Comments on the Recapitalization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling at the Idaho National Laboratory, draft DOE/EIS-0453D

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Submitted by Tami Thatcher, former Idaho National Laboratory nuclear safety analyst and nuclear safety consultant, citizen of Idaho Falls, Idaho. Email: tzt@srv.net

These are comments on the Recapitialization of Infrastructure Supporting Naval Spent Nuclear Fuel Handling at the Idaho National Laboratory in draft DOE/EIS-0453D. I am in favor of Alternative 3 to construct and operate a new facility at the Naval Reactors Facility (NRF) located at the Department of Energy's Idaho National Laboratory.

It is important to replace the leaking unlined original Expended Core Facility pool built in 1957. The Naval Reactors Program, a joint US Navy and Department of Energy organization, is to be commended for their diligent efforts to transfer their spent nuclear fuel to dry storage and make it ready for shipment to a repository. This is a long and expensive process that unfortunately the Department of Energy and commercial nuclear energy industry have not made similar progress.

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

In 2000, Congress passed the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) to provide an alternative Federal compensation program for workers whose health was impacted as a result of nuclear weapons related work for Department of Energy contractors. [1] The EEOICPA generally covers contractors and Department of Energy employees, as designated by the Secretary of Energy, who worked in facilities that processed or produced radioactive material for use in the production of atomic weapons. But NRF workers, predominantly non-military workers, have been excluded from this compensation.

Facilities at NRF had conducted 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 intent to protect workers has not always coincided with effective radiological protection of workers or adequate understanding of health effects. Experience at similar INL facilities, often

[1] 42 USC 7384, The Act--Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA), as Amended and see the website for the Center for Disease Control, National Institute of Occupational Safety and Health, Division of Compensation Analysis and Support at http://www.cdc.gov/niosh/ocas/ and U.S. Department of Labor, Office of Workers' Compensation Programs, EEIOCPA Program Statistics, http://www.dol.gov/owcp/energy/regs/compliance/weeklystats.htm

with management personnel having extensive naval nuclear background, has shown a multitude of issues and new issues continue to arise. Transient conditions within hot cells and transfers of material to and from hot cells, undetected penetrations of hot cells or casks, inadequate lineup of shielding during transfers, and inadequately shielded filters have occurred at INL Department of Energy facilities: why would they not have occurred at NRF through its historical operations?

Inadequate internal monitoring programs at INL historically have been found in 2015 by investigations conducted by the National Institute of Occupational Safety and Health because of the most recent INL Special Exposure Cohort petition. Inadequate radiological protection has been found from 1963 to 1975 at the Chemical Processing Plant (now INTEC) and other facilities are being reviewed.

Section 4.13.2.1 of the EIS states: "No one in the NNPP [includes NRF] has exceeded 0.02 Sievert (2 rem) of radiation exposure in 1 year (less than half the annual limit of 5 rem) since 1979." That the radiation levels prior to 1979 exceeded this, and the fact that Department of Energy employee studies have found increased levels of certain cancers for workers exposures generally below 2 rem per year is relevant. The Energy worker compensation act (EEOICPA) points out that "studies indicate than 98 percent of radiation-induced cancers within the nuclear weapons complex have occurred at dose levels below existing maximum safe thresholds." (See 42 USC 7384, The Act-Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA), as Amended.)

NRF workers are excluded from EEOICPA compensation "because of the effectiveness of Naval Reactors' worker protection, worker training, and workplace monitoring programs, employees who performed Naval Reactors' related work at Naval Reactors' Department of Energy facilities . . . As discussed earlier, the GAO reported to Congress in 1991 that 'Naval Reactors Laboratories are accurately measuring, recording, and reporting radiation exposures,' and 'exposures have been minimal and overall are lower than commercial nuclear facilities and other Department of Energy facilities.' This longstanding record of effectiveness supports the conclusion by Congress that workers at Naval Reactors' Department of Energy facilities did not need the compensation alternatives created for workers in the nuclear weapons complex by the EEOICPA." [2]

The historically high allowable doses at NRF, the variety and complexity of operations at NRF, the problems of adequately monitoring internal dose and transient conditions, and the evolving science of radiation health [3]and epidemiology of radiation workers [4] showing elevated cancer

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

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

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

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.**

2. N**RF Has a Long History of Burying its Radioactive Waste Over the Snake River Plain Aquifer and This Must Stop.** Waste Management (Section 3.14)

Analyses by the Department of Energy predict the eventual migration of radionuclide contamination into the soil and then aquifer from buried waste at the Radioactive Waste Management Complex (RWMC). [5] NRF waste buried at RWMC is not being removed. Future burial of NRF and other INL facility waste, some of which supports NRF operations, planned for the replacement for RWMC, the Replacement Low-Level Waste Disposal facility provide significant and virtually unending contamination of the aquifer. [6]

Historically poor record keeping was conducted with regard to the amount and type of radionuclide material buried from NRF. For many years the Department of Energy placed no limits on curie content or radionuclide inventory in its burial grounds, the RWMC. NRF wastes included significant quantities of spent nuclear fuel material from experiments and from the Shippingport spent nuclear fuel examinations (from the 1960 and continuing into the 1980s) that were buried shallowly at the RWMC. Because of the CERCLA cleanup at RWMC, efforts have been made decades later to estimate radionuclides and curie amounts of material buried at RWMC in order to conduct waste migration studies. [7] It also is worth noting that significant aquifer contamination occurred due to fuel reprocessing at INTEC [8] in support of naval reactors programs.

The radionuclides buried at RWMC include the same radionuclides that pose the greatest concern for migration from a spent nuclear fuel repository. The radionuclides buried at RWMC include very long-lived and mobile radionuclides of carbon-14 (5,730 year half life), iodine-129 (17 million year half life), technetium-99 (213,000 year half life), nickel-59 (76,000 year half life) and uranium-238 (4.4 billion year half life). The DOE's performance assessments for disposal of these radionuclides show that they will migrate to the aquifer in significant amounts

[5] U.S. Department of Energy, 2008. Composite Analysis for the RWMC Active Low-Level Waste Disposal Facility at the Idaho National Laboratory Site. DOE/NE-ID-11244. Idaho National Laboratory, Idaho Falls, ID and U.S. Department of Energy, 2007. Performance Assessment for the RWMC Active Low-Level Waste Disposal Facility at the Idaho National Laboratory Site. DOE/NE-ID-11243. Idaho National Laboratory, Idaho Falls, ID. Available at INL's DOE-ID Public Reading room electronic collection. (Newly released because of Environmental Defense Institute's Freedom of Information Act request.) See https://www.inl.gov/about-inl/general-information/doe-public-reading-room/

[6] US Department of Energy, "Environmental Assessment for the Replacement Capability for Disposal of Remote-Handled Low-Level Radioactive Waste Generated at the Department of Energy's Idaho Site," Final, DOE/EA-1793, December 2011. http://energy.gov/sites/prod/files/EA-1793-FEA-2011.pdf

[7] Idaho Completion Project, Bechtel BWXT Idaho, LLC, for the US Department of Energy, Idaho Operations Office, "Supplement to Evaluation of Naval Reactors Facility Radioactive Waste Disposal at the Radioactive Waste Management Complex from 1953 to 1999," ICP/EXT-05-00833, April 2005.

[8] Idaho Nuclear Technology and Engineering Center (INTEC), formerly the Chemical Processing Plant (CPP).

for hundreds of thousands of years, see DOE/NE-ID-11243 which DOE kept from public view until 2015 upon Freedom of Information Act request.

The CERLCA cleanup effort is focused on removing the most chemically contaminated waste. [9] The amount of Rocky Flats weapons plant transuranic waste that is being cleaned up is unspecified. Less than 6 acres of the 35 acre burial ground are being exhumed. So a small fraction of buried transuranic waste from Rocky Flats weapons plant is being exhumed, but none of the waste buried from NRF or the Advanced Test reactor or other facilities is being exhumed.

The performance assessment for RWMC predicts that the radiation ingestion dose for hundreds of thousands of years near the waste dump will reach the DOE limit of 100 mrem/yr unless the engineered soil cap over the dump is assumed to perform flawlessly, limiting infiltration to 0.1 cm/yr. In the case of perfect soil cap performance, the ingestion dose is about 30 mrem/yr. No other organization deems it reasonable to rely on maintenance of a soil cap forever and five-year-reveiws forever; but it is an accepted tri-agency fiction among the DOE, Idaho Department of Environmental Quality, and the EPA for the RWMC burial ground at INL.

The population dose from the contamination due to migration of radionclides to the aquifer is unspecified. For such expansive time frames because of the large amounts of very long-lived and mobile radioactive contamination, speculation of the number of affected people has not been provided as it is for other radiological releases.

The new replacement disposal facility use of metal canisters may alleviate some of the surface contamination and subsidence (soil erosion and uneven settling problems) that occur at RWMC, but it still is acknowledged that the radionuclides will eventually migrate into the soil and to the aquifer. The amount of radionuclides to be buried in the replacement for RWMC, the Replacement Remote-handled Low-Level Waste Disposal facility is significant and approaches or exceeds Greater-Than-Class C inventory limits for some of the contaminants.

In both the analysis of RWMC and of the new replacement for RWMC, the analysis assumptions of steady infiltration and leaching keep the doses artificially steady and low. Episodic flooding is known to occur and would increase migration rate and radiation doses but has been assumed not the occur for hundreds of thousands of years.

Inconsistencies in various buried waste studies at INL are not random — they result from pressure to lower the radiation ingestion doses from the most prevalent source of contamination. More plutonium at RWMC? No problem, just raise the assumed soil sorbing coefficient. The various assumed parameters such at the soil coefficient for soil sorbing properties are adjusted by arguing whatever value selected is reasonable and conservative. Yet the variability in the soil coefficients from study to study for the Department of Energy is quite large. [10] The resulting

[9] See the CERCLA administrative record at www.ar.icp.doe.gov (previously at ar.inel.gov) and see also Parsons, Alva M., James M. McCarthy, M. Kay Adler Flitton, Renee Y. Bowser, and Dale A. Cresap, Annual Performance Assessment and Composite Analysis Review for the Active Low-Level Waste Disposal Facility at the RWMC FY 2013, RPT-1267, 2014, Idaho CleanupProject.

[10] Idaho National Laboratory, "Explanation of Significant Differences Between Models Used to Assess Groundwater Impacts for the Disposal of Greater-Than-Class C Low-Level Radioactive Waste and Greater-Than-Class-C-Like Waste Environmental Impact Statement (DOE/EIS-0375D) and the Environmental Assessment for the

analyses for predicted buried waste facility performance are inconsistent. The analysis results are not conservative but are based on best estimate (mean or median values) of radionuclide inventory and other factors and so the radiation ingestion doses may be significantly higher than stated for a variety of reasons. The analyses for the buried waste migration over millennia have assumed there will be no episodic flooding and there will be no geologic instability: these studies are scientifically indefensible, despite the mathematical modeling complexity involved in their derivation.

The Department of Energy has continued to obscure from public view the predicted future levels of contamination, the continual migration of these contaminants to Thousand Springs and beyond and the thousands of years that the waste will continue migration to the aquifer. It kept the performance assessment of RWMC from being publically available until 2015 upon Freedom of Information Act request. The CERLCA cleanup documents made deceptive and misleading statements regarding the level of contamination after 10,000 years. The analysis gyrations and inconsistencies from study to study have been made in order to bias the results toward lower radiation ingestion results. Seemingly scientific, these studies show that radionuclide contaminants will migrate to the aquifer. But the assumptions built into the models regarding the rate and steadiness of this migration are a charade, a show made to provide studies that look scientific and protective of health when they are not.

The low-level waste from NRF and other INL facilities slated for burial over the Snake River Plain aquifer can be shipped out of Idaho to an operating low-level waste facility in Nevada. NRF needs to stop its burial practices over our aquifer especially in light of years of aquifer contamination it has caused and will cause with waste it has already buried.

3. **All Spent Nuclear Fuel at INL Needs to Made Road Ready.** Unfortunately the Department of Energy has not made similar progress for ensuring the capability for packaging non-Naval spent nuclear fuel at the INL — to make it road ready to a repository or repackage if a repository is delayed.

The mission need statement from 2007 stated that "The capability that is required to prepare Spent Nuclear Fuel for transportation and disposal outside the State of Idaho includes characterization, conditioning, packaging, onsite interim storage, and shipping cask loading to complete shipments by January 1,2035. These capabilities do not currently exist in Idaho." [11]

The Department of Energy's 2015 Supplement Analysis for bringing two proposed shipments of spent nuclear fuel into Idaho argues that there are no impediments to sending the spent nuclear fuel to the Yucca Mountain Repository. Yet, the Department of Energy has not put planning, schedules and a budget together regarding building the facility to inspect, package and make non-Naval spent nuclear fuel road ready in order to meet the 1995 Idaho Settlement Agreement.

INL Remote-Handled Low-Level Waste Disposal Project (INL/EXT-10-19168)," INL/EXT-11-23102, August 2011. http://www.inl.gov/technicalpublications/documents/5144355.pdf and a report prepared for the US Department of Energy, DOE Idaho Operations Office, "Preliminary Review of Models, Assumptions, and Key Data Used in Performance Assessments and Composite Analysis at the Idaho National Laboratory," INL/EXT-09-16417, July 2009. See p. 11, Tables 3 and 4 for sorption coefficients.

[11] Department of Energy, Mission Need Statement: Idaho Spent Fuel Facility Project, DOE/ID-11344, September 2007. http://www5vip.inl.gov/technicalpublications/Documents/3867685.pdf

Candid discussion is needed now regarding the Department of Energy on the repackaging capability and ability to make non-naval spent nuclear fuel at INL road ready instead of simply pointing to various statements about INL being the lead laboratory for DOE spent nuclear fuel ——although apparently unfunded in this regard since 2009 or being the lead nuclear research laboratory —but discussing a "transshipment" facility as though conditional upon Idaho allowing additional commercial nuclear spent fuel into the state.

4. **Drinking Water History Discussion Lacking Complete Disclosure of Historical Monitoring Deficiencies and Contamination Levels.** Water Resources (Section 3.4) and Land Use Adjacent to INL (Section 3.1)

The description of drinking water standards omits the fact that due to the non-community well loop hole for drinking water regulations, the State of Idaho, per the Department of Energy's request, does not provide radionuclide sample results by independent certified laboratory to the State of Idaho and the State of Idaho does not make publically available radionuclide monitoring results on its publically available database. Only chemical monitoring of INL drinking water is overseen by the State of Idaho Department of Environmental Quality.

The Department of Energy has historically adopted its own far more lax contaminant level guidelines for its facilities and not disclosed to workers the monitored contaminant levels. There is a lack of public disclosure of the current and historical radionuclide contaminant levels in INL drinking water including the drinking water at NRF. Workers remain uninformed of the level of contaminants in their drinking water even for years when federal maximum contaminant levels have been exceeded. Other state environmental departments recognize that federal maximum contaminant levels are not necessarily protective of health and even the Department of Energy recognized this in the early years until they came to realize that they were exceeding them. Since then, the posture is to act as though any combination of chemical and radionuclide contaminants in drinking water is of no concern as long as individually they are under the federal maximum contaminant level. The chemical and radionuclide contamination of INL drinking water has exceeded MCL levels historically, especially prior to chemicals being monitored in the last 1980s. Radionuclide monitoring has been spotty and has not covered all of the years that contamination was present. Contaminated drinking water may explain the epidemiology reports for the INL that found specific cancers to be elevated at INL for radiation and non-radiation workers.

Historical contamination of INL drinking water commenced in the early 1950s and monitoring of contaminants often lagged by decades. When nuclear operations were releasing large amounts of airborne contamination, the US Geological Survey ceased aquifer monitoring at INL from NRF to TAN between roughly 1965 and 1975. The EIS has obscured this by presenting only an average contamination level from past operations.

It is a reminder that the US Geological Survey monitors what wells it chooses and what contaminants it chooses to monitor and this does not necessarily serve for trending or public protection. Contamination levels off site at Mud Lake that exceeded federal drinking water standards were included in reports that the USGS now says were in error. Tritium levels in the Mud Lake well in 1966 clearly exceeded the MCL at 93,000 pCi/L and yet it appears the public

was never told. Publication in a report 20 years later, in 1984, also does not seem adequate (USGS Report 84-714) [12] It does appear that the levels of tritium occurred but not for a different well in the Mud Lake area. Tritium levels offsite the exceeded the federal maximum contaminant level for tritium went unexplained by the USGS for decades.

The monitoring performed and the contaminant levels measured need to be provided for NRF even though it was comparatively low to other INL facilities. Historical averaging of well water contamination levels may be convenient, as provided in Table 3.4-6, but it obscures the years when monitoring was absent or addressed an incomplete set of contaminants. And it obscures peak values. Again, unexplained lapses of USGS monitoring have occurred at NRF. USGS monitoring for radionuclides has been spotty at best. Many long-lived radionuclides present in the aquifer were not monitored until the 1990s and then not reported by USGS. [13] And USGS monitoring of chemical contaminants was non-existent until the late 1980s. In the perennial effort to give the impression of rigorous monitoring, the Department of Energy and Naval Reactors are self-serving in the lack of clarity concerning past monitoring program deficiencies and actual contaminant levels present, monitored or not.

5. **Sketchy Picture of Historical Air Emissions.** Affected Environment Air Quality (Section 3.6)

Air emissions results presented by radionuclide and curie amount in the ESER reports is information that needs to be publically available. But the ESER reports are only available since 1995 (quarterly reports) and 1997 (annual reports). Health impact is not adequately represented by curie amounts: a curie of plutonium-239 is 10,000,000 greater than a curie of Krypton. Radiation dose in typically performed for INL at Frenchman's cabin, many miles away from the facilities. Information in the ESER reports for radiological air emissions is based on DOE-provided information, which are largely unverified estimates rather than measurements.

Despite the limited air monitoring by Idaho Department of Environmental Quality and ESER, there is actually no independence of data regarding the total amounts released from INL facilities. Even for data transmitted to ESER from the DOE, ESER has made mistakes in reporting the information in its tables. I reported errors I found in the 2013 ESER report that included understatement of the total plutonium air emissions by a significant amount. They have corrected the report but have not publically admitted that the originally posted report was in error. As troubling as the lack of independent data and errors in presented data are, equally troubling is the bias toward downplaying the air emissions. These oversight organizations seem lack a questioning attitude and DOE emphasizes that the state does not regulate radionuclide emissions.

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[12] US Geological Survey, *Water-Quality Data for Selected Wells On or Near the Idaho National Engineering Laboratory, 1949 through 1982*, Report 84-714, June 1985. http://pubs.usgs.gov/of/1984/0714/report.pdf See USGS well 14 and the Mud Lake well for tritium (H-3) spikes. Multiply picocurie/milliliter (pCi/mL) by 1000 to convert to picocurie/Liter (pCi/L). The MCL for tritium is 20,000 pCi/L.

[13] T. M. Beasley, P. R. Dixon, and L. J. Mann, ^{99}Tc, ^{236}U, and ^{237}Np in the Snake River Plain Aquifer at the Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, Environ. Sci. Technol., 1998, 32, 8375-3881.

The stated INL air emissions are largely based on estimates rather than stack monitoring data and there is apparently no independent technical review of the estimation methods. The technical documents of the estimation are not available publically. There is little evidence of adequate review of monitoring equipment placement based on emission source. ESER and Idaho Department of Environmental Quality display a bias toward downplaying the releases rather than scrutinizing whether adequate monitoring, estimation techniques and monitoring is in place. And this was recognized in a Department of Energy Health and Safety (HSS) independent oversight assessment in 2010. [14]

Historical air emissions from INL as discussed in the 1991 INEL Historical Dose Evaluation (DOE/ID-12119). Emissions were ambiguously documented as "unidentified beta and gamma" or "unidentified alpha." Because of the inadequate monitoring from the 1950s to the 1970s and beyond, and inadequate technical estimation of the air emissions, extensive efforts were made to try to characterize the identity of the radionuclides released and their curie amounts based on assumed fuel composition and release mechanism. Only the large NRF release from destructive fuel tests of the S1W reactor were included as episodic releases in the 1991 HDE. These 1991 HDE estimates which focused on the off-site public remain flawed and are not adequate to address historical worker exposures. The primitive nature of INL monitoring and reporting of emissions for years should re-emphasize the false argument for excluding NRF workers from EEOICPA compensation act coverage.

6. **Accident Radiation Consequences are Not Conservative.** Accidents (Appendix F)

The case for the new facility could have been made stronger had the real leak rate from the now-operating ECF been communicated. Remaining unstated is the time allowable to restore cooling in a pool draining event with the EIS stating only that: "thermal analysis for a new naval spent nuclear fuel rack design will show that heat dissipation largely from air circulation, is sufficient to prevent cladding failure ***for the time necessary*** to restore cooling."

It is problematic that this EIS has separated ECF from examination facilities as this allows some accident scenarios to be excluded from this EIS. Excludes from its risk assessment the transportation of irradiated test specimens to and from the Advanced Test Reactor Complex. This is 5 miles away and would have been appropriate to include fire and loss of shielding of an irradiated test specimen. Worker radiation risks within 100 meters can be occur more rapidly than pool draining and can be lethal.

The EIS includes "inter-facility transport" only, being between the new ECF pool and examination facilities. It deems an inter-facility transport accident at only being caused by an intentionally destructive act but does not assess whether a loaded transport cask is ever parked, for example in a building in which case the likelihood of a fire in a building can readily be assigned a likelihood of occurrence. Driving error by hour of driving (by inattentiveness of a health crisis of the driver (heart attack or bee sting) could be assessed based on driver accident statistics. The conclusion deeming an accident as only possible due to intentional act is not

[14] http://www.hss.doe.gov/IndepOversight/docs/reports/eshevals/2010/2010_INL_Environmental_Monitoring_final_May2010.pdf

sufficiently supported. It would seem that an unplanned loss of shielding relevant to worker exposure should be addressed for inter-facility transport.

The overall perspective of NRF's relatively low accident risk (likelihood and consequence) leaves unstated the much higher risk posed by NRF's supporting facility for irradiation tests, the Advanced Test Reactor. An accident at the ATR reactor or spent fuel pool has been predicted to have a far greater foot print, a characterization never made for the higher hazard facility, although it poses large offsite consequences. The evacuation needs for ATR may extend beyond 65 miles. [15]

The EIS states: "The ICRP recommendations for health effects and radiation effects have been updated based on more recent scientific and technical knowledge than was available in 1995. Conversion factors for health effects based on ICRP Publication 103 (ICRP 2007) guidance replace the ICRP Publication 60 (ICRP 1991) values for cancer fatalities used in 1995. The fatal cancer effects calculated in this EIS are a conservative estimate of cancer fatalities, and the use of this factor to estimate the incidence of fatal cancer is different from the methodology used in 1995." However, more recent report of radiation health effects that predict an increased level of cancers is available in the BEIR VII report. The Department of Energy needs to use more recent provides scientific assessment by the National Research Council and includes the estimates of both cancer incidence and cancer fatalities. [16]

Also in Appendix F: "Information on the effects of acute radiation exposures on humans was obtained from studies of the survivors of the Hiroshima and Nagasaki bombings and from studies following a multitude of acute accidental radiation exposures." The multitude of problems associated with the acute gamma radiation dose from the WWII bombing studies have long been recognized and include the facts that the study was not initiated until 5 years after the bombing and the location of exposed people had to be estimated years after the event. Only the healthiest individuals survived the first five years. Then, manipulations of the model were made in order to reduce the effect of radiation exposure. Internal contamination was present but occurred in both the bomb-exposed cohort and comparison population that returned to the bombed city. Internal radiation effects are inadequately represented by the study of WWII Japanese bombing.

The Department of Energy's inclination to rely on out-of-date radiation health information would be acceptable if the old information conservatively estimated health risks. But it does not. The DOE's used of out-of-date radiation health information provides convenience for the nuclear industry but is not adequately protective of public or worker health.

[15] EHA-50, "Emergency Management Hazards Assessment" for TRA-670, Advanced Test Reactor Building, January 2010.

[16] National Research Council, Board on Radiation Effects Research (BRER), Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2. Washington, D.C.: The National Academies Press, 2006