-12119, August 1991. Volumes 1 and 2 can be found at https://www.iaea.org/inis/inis-collection/index.html p. 40

[51] Risk Assessment Corporation, "Identification and Prioritization of Radionuclide Releases from the Idaho National Engineering and Environmental Laboratory," October 8, 2002, https://www.cdc.gov/nceh/radiation/ineel/to5finalreport.pdf See p. 117, 118 for SL-1.

[52] SENES Oak Ridge, "A Critical Review of Source Terms for Select Initial Engine Tests Associated with the Aircraft Nuclear Program at INEL," Contract No. 200-2002-00367, Final Report, July 2005. http://www.cdc.gov/nceh/radiation/ineel/anpsourceterms.pdf See p. 4-67 for Table 4-13 for I-131 estimate for IET's 10A and 10B and note the wrong values for I-131 are listed in the summary ES-7 table.

[53] CDC NIOSH, "NIOSH Investigation into the Issues Raised in Comment 2 for SCA-TR-TASK1-005," September 3, 2013. https://www.cdc.gov/niosh/ocas/pdfs/dps/dc-inlspcom2-r0.pdf See p. 3 stating various episodic releases underestimated by the INEL HDE: IET 3, IET 4 and IET 10.

the releases were used for estimating the releases for the 1991 INEL HDE without using environmental monitoring to confirm the estimates — except for the 1961 SL-1 accident in which the environmental monitoring showed that the **theoretical modeling had underestimated the release**. In fact, many of the environmental monitoring records were deliberately destroyed before the 1991 report was released. [54] INL airborne releases included a long list of every fission product that exists including iodine-131, long-lived I-129, tritium, strontium-90, cesium-37, plutonium, and uranium.

The source documents for the INEL HDE are in fact part of the Human Radiation Experiments collection of DOE documents. Why? Because there was enough information available for the DOE to know that showering nearby communities and their farms and milk cows with radiation really was likely to be harmful to their health. The INL (formerly the NRTS, INEL and INEEL) takes up dozens of volumes of binders in the DOE's Human Radiation Experiments collection and that isn't including the boxes of documents no one can get access to or the records that were deliberately disposed of. [55]

15. DOE and the CDC still not disclosing the full extent of historical releases, including the magnitude of the 1961 SL-1 release which affected communities including Atomic City and Mud Lake which will be further harmed by the proposed action

This matters because communities near the INL, include Atomic City to the south and Mud Lake to the north have been affected already and isn't the harm done to those poor people enough?

The Atomic Energy Commission, predecessor of the Department of Energy, claimed that no other fission products were detected other than 0.1 Curies of strontium-90 and 0.5 curies of cesium-137 within the perimeter fence of the SL-1. [56] The derived release fractions based on trying to fit the AEC claims to a computer derived release fraction show that the AEC claimed low curie amount releases are fiction. Never before or since has a reactor fuel had such low release fractions! The AEC not only left out many radionuclides, they underestimated the amount of the fission product releases from the accident by a factor of over 22 for iodine-131, 588 for

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[54] Chuck Broscious, Environmental Defense Institute Report, "Destruction and Inadequate Retrieval of INL Documents Worse than Previously Reported," Revised September 1, 2018. http://environmental-defense-institute.org/publications/DocDestruction.pdf

[55] February 1995, the Department of Energy's (DOE) Office of Human Radiation Experiments published *Human Radiation Experiments: The Department of Energy Roadmap to the Story and Records* ("The DOE Roadmap"). See also the INL site profile on Occupational Environmental Dose: http://www.cdc.gov/niosh/ocas/pdfs/tbd/inl-anlw4-r2.pdf) Most of the documents in the DOE's Human Radiation Experiments collection remain perversely out of public reach. Documents are said to be stored at the INL site, out of state in boxes, [Good luck with getting these documents via the Freedom of Information Act] and in the National Archives. I found that retrieving documents from the National Archive would require extensive fees for searches and copying. Where is the transparency in creating a document collection that cannot be viewed by the public?

[56] Report by Risk Assessment Corporation for Centers for Disease Control and Prevention, Department of Health and Human Services, *Final Report Identification and Prioritization of Radionuclide Releases from the Idaho National Engineering and Environmental Laboratory*, RAC Report No. 3, CDC Task Order S-2000-Final, October 2002, pages 117, 118. https://www.cdc.gov/nceh/radiation/ineel/TO5FinalReport.pdf

Cs-137 and 277 for Sr-90. And even with the low-balled curie releases, the SL-1 accident was a serious accident.

Despite what Risk Assessment Corporation (RAC) writes about prevailing meteorological conditions at the time of the SL-1 accident being characteristic of the typical conditions at the time of year, the conditions were not typical. During the accident, the prevailing winds were from the north to northeast for 100 hours with an extremely strong inversion. Typical conditions are a prevailing wind in the opposite direction during the daytime, with wind reversals at night typical. The SL-1 radionuclide plume blew south toward American Falls and Rupert, Idaho.

The SL-1 reactor fission product inventory consisted of radionuclides produced during the excursion and also radionuclides the had built up in the fuel during previous reactor operations. The operating history of the reactor consisted of 11,000 hours for a total of 932 MW-days. The reactor accident resulted in a total energy release of 133 MW-seconds. Roughly 30 percent of the core's fuel inventory was missing from the vessel, when examined after the accident. [57] [58] [59]

Risk Assessment Corporation used the computer code RSAC to calculated a fission product inventory based on operation of the reactor at a power level of 2.03 MW (mega-watts) for 458 days, followed by a shutdown period of 11 days and the excursion power level of 88,700 MW for a period of 0.015 seconds. The Center for Disease Control did not call out what were obvious discrepancies and which meant that the SL-1 radiological consequences have been grossly understated.

Sage brush samples were collected and according to the AEC, the "gamma spectra of representative samples indicated that the activity was due to iodine-131. (IDO-12021, p. 131)

It was customary for the AEC to monitor jack rabbit thyroids and the iodine-131 levels before the SL-1 accident, for jack rabbit thyroids were typically 100 picocuries per gram. After the SL-1 accident, the levels were as high as 750,000 picocuries per gram at the SL-1, 180,000 picocuries/gram at nearby Atomic City, located south of the SL-1, and 50,000 picocuries per gram at Tabor, a farming community southeast of SL-1 and west of Blackfoot, and 11,200 picocuries at Springfield. These rabbit thyroid results reveal much higher rabbit thyroid iodine-

[57] Department of Energy, Idaho National Engineering Laboratory Historical Dose Evaluation, DOE/ID-12119, August 1991. See https://inldigitallibrary.inl.gov

[58] Atomic Energy Commission, "Final Report of the SL-1 Recovery Operation," IDO-19311, June 27, 1962. See p. III-77 regarding fuel damage. https://inldigitallibrary.inl.gov/PRR/163644.pdf

[59] Atomic Energy Commission, "Additional Analysis of the SL-1 Excursion Final Report of Progress July through October 1962," IDO-19313, November 21, 1962. See p. 27 Table I-VIII. https://inldigitallibrary.inl.gov/PRR/163644.pdf

131 levels than produced by the other large episodic and routine releases from the Idaho National Laboratory during the 1950s and 1960s. [60] [61] [62] [63]

As the DOE still publishes false information about the SL-1 accident, you can read my report about the consequences of the SL-1 accident on the Environmental Defense Institute website, *The SL-1 Accident Consequences*, at http://environmental-defense-institute.org/publications/SL-1Consequences.pdf and the cause of the SL-1 accident on the Environmental Defense Institute website, *The Truth about the SL-1 Accident – Understanding the Reactor Excursion and Safety Problems at SL-1* at http://environmental-defense-institute.org/publications/SL-1Accident.pdf

16. Idaho laws being weakened regarding radiological releases

The State of Idaho weakened laws for radiological releases this year, removing clean air law protections in place since 1995.

I stumbled upon this 2019 law change, effective spring of 2019 after the adjournment of the Idaho Legislature, to IDAPA 58 – Department of Environmental Quality, 58.01.01 – Rules for the Control of Air Pollution in Idaho, Docket No. 58-0101-1801. [64]

The law had included since 1995 a provision for radionuclides. But this section of the clean air law has now deleted the following text:

> *xvi. Radionuclides, a quantity of emissions, from source categories regulated by 40 CFR Part 61,Subpart H, that have been determined in accordance with 40 CFR Part 61, Appendix D and by Department approved methods, that would cause any member of the public to receive an annual effective dose equivalent of at least one tenth (0.1) mrem per year, if total facility-wide emissions contribute an effective dose equivalent of less than three (3)mrem per year; or any radionuclide emission rate, if total facility-wide radionuclide emissions contribute an effective dose equivalent of greater than or equal to three (3) mrem per year.(5-1-95)*

Given the increasing levels of airborne radiological contamination occurring on the lower west Boise-side and the lower east Idaho National Engineering-side of Idaho, this law change certainly is not about protecting human health and the environment.

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[60] Atomic Energy Commission, "1958 Health and Safety Division Annual Report, IDO-12012, See p. 72, 73 for iodine-131 in sage brush and rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/112697.pdf

[61] Atomic Energy Commission, "Annual Report of Health and Safety Division, 1959," IDO-12014, See p. 88 for iodine-131 in rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/112700.pdf

[62] Atomic Energy Commission, "Health and Safety Division Annual Report, 1960," IDO-12019, See p. 91 for iodine-131 in rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/90927.pdf

[63] Atomic Energy Commission, "Health and Safety Division Annual Report, 1961," IDO-12021, See p. 128, 133 for iodine-131 in jack rabbit thyroids. https://inldigitallibrary.inl.gov/PRR/163656.pdf

[64] Office of the Administrative Rules Coordinator, Department of Administration, Pending Rules, Committee Rules Review Book, Submitted for Review Before House Environment, Energy & Technology Committee, 65th Idaho Legislature, First Regular Session – 2019. January 2019 at https://adminrules.idaho.gov/legislative_books/2019/pending/19H_EnvEnergyTech.pdf

17. The Department of Energy is not trustworthy

From the DOE's nuclear weapons testing at the Nevada Testing Station, in the Pacific islands, and elsewhere, the DOE told people they were safe and then covered up epidemiology that showed people had increased rates of leukemia and cancer from the fallout. The DOE claimed its releases from the INL were too low to cause harm, but when asked to state what it had released to the Idaho skies, the DOE didn't know. Then when the DOE issued a report of estimated releases through its history to 1989, reviews by the Center for Disease Control found the releases had been significantly underestimated. It is also documented that many environmental monitoring records were subsequently destroyed, which would have indicated more contamination that the DOE wanted others to know about. The DOE has lost or destroyed worker radiation dose records throughout its history when the records would show elevated doses. The DOE uses secrecy, document destruction, omission of key information during public presentations, and adherence to providing false information about its plans, and breaks its commitments. The DOE would not have conducted any cleanup at all if other federal agencies had not been able to say that hazardous chemical laws needed to apply to DOE sites, allowing CERCLA cleanup investigations. The DOE has systematically lied about the pervasive long-lived radionuclides at sites likes the INL, omitting what it well knew, that uranium, plutonium and americium were included in soil and perched water. It omitted this information so well that the DOE and the U.S. Geological Survey have often, without justification, omitted the reporting of extensive radiological contamination at the INL, later found by CERCLA investigations.

DOE lied about its radiological releases decades ago from nuclear weapons testing, reactor testing, and reactor accidents and other operations and it continues to misinform the public about its past and about current contamination.

The Department of Energy has a long history of telling workers they are protected from radiological hazards — but workers got illnesses. Nationwide, billions of dollars of illness compensation have been paid out under the Energy Employee Illness Compensation Program Act (EEICOPA) even with two-thirds of INL claims denied.

The Department of Energy has a long history of saying its radiological releases were too small to affect the public — but studies found that the public had higher infant mortality and certain cancers and leukemia.

The Department of Energy has rightfully earned and continues to earn the public's distrust. The Department of Energy must not be allowed to unilaterally reclassify HLW waste because the DOE cannot be trusted to comply with its own regulations should its regulations or DOE Orders be deemed inconvenient or costly.

18. The DOE has a record of not being transparent

The DOE has also conducted numerous public comment opportunities, only to refuse to publish those public comments such as the consent-based interim spent nuclear fuel storage meetings conducted a few years ago. [65] [66] [67]

People might eventually catch on that Idaho is getting more and more radiologically polluted — but with all the dis-information, probably not before it's too late.

[65] The Department of Energy was planning to use a consent-based approach for siting spent nuclear fuel and high-level waste storage and disposal facilities including: (1) a pilot interim storage facility, (2) consolidated interim storage facilities, and (3) permanent geologic disposal facilities, one for commercial spent nuclear fuel and the other for defense spent nuclear fuel and high-level waste.

A consent-based approach was recommended in the 2012 Blue Ribbon Commission report on the nation's problem of spent nuclear fuel disposal, but no one knows what a consent-based approach entails. What we do know that even with local support, state opposition effectively stymied efforts to obtain authorization to construct the geologic waste disposal at Yucca Mountain at Nevada and prevented a proposed interim storage site at Skull Valley, Utah. The DOE held meetings in 2016 around the country seeking public input on the consent-based process, including one in Boise, Idaho. The Department of Energy successfully disposed of the consent-based approach and the public comments collected following the appointment of Rick Perry as the Secretary of Energy in 2017.

The majority of the spent nuclear fuel is from commercial electricity generation from US nuclear power plants. As of 2013, there was 70,000 metric tons heavy metal, enough for the stymied Yucca Mountain repository. The inventory is expected to roughly double as the existing fleet of US nuclear reactors operates for its expected life. Utilities are winning billions in compensation from the DOE over the continuing costs of storing the spent nuclear fuel because of the DOE's failure to provide a disposal facility.

The rest of the spent nuclear fuel is from DOE research and defense reactors, including nuclear submarines and carriers. The DOE's high-level waste is in various forms ranging from liquid waste at Hanford awaiting vitrification, highly soluble powder-like calcine at Idaho and vitrified waste as other sites.

[66] Before ending the consent-based siting effort, information found about the Department of Energy's consent-based siting at www.energy.gov/consentbasedsiting and its Integrated Waste Management and Consent-based Siting booklet at http://energy.gov/ne/downloads/integrated-waste-management-and-consent-based-siting-booklet

[67] Environmental Defense Institute's comment submittal on the Consent-based Approach for Siting Storage for the nation's Nuclear Waste, July 31, 2016. http://www.environmental-defense-institute.org/publications/EDIXConsentFinal.pdf