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Nuclear Regulatory Commission
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November 15, 2017

RE: NUCLEAR REGULATORY COMMISSION [NRC–2011–0012] RIN 3150–AI92, Low-Level Radioactive Waste Disposal, Nuclear Regulatory Commission. Regulatory analysis; request for comment and public meeting. Posted in *Federal Register* /Vol. 82, No. 199 /Tuesday, October 17, 2017 /Notices 48285

The following are the comments of the Environmental Defense Institute (EDI) concerning the Nuclear Regulatory Commission's Proposed Rule on Low-Level Radioactive Waste Disposal as it appeared in the Federal Register *Federal Register* /Vol. 82, No. 199 /Tuesday, October 17, 2017, Notices 48285.

It is difficult to find the documents to review for this public comment period. The NRC docket page did not appear to provide SECY-16-0106 or the later overriding changes to it in the September 8, 2017 Staff Requirements Memorandum SRM-SECY-0106. The incompleteness of the NRC's Docket page combined with the challenges in obtaining documents in the Adams database may explain the lack of public comments received so far. [1]

In SECY-16-0106, the NRC tried to shore up protections of human health from shallow burial of low level radioactive waste that resulted from its very weak protections in its draft rule. This has led to an outcry from the Department of Energy and others who profit from making messes that will forever harm future generations of people. [2] [3] So the NRC is backing down on proposed protections.

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[1] When using the NRC Adams database, it is helpful to know that for the Staff Requirements Memorandum SRM-SECY-0106, the ML17251B147 number posted in the Federal Register is the accession number. By using the advanced search, accession number option, using operator "is equal to," entering the full ML accession number, and clicking on "search," the SRM-SECY-0106 document can be retrieved. For the infrequent user, NRC's instructions could be improved.

[2] Letter to the NRC Chairman Kristine L. Svinicki from Department of Energy, Acting Assistant Secretary for Environmental Management, Susan M. Cange, February 9, 2017. The letter expresses concern over the 10,000 year compliance period with a 25 mrem annual dose limit.

[3] Letter to the NRC Chairman Kristine L. Svinicki from EnergySolutions Senior Vice President, Daniel B. Shrum, April 10, 2017, Reference SECY-16-0106. In the letter it appears that EnergySolutions is concerned over language that might be considered to mean that EnergySolutions had confidence that their analyses to the extent that they would "ensure" that the results were met. They seem to want to clarify that they wish to make it sound like they will meet performance objectives but they do not want to imply that they will stand behind their model

The changes proposed in Staff Requirements Memorandum SRM-SECY-16-0106, at ML17251B147 on the Adams database but not directly available from Regulations.gov or from the NRC Docket page, would remove several key features from SECY-16-0106. The Staff Requirements Memorandum will make it easier to bury long lived radionuclides in shallow burial and virtually guarantee it will cause significant health impacts in the future. No one who cares about human health should allow the changes stated in the Staff Requirements Memorandum SRM-SECY-16-0106 to be made.

So, the Department of Energy would find the restrictions problematic as it would make it more difficult for it to dump its waste at NRC licensed facilities. But the Department of Energy only knows how to make environmental devastations and it should not be allowed to derail efforts to create regulations that have at least some chance of being protective of human health and the environment.

SECY-16-0106 proposed extending the "Compliance Period" from 1000 years to 10,000 years if significant quantities of long-lived radionuclides are present. The new requirements were to apply to currently operating and future low level radioactive waste (LLRW) disposal facilities. But the Staff Requirements Memorandum SRM-SECY-16-0106 direction is to limit the compliance period to 1000 years, independent of radionuclide content. And the new requirements would not apply to existing facilities. This makes the whole exercise of creating regulations rather meaningless given the Department of Energy's plans to use existing non-DOE facilities that use these NRC regulations to dispose of enormous amounts of depleted uranium.

The wording of the regulations waffles so much that it has said in prior versions of draft rule changes (Federal Register March 26, 2015, 16098) that "the annual dose should be minimized below 500 mrem" — note that "should" does not mean "shall" and therefore is not a requirement. Furthermore, regulations have stated, "should be minimized below 500 mrem **or a level that is supported as reasonably achievable based on technological and economic considerations**." In the later version of SECY-16-0106, it states that "a licensee must demonstrate that the impacts after 10,000 years have been minimized to the extent reasonably achievable. But the Staff Requirements Memorandum has even undone that statement, as weak as it is. A red-line and strike-out of the Staff Requirements Memorandum effect on the proposed final rule in SECY-16-0106 would be helpful to fully inform the public.

The rulemaking efforts are going on in ways intended to fool the public into thinking that careful decisions are being made based on sound scientific reasoning. The fact is that the Department of Energy wants to dump its depleted uranium as cheaply as possible and not worry about the consequences years from now. The companies running the dumps want to avoid liability and so want to avoid implying that they are making any firm commitments. The NRC obliges by

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predictions. They apparently realize that their mathematical models are not adequate to "ensure" adequate stability of the burial site.

creating a regulation that says do an analysis and try to make it look like you tried to slow the migration of contaminants.

Implying that "defense in depth" will be protective when the NRC knows that various barriers are not independent nor are they redundant or effective barriers to prevent migration of radionuclides is meant to deceive the public and little else. The large uncertainties in predicting the rate of radionuclide migration over hundreds and thousands of years are being used as an excuse to do whatever seems expedient. The enormous uncertainties should be cause for more conservatism and more restrictions in the allowed concentrations of contaminants and reduced total curie amounts that can be buried. Superficial uncertainty analyses conducted by the Department of Energy have not be forthright about the many orders of magnitude of change to radiation dose which would be deadly at much smaller variations.

The low level radioactive waste industry, at times aided by the Department of Energy, has not even been successful at tracking the quantity and types of waste being buried. [4] The Department of Energy has created Superfund contamination sites in nearly every endeavor and should not be driving the regulations for low level radioactive waste disposal. [5]

In a moral society, one would not shallowly bury radionuclides that build up over thousands of years and sabotage the health of future inhabitants, whether or not the NRC refers to these humans as "intruders."

As IEER commented previously, "The definition of "inadvertent intruder" in the proposed rule is absurd. How can a person be an 'intruder' if they engage in normal activities, such as agriculture, after all institutional controls have expired and after all passive barriers are assumed to no longer be effective? An 'intruder' by definition is someone who is not authorized to be on the site but enters anyway. After 500 years, people who enter the site will be members of the public who may gain access by purchasing land, by using in a manner that may then be authorized, or may simply be using land that has been opened up to the public by design or lapse of institutional memory. At that time, anyone on the former disposal site is simply a member of the public." [6]

The focus on the economic costs now is driving the regulatory changes and there is no advocate for future generations of people who will suffer and die because of these egregious changes to

[4] Massachusetts Department of Public Health, Low-Level Radioactive Waste Trend Report, 2015. See p. 47 for a discussion of inadequate recordkeeping of radioactive waste disposal.

[5] United States Government Accountability Office, SUPERFUND – Trends in Federal Funding and Cleanup of EPAs Nonfederal National Priorities List Sites, GAO-15-812, September 2015. The number of nonfederal and federal Superfund contamination sites in 2015 on p. 1. The total number of sites is 1,315 with 157 being federal sites created by the Department of Defense or Department of Energy.

[6] Institute for Energy and Environmental Research, IEER Comments on the Nuclear Regulatory Commission's Proposed Rule on Low-Level Radioactive Waste Disposal (10 CFR Part 61; Docket NRC-2011-0012)1 Arjun Makhijani September 21, 2015, PR-20, 61, 80FR16081

allow shallow land burial of long lived radionuclides in NRC licensed facilities that were to have become benign through radioactive decay in a few hundred years.

Environmental Defense Institute, Troy Idaho (Chuck Brocious and Tami Thatcher) offered the following public comment July 24, 2015 to the NRC regarding rule changes initially proposed." [7]

> "The US Nuclear Regulatory Commission (NRC) is proposing to amend regulations that govern low-level radioactive waste disposal facilities.[8] These are shallow land burial facilities that bury radioactive materials. These facilities will be allowed to bury large amounts of long-lived radionuclides — radionuclides that do not substantially decay away within 500 years. Long half life or the increase of radioactivity due to ingrowth of decay progeny will cause these disposal sites to eventually leach radioactive contaminants into our groundwater for hundreds of thousands of years.
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> "We appreciate that the NRC has acknowledged shortcomings in its current regulation of low level radioactive waste burial regulations due to waste blending. We appreciate that the NRC recognizes that its current focus on the first 100 or 500 years of operation of these facilities is inadequate to protect the public from the large amounts of long-lived radionuclides being disposed of. But the proposed rule changes are not protective of human health or the environment.
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> "The NRC is recognizing how inadequate the capability of limiting the migration of these radionuclides into the environment is over the long term. But nice-sounding phrases like defense-in-depth disguise the fact that significant amounts of radioactive contaminants will leach into our groundwater over time.
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> "The NRC is recognizing the inadequacy of attempts to model the performance of these waste sites for anything past a few hundred years. They know that these performance assessments depicting unrealistically slow and constant trickle out of contaminants are indefensible and unsupportable. The NRC is requiring that a performance analysis be conducted — yet accepting unlimited contamination and radiation dose levels as long as there was the pretense to minimize the contamination.
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> "This is a regulation that pretends to be concerned with protecting human life. But this is a regulation concerned only with protecting the nuclear industry's ability to dispose of radioactive materials in the most unfettered way possible.
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> "The Compliance period (within 1000 years following closure of the disposal facility), the Protective Assurance Period (between 1000 and 10,000 years following closure of the disposal facility) and the Performance Period (after 10,000 years) have varying

[7] Comment (73) of Tami Thatcher on FR Doc # 2015-06429. This is a Comment on the Nuclear Regulatory Commission (NRC) Proposed Rule: **Low-Level Radioactive Waste Disposal** For related information, **Open Docket Folder**

[8] 10 CFR Part 61; Docket NRC-2011-0012. See http://www.regulations.gov/#!docketDetail;D=NRC-2011-0012

performance objectives. It is an immoral act to pretend to regulate the disposal of radioactive material with concern for human health but to actually not provide any assurance of this protection.

"After the initial compliance period, the proposed rule requires only that an effort be made to minimize releases to the extent reasonable achievable at any time — "Do only what is reasonably achievable based on technological and economic considerations. Doses greater than 25 mrem/yr? No problem. Doses greater than 500 mrem/yr? No problem, says the NRC. Yet, we know that these levels will damage children and shorten lives. A limit of 25 mrem/yr is barely protective. Anything above 4 mrem/yr is going to damage health. The proposed rule could accurately be called the "anything goes" rule and it is not protective of human health. In fact, the proposed rule practically guarantees extensive contamination of our country.

"The public has not been provided an adequate description of the devastating ramifications of this inadequate proposed rule. NRC presentations and descriptions of this rule have been inadequate to explain the extensive contamination that will be allowed and actually encouraged by this proposed regulation. Anyone concerned with human health and the environment cannot be satisfied with the proposed low–level waste disposal "anything goes" rule.

"This regulation will permit unlimited contamination of our groundwater for millennia despite the charade of lengthy discussions that would make it appear otherwise.

"The NRC must not be allowed for make the proposed rule into law. In this regulation the NRC claims to be addressing public health and safety and the requirements for meeting health and safety standards. But instead the NRC throws existing and future health standards out the window after the initial compliance period. The NRC wants to allow any level of contamination by the disposal of long-lived waste as long as the dumper "tried" to minimize the inevitable migration of contamination. Throwing all health standards out the window is not responsible and is not protective of human health or the environment." [9]

The recent SECY-16-0106 proposed NRC regulation changes that would have been more protective, by extending the compliance period to 10,000 years and trying to reduce the radiation dose to 25 mrem rather than 500 mrem annually. But the outcry from the Department of Energy and others is that attempting to provide even this measure of protectiveness is too burdensome.

[9] EDI's July-August 2015 Newsletter articles by Tami Thatcher. www.environmental-defense-institute.org

The public comment period is about insiders getting what they want. It is not about an openly public process that is transparent.

The NRC staff says it will consider the responses to these questions as it revises the regulatory analysis.

Question 1: Is the NRC considering appropriate alternatives for the regulatory action described in the draft regulatory analysis?
*Response to 1:*No. The NRC's efforts in this go round are about economic costs now and not the protectiveness to future generations. The extent of harm is ignored as there is no attempt to estimate the number of people who may be harmed over the many thousands of years that the long lived radionuclides will pose significant health risks. The public has not been informed of the magnitude of the harm posed by various regulatory choices in the various versions of the proposed rule changes regarding burial of low level radioactive waste. The magnitude of the environmental harm is not being accurately portrayed. The choices should require the NRC to prepare an Environmental Impact Statement on the proposed revisions, setting forth and analyzing reasonable alternatives as well as a no-action alternative. The public is not being told in a forthright manner the enormous consequences of these various low level radioactive waste regulation changes.

Future inhabitants are not going to be protected. [10]

Question 2: Are there additional factors that the NRC should consider in the regulatory action? What are these factors?
Response: The NRC's inability to protect radiation workers should be a clue as to how effectively they are going to protect people in the future. The argument that organ dose should be eliminated because the ICRP 2 approach was based on an obsolete "critical organ" approach is specious. Organ dose is still fundamental to internal dosimetry. There is nothing obsolete about this approach. Moreover, current science continues to show that many radionuclides target specific organs like the thyroid or bone surface. This means that limiting organ doses is the most protective way to limit harm to public health. [11] [12]

The fact that the NRC would even entertain 500 mrem/yr as a dose limit demonstrates an inability to understand the adverse impacts of radiation especially on children and the unborn developing child. The epidemiology of radiation workers issued in 2015 by Richardson shows harm to adult workers receiving less than 500 mrem/yr for a few years. [13]

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[10] Institute for Energy and Environmental Research, IEER Comments on the Nuclear Regulatory Commission's Proposed Rule on Low-Level Radioactive Waste Disposal (10 CFR Part 61; Docket NRC-2011-0012)1 Arjun Makhijani September 21, 2015, PR-20, 61, 80FR16081
[11] IEER Comments on NRC-2011-0012.
[12] IEER Comments on NRC-2011-0012.
[13] 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

Question 3: Is there additional information concerning regulatory impacts that the NRC should include in its regulatory analysis for this rulemaking?
*Response:*NRC must STOP encouraging new nuclear power projects that will generate more waste that NRC/DOE cannot safely dispose of anywhere.

Question 4: Are all costs and benefits properly addressed to determine the economic impact of the rulemaking alternatives? What cost differences would be expected from moving from the discussed 1,000 year and 10,000 year compliance periods to a single 1,000 year compliance period? Are there any unintended consequences of making this revision?
Response: The costs should not be more important that the harm which has not adequately been conveyed by consideration of a radiation protection limit which they won't even try to meet. The dumpers don't care about anything past their retirement. These regulations may guarantee harm to untold numbers of people in the future. The Department of Energy here in Idaho claims that they will provide institutional controls for millennia to maintain soil caps over waste and to prevent human's from living near the waste, [14] [15] even though the NRC recognizes that this is a ridiculous commitment.

Question 5: Are there any costs that should be assigned to those sites not planning to accept large quantities of depleted uranium for disposal in the future?
Response: Again, putting today's economic costs ahead of the need to protect human life is out of balance. Why aren't the future costs of institutional controls being considered? What about the cost of the loss of clean groundwater? What about describing the costs of attempted cleanup of previous/current of existing LLRW dumps that have contaminated groundwater? [16] [17] [18]

(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.

[14] EDI 2016 Earth Day Report describing the "Forever" Contamination Sites at the Idaho National Laboratory, by Tami Thatcher, April 23, 2016.

[15] 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/

[16] Idaho Cleanup Project, Idaho National Laboratory, "Record of Decision – Radioactive Waste Management Complex Operable Unit 7-12/14, DOE/ID-11359, September 2008". https://ar.icp.doe.gov/images/pdf/200810/2008100100495TUA.pdf

[17] 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/

[18] 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 Cleanup Project. And see Prepared for Department of Energy Idaho Operations Office, Phase 1 Interim Remedial Action Report for Operable Unit 7-13/14 Targeted Waste Retrievals, DOE/ID-11396, Revision 3, October 2014 https://ar.inl.gov/images/pdf/201411/20141103009 60BRU.pdf

Question 6: Is NRC's assumption that only two existing LLRW sites (*i.e.,* EnergySolutions' Clive Utah disposal facility and Waste Control Specialists' Texas disposal facility) plan to accept large quantities of depleted uranium for disposal in the future reasonable?
Response: For general short term planning typical of the nuclear industry, it might be a reasonable assumption. But the impacts of the regulation loosening will encourage the Department of Energy to further reduce protections at its many radioactive burial grounds that contain long lived radionuclides. Experience has consistently shown that shallow burial of nuclear waste contaminates groundwater far more than estimated when the dumping took place.

Question 7: What additional costs or cost savings, not already considered in the draft regulatory analysis, will the supplemental proposed rulemaking or alternatives cause to society, industry, and government? What are the potential transfer (''pass-through'') costs to the waste generators and processors?
Response: The economic costs now should not be used to ignore the future harm to humans and the environment. An adequate nuclear waste repository for the waste should be pondered and whether or not an adequate waste repository is even achievable should color the importance of ceasing to create more of the waste.

The proposed NRC rule does not inform the public of the great harms created by making it easier to bury the waste without any meaningful protection to people in the future. The emphasis on present day economic harm is out of balance with the great harms the proposed rule changes are poised to inflict.

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