

## **Public Comment Regarding Application to the U.S. Nuclear Regulatory Commission on the “Holtec International HI-STORE Consolidated Interim Storage Facility Project,” Docket NRC-2018-0052 regarding NRC’s draft environmental impact statement**

Comment submittal by Tami Thatcher on behalf of Environmental Defense Institute, Troy, Idaho, <http://www.environmental-defense-institute.org/> September 22, 2020.

### **Background**

In 2017 Holtec submitted an application to the NRC to construct and operate a Consolidated Interim Storage Facility (CISF) for spent nuclear fuel (SNF) and greater than class C waste (GTCC), as well as a small quantity of mixed oxide fuel (fuel blending uranium with plutonium to use in a reactor), in Lea County, New Mexico. The proposed Holtec CISF would provide an option for storing SNF from nuclear power reactors for a period of 40 years, that is away from the location where the often now-closed reactors operated.

Holtec proposed initially storing 500 canisters holding up to 8,680 metric tons of uranium or heavy metal and plans to have 19 additional expansion phases. Ultimately the facility will store up to 10,000 canisters of spent nuclear fuel or up to 173,600 metric tons of initial uranium or fuel blended with plutonium.

The NRC is assuming that two additional renewals of 40 years each, for a total of 120 years may be granted by the NRC. The NRC appears to assume that a permanent repository will become available within 40 years.

The NRC has stipulated that virtually every issue important to the understanding the long-term consequences of this action is “out of scope” for public commenters despite the fact that these issues are fundamental to evaluating the impact of the proposed facility.

### **This EIS Must Include the Consequences of Bringing the Spent Nuclear Fuel to New Mexico and Extended Delay or Having No Repository to Send These Canisters To**

The U.S. Nuclear Regulatory Commission’s draft Environmental Impact Statement is grossly inadequate because every canister of spent nuclear fuel that comes into the state of New Mexico is unlikely to leave New Mexico within the next forty years or ever. This elephant in the room will not be addressed in the NRC’s safety review and therefore must be addressed in its EIS.

The draft EIS is misleading and understates the harm of the proposed action to bring 500 canisters holding 8,680 metric tons of heavy metal in each of 20 phases of expansion, for a total of 10,000 canisters and up to 173,600 metric tons of heavy metal. For perspective, the proposed Yucca Mountain repository capacity was 70,000 metric tons.

There is no economic incentive for building the Holtec facility in New Mexico, based on the selected facts in the draft EIS. The NRC continues to falsely claim that the dry spent fuel storage near populated regions of the country is safe and if that is so, leave it at those sites. The EIS must include conservative estimates of the number of rejected canisters that will not be accepted by the Holtec facility, that must stay behind at the stranded spent fuel sites and therefore prevent the stated goal of these returning to green-field status.

If, as this draft EIS assumes, an adequate number of permanent repositories for the spent nuclear fuel will soon become available, then there is no reason to send the waste to a consolidated storage facility.

The most egregious omission of this draft EIS is that the NRC assumes that a permanent repository for the spent fuel will be available within 40 years...as though the fuel could timely be shipped to this non-existent permanent repository.

Bringing the spent nuclear fuel to New Mexico will weaken, not strengthen, the nation's resolve for securing a permanent disposal facility.

This draft EIS does not even acknowledge the extremely high likelihood of extended delays in securing the ability to send spent nuclear fuel to a repository, should a decision on where a repository may be sited actually occur in the next 40 years. The proposed facility will have breached canisters and no way to repair or replace the canisters and no approved way to ship the breached canisters. Neither the radiological releases from breached canisters shipped to the proposed facility, canisters becoming breached at the proposed facility, nor the compromised safety of shipping breached canisters to a repository have been included in the draft EIS but must be.

The prospects of Yucca Mountain opening are dimmer than they were 30 years ago. This EIS must acknowledge what will happen as these canisters are no longer safe to transport.

The proposed Yucca Mountain repository in Nevada still does not have a "License to Construct" and despite a portion of a tunnel existing, the facility has not been built, nor have railways to Yucca Mountain been built. Most troubling is that the proposed Yucca Mountain repository will not safely confine the waste. The radionuclides will be leaching into watersheds and will not remain isolated in the repository. The NRC is assuming the existence of a repository that cannot be constructed with the promised titanium drip shields – yet the NRC rules out consideration of other options, on the basis of the lack of information.

One Yucca Mountain repository won't even hold all the spent nuclear fuel the Holtec facility is envisioned to hold. The Holtec facility in New Mexico is proposed to hold up to 173,600 metric tons of spent nuclear fuel, including high burn-up SNF, in 10,000 canisters. Yucca Mountain's evaluated capacity was 70,000 metric tons.

The NRC's draft EIS relies on magical thinking concerning obtaining permanent repositories adequate for all the spent nuclear fuel, up to 173,600 metric tons heavy metal that would be accepted at the proposed Holtec facility should 10,000 canisters fill the 20-phases of the project.

### **Safer Options for Storing Spent Nuclear Fuel at Existing Sites Must Not Be Unscientifically Tossed Out**

This draft EIS tossed out safer options for storing spent nuclear fuel based on the flimsy excuse of not having enough information available, all while promoting the Holtec facility despite

lacking adequate information about canister safety, actual transportation container testing, or realistic repository design details or availability.

Within a few decades, the gamma radiation from the spent nuclear fuel will become easier to shield. But the radioactive material in the spent fuel will remain toxic for millennia and will cause disease and death when in our air, soil and water. More and more canisters will be breached whether by canister cracking or weld failure and will be releasing radionuclides to the air – and that’s the best scenario.

This EIS must acknowledge the high likelihood that Holtec will likely go bankrupt within 40 years as have other nuclear industry companies including the spinoffs of nuclear divisions of General Electric and Westinghouse, and the EIS needs to address what will happen then.

### **The Draft EIS Accident Section 4.15 Accidents Is Incomplete, Not Bounding of Expected Radiological Releases, and Misrepresents Expected Radiological Releases in Other Sections of the EIS**

The draft EIS Section 4.15 that is supposed to address postulated accidents involving the storage of spent fuel at the proposed consolidated interim storage facility (CSIF) includes but is incomplete pertaining to canister integrity. Why would a topic included in the draft EIS be stipulated as outside the scope of the EIS? Canister integrity from weld failure is included in the EIS and the EIS admits that canister breach is expected to occur with a frequency of once per year. An expected event is not an accident, it is a design characteristic.

The draft EIS must address the age-related failures of the canisters including chloride-induced stress corrosion cracking, no matter how many Nuclear Energy Institute employees claim otherwise. The fact is that there is currently no effective method for inspecting for cracks or fixing them or replacing or isolating the damaged canister. Therefore, the risk assessment used by Holtec that omitted canister cracking is woefully inadequate and underestimated the risk of canister breach. The NRC has accepted a risk assessment from Holtec that it knew was unjustifiably incomplete and underestimated the risk of canister breach by stipulating that aging mechanisms would not be included in the risk assessment.

The likelihood and consequences of a spent fuel canister breach affect air quality, worker radiation dose and public radiation dose. Canister integrity issues therefore must not be excluded from the scope of comments on the draft EIS.

The canisters are stainless steel and are susceptible to chloride-induced stress corrosion cracking and can be expected to have been exposed to chlorides. The NRC knows that the canisters will experience through-wall cracks. The NRC’s current approach is to say they will decide what to do when it happens, but we should all rest assured that radiation protection standards will not be exceeded. Therefore, it is the utmost dishonesty to exclude canister cracking from the draft EIS as well as from Holtec’s risk assessment for the canisters.

Section 4.15, “Accidents” does include that it is expected that about once per year a canister at the proposed Holtec facility will be releasing radionuclides to the air, although the reasons for canister leakage is incomplete. The draft EIS acknowledges canister weld failure and estimated

one leaking canister per year. Why then do instructions for commenting on the draft EIS say that canister integrity is outside the scope of the EIS?

The spent nuclear fuel is stored in canisters are described as “below ground” but in reality, the concrete vaults holding the canisters are vented to the atmosphere. The canisters that enclose the spent fuel require air circulation to cool the canisters. That air circulation comes directly from the open air and is unfiltered. A breached canister will be releasing radionuclides directly to the environment at a rate dependent upon the condition of the spent fuel, which the NRC has remained vague about characterizing.

Section 7.3 “Other Monitoring” in the draft EIS makes the incorrect statement: “Because the casks are sealed and welded shut, there is no radiological exposure air pathway.” First of all, canisters, not shipping casks are welded shut. Second, the draft EIS already acknowledges once per year breaches of the canisters. But the extend of wishful thinking and trying to hide the truth in this draft EIS is consistent with the quality of radiological monitoring that citizens of New Mexico can expect if this facility is built.

The radiological release consequences of the canister cracks have not been well characterized as the NRC wishes to pretend that the issue does not exist and certainly does not want the public to understand how serious the issue is. But the consequences will at least include elevated radionuclide releases from the canister. The radionuclides and curie amounts released from a cracked canister will depend on the original fuel burnup, how long the fuel has cooled, damage to the fuel during operation, storage and transport and many variables that will not be known about the fuel condition.

Cracked canisters are far more likely to experience more severe accident conditions should water from flooding enter the canister. The accident risks must also assume a large number of breached canisters are present at the facility. Criticality will occur when non-borated water enters a canister containing high burnup spent nuclear fuel and assumptions that no breached canisters are at the facility are convenient but wrong. The EIS must not be based on wrong assumptions that underestimate the radiological releases from the facility.

Section 4.13 “Public and Occupational Health” cannot properly be written and commented on without scientifically valid treatment of canister cracking likelihood and consequences. Underestimating the likelihood and consequences of canister cracking, omitting age-related or corrosion-related canister cracking from the EIS, despite the known fact that such events are expected and the proposed facility has no approved way to deal with a breached canister is unacceptable and appears to be deliberate denial of the routinely expected radiological harm of the proposed Holtec facility, which would make the proposed project unacceptable.

### **Carbon-14 Dose and Total Annual Radiological Airborne Release Must Be Included in the EIS For Unbreached and Breached Canisters**

Carbon-14 created by unbreached canisters must be included in the EIS as well as unisolated breached canisters, accumulating over 40 years and longer. Neutrons passing through canister walls create carbon-14 outside the canister. Carbon-14 inside the canisters and various other

radionuclides that will be released as canisters are breached must be included in the EIS. As there is no designated or approved means for isolating the breached canister, releases from canisters will continue to increase each year. Ignoring these airborne radiological releases, that expected to be annual occurrences is an example of the inadequacy of the draft EIS.

### **Transportation Accident Releases Must Use Realistic Accident Scenarios and High Burnup Fuel and Therefore Cannot be Based on NUREG-2125**

The NRC's selected assumptions in this EIS are that no transportation accidents will cause a radiological release, even though examination of NRC's assumptions show that is untrue.

It is unacceptable that the draft EIS (Section 4.3 and elsewhere) assumes that there are no radiological releases resulting from the transportation of 10,000 canisters of spent nuclear fuel based on NUREG-2125 because NUREG-2125 deliberately omits realistic accident scenarios such as impact with a surface that isn't flat. NUREG-2125 also fails to address the increased vulnerability and fission product inventory of high burnup fuel.<sup>1</sup>

Many surfaces along the transportation routes are not flat, and this means that accident impacts are greater than assumed in NUREG-2125. Fires involving longer duration fires or hotter temperatures can occur and are more severe than assumed by the NRC for cask design.<sup>2 3</sup> Wishfully and willfully assuming away the devastating radiological releases that may occur as the result of a severe transportation accident does not make it so. The EIS must not be based on unsubstantiated wishful thinking. The consequences of a severe transportation accident must be included in the EIS. The public must not accept the unrealistic and overly rosy assumption that no transportation accident will release radionuclides and the EIS must include realistic radionuclide releases from transportation 10,000 canisters of spent nuclear fuel across the nation's crumbling bridges, roads and railways.

### **An EIS is Must Describe Scientifically Valid Radiation Health Harm**

It is important to know that the public and systematically misinformed radiation workers will be receiving life shortening radiation doses even at when below allowable radiation protection standards. The U.S. NRC fails to acknowledge compelling and diverse studies of human epidemiology that show more harm than accepted radiation protection standards predict. The radiation exposure from transportation of the spent fuel to Holtec poses a risk to the public along the route to the proposed Holtec facility in New Mexico.

Science requires the constant review of new evidence. But the U.S. NRC has not only ignored valid evidence from epidemiology in other countries and in multi-country studies, the NRC has refused to conduct epidemiology near U.S. nuclear facilities that would reveal increased

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<sup>1</sup> Office of Nuclear Materials Safety and Safeguards, Nuclear Regulatory Commission, *Spent Fuel Transportation Risk Assessment*, NUREG-2125, May 2012. <http://pbadupws.nrc.gov/docs/ML1212/ML12125A218.pdf>

<sup>2</sup> Memo from Marvin Resnikoff to Bob Halstead, "NUREG-2125 Review," July 18, 2013, <https://sanonofresafety.files.wordpress.com/2013/06/nureg-2125-review.pdf>

<sup>3</sup> U.S. Nuclear Waste Technical Review Board (NWTRB) Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel, December 2010

childhood cancer and leukemia. The NRC ignores extensive and diverse evidence that there is more harm from radiation exposure to people than the U.S. nuclear industry has assumed.

The NRC continues to use radiation health models that underestimate the actual health harm to humans from radiation exposure.<sup>4</sup>

Radiation workers receiving an average 400 mrem/yr had greater cancer risk, yet the annual limit is 5000 mrem/yr for a worker.<sup>5</sup> The reproductive health effects are larger than workers realize, in terms of sterility and in terms of increased risk of birth defects. And reproductive effects may be worse for workers whose work requires being near spent fuel canisters because of the potential for neutron exposure from the fissile material. The neutron exposure is not measured by typical radiation detectors.

The NRC marches on as though its emergency planning and environmental monitoring of radionuclide emissions are adequate, despite evidence to the contrary. The truth about the lives shortened by the Three Mile Island Unit 2 accident matters.<sup>6</sup>

The US Nuclear Regulatory Commission refuses to fund epidemiology studies near US nuclear power plants. The framework for the study was reported in “Analysis of Cancer Risks in Populations Near Nuclear Facilities; Phase I (2012).<sup>7</sup> After 5 years in planning for the study, the NRC decided it would take too long and cost too much. I think the NRC knows that a credible study would be the end of licensing new nuclear plants.

Epidemiology conducted in Europe includes the study known by its German acronym KiKK (Kinderkrebs in der Umgebung von Kernkraftwerken). The KiKK study on Childhood Cancer in the Vicinity of Nuclear Power Plants, completed in 2007 is scientifically rigorous and statistically sound and its peer reviewed results show significantly elevated cancer risk for children under five years of age living within 5 km of a nuclear power plant. The study looked at childhood leukemia and cancer near nuclear plants from 1980 to 2003.

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<sup>4</sup> “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](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.

<sup>5</sup> 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.

<sup>6</sup> Steve Wing, David Richardson, Donna Armstrong, and Douglas Crawford-Brown, A Reevaluation of Cancer Incidence Near the Three Mile Island Nuclear Plant: The Collision of Evidence and Assumptions, Volume 105, Number 1, January 1997, *Environmental Health Perspective*

<sup>7</sup> See cancer risk study at nap.edu.

The NRC issued a statement <sup>8</sup> explaining their decision which included this excuse: “For example, the German study initially found an association of increased childhood leukemia risk within 5 kilometers of the facilities. However, upon examination of the offsite exposures, the authors concluded the increased risk could not be explained by the releases from the facilities.” In other words, it couldn’t happen, so it didn’t.

In Illinois, near the Braidwood and Dresden nuclear power plants, one family learned that many children in the area had cancer, brain cancer, and leukemia, after their daughter Sarah was diagnosed with brain cancer when she was seven. <sup>9</sup> Cindy and Joe Sauer lived in the area of these reactors from 1998-2004. Joe Sauer, a medical doctor, conducted his own epidemiology study which showed clear increases in childhood cancers near the plants. Read his findings of elevated brain and other cancers near these plants and other studies. <sup>10 11</sup>

### **Worker Radiation Dose Statements in the Draft EIS Are Misleading and Understate the Known Harm to Radiation Workers**

The EIS must include the total dose allowed to workers for their entire career, and include the high likelihood of underestimating the dose from airborne inhalation and ingestion of radionuclides. The cancer fatality and incidence and severe hereditary effects must be included and presented in the EIS, rather than the currently misleading and incomplete coverage in the draft EIS.

### **Public Radiation Dose Statements in the Draft EIS Are Misleading and Understate the Known Harm to the Public from the Allowed 100 mrem Per Year Doses to the Public**

The draft EIS states that the increased risk of a fatal cancer from a one-time exposure of 100 mrem/yr was 1 in 20,000. Yet, such a dose would not be a once in a lifetime event for a citizen living near this facility. Citizens are interested not only in the fatal cancer risk, but also in the cancer incidence, severe hereditary effects, increased infant mortality and other non-cancer health effects.

Because the draft EIS acknowledges that by addressing just a subset of canister breach causes, one breached canister per year can be expected, and because the NRC considers a 100 mrem per year dose to the public to be acceptable, the draft EIS, by choosing to imply that the public would only incur a one time 100 mrem dose, is grossly misleading.

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<sup>8</sup> NRC Policy Issue Information SECY-15-0104, August 21, 2015 “Analysis of Cancer Risks in populations Near Nuclear Facilities Study,” <http://pbadupws.nrc.gov/docs/ml1514/ML15141A404.pdf>

<sup>9</sup> Read about Cindy and Joe Sauer and what they learned about childhood cancer near nuclear power plants: <http://ieer.org/resource/commentary/on-life-near-two-nuclear-power-plants-in-illinois/> and read Joe Sauer, MD, presentation on elevated cancer rates near the Dresden and Braidwood nuclear plants at <http://ieer.org/wp/wp-content/uploads/2013/06/Health-Concerns-and-Data-Around-Illinois-Nuclear-Plants-slides-for-SDA-2013.pdf>

<sup>10</sup> Dr. Paul Dorman, “Why UK nuclear power plants may cause childhood cancer and leukaemia,” May 16, 2011, <https://www.escosubs.co.uk/theecologist/promotion.asp?code=RF2011ROW>

<sup>11</sup> Steve Wing, David B. Richardson, Wolfgang Hoffman, “Cancer Risks Near Nuclear Facilities,” Environ Health Perspect. 2011;119(4):417-421.

Because there is currently no way for the proposed Holtec facility in New Mexico to repair a breached canister or isolate a breached canister, the continued release of about one canister per year for 40 years would be 40 leaking canisters. The EIS must include the total radiological release for all of the leaking canisters. If built, will the NRC meet the 25 mrem/yr dose by evacuating people, by failure to monitor the release or by lying about the magnitude of the releases? Long-lived radionuclides released from the canisters will continue to accumulate in the soil and there will be a buildup of radionuclides at the facility and where people live. Will the NRC simply raise the stated *background* level of radiation as this occurs, and pretend that the levels of radionuclides are not above *background*?

A lifetime dose of an extra 25 or 100 mrem inhalation or ingestion dose will have significant health consequences beyond fatal cancer dose. It will elevate the cancer incidence and severe hereditary effects. It will disproportionately harm the unborn and children, harming female children even more than male children.

### **The Disconnect Between Stated Radiological Releases and Actual Health Effects Means the Harm of 25 mrem/yr is Actually Far Higher Than NRC-approved Modeling Predicts**

There are consequences to the refusal of the NRC to use current compelling and diverse scientific evidence of the harm of radiation inhalation and ingestion on human health.

Our experience in Idaho with radionuclide releases that are said to be a fraction of a millirem per year. We have Three Mile Island fuel debris in dry storage. The dry fuel storage leaks radionuclides to blow around in the air. Now, Idaho is a very radioactively contaminated state, from one end to the other. We received radioactive fallout from the Department of Energy's nuclear weapons testing in Nevada. Idaho has privately owned hazardous waste dumps on the Boise-side of the state, one closed and one still operating by US Ecology in Grandview. These dumps accepted for years and the Grandview dump still accepts radioactive waste, despite not being a licensed radioactive waste dump. We have radioactive waste going airborne from this activity, and leaking into groundwater and the Snake River. And only perhaps one dozen jobs in the state from it. But our political leaders silence has been bought. Our state Idaho Department of Environmental Quality does everything in its power to avoid monitoring the radionuclide emissions from the radioactive waste dumping at Grandview and from the Idaho National Laboratory. Our Idaho legislature removed a decades old law restricting airborne radiological emissions, solely in order to prevent any legal challenge to radiological polluters in our state.

At the INL, the Three Mile Island dry cask storage releases a very large amount of radioactive material airborne to our state, including iodine-129, radioactive for 16 million years.

Despite the fact that the entire state had radioactive fallout from Nevada weapons testing, only the counties near the INL and that includes near the NRC-licensed Three Mile Island dry fuel storage have twice the thyroid cancer incidence compared to the rest of the state of Idaho and the country.

What are the radiation doses claimed to be from the airborne release of radionuclides from the TMI casks? Less than a tenth of a millirem, whole body. Every county surrounding the INL's

TMI casks, including Bonneville, Bingham, Madison, Jefferson, and Butte has double the thyroid cancer rate of the rest of the state and the rest of the country.

The total whole-body dose from the INL, including the TMI dry storage, is stated to be less than a tenth of a millirem, annually. What will happen in New Mexico when the NRC allows 25 mrem/yr or more to be released to the air (not shine, but radionuclide particulates) from the Holtec facility? Well, citizens of New Mexico can expect that no valid epidemiology will be conducted.

Sincerely,

Tami Thatcher