

January 5, 2014  
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**UNSAFE NUCLEAR REACTOR OPERATIONS  
AT SANDIA NATIONAL LABORATORIES**

**Citizen Action New Mexico Comments on the  
DOE Draft Environmental Assessment for Resumption of Transient Testing of  
Nuclear Fuels and Materials**

Citizen Action New Mexico (CANM) is a 501(C)(3) project of the New Mexico Community Foundation, a public interest organization. CANM is very interested in Sandia National Laboratories (SNL) since it is a key facility in the Department of Energy (DOE) nuclear weapons complex that generates and stores extremely large amounts of hazardous and radioactive wastes. DOE has failed to clean up radioactive and hazardous waste at both Sandia National Laboratories and the Idaho National Laboratory. Those wastes pose great threats to public health and the environment. Operation of DOE reactors historically and up to the present have lacked adequate safety systems, controls and upgrades. DOE has not analyzed the full potential for accident consequences to the public in the Draft EA.

CANM is opposed to operation of the Annular Core Research Reactor (ACRR) or the TREAT reactor as described in the Draft Environmental Analysis (EA). A full Environmental Impact Statement (EIS) is required as a matter of law to be performed for both the TREAT reactor and the ACRR. DOE is incorrect to use an EA for the ACRR or the TREAT. 10 CFR 1021 (Appendix D at D4) requires that reactors, even test or research reactors must have an EIS. The alternative in the Environmental Analysis (EA) for running transient tests in the ACRR is unacceptable for reasons stated below and included in the Attachments 1-5 (separately provided). The operation of the ACRR poses danger to employees and the public in Albuquerque New Mexico. Use of the ACRR will generate more nuclear waste.

The SNL 1999 Environmental Impact Statement is out of date and does not contemplate the many activities described in the Draft EA for transport, hot cell activity between Idaho National Laboratory and SNL facilities.

The operation of either the TREAT reactor or the ACRR reactor is a waste of money for advanced reactor development. This is a direction the public has argued against time and again. The Fukushima disaster argues against the direction even more strongly.

Transient reactor testing has the goal of advancing the nuclear fuel cycle which means research for fast neutron reactors. The problem is that fast reactors may never be safe, economic, or ready in time to address global warming. The TREAT reactor research was

used for Japan's Monju fast reactor fuel. Monju started operation in 1994 but following a serious liquid sodium leak in 1995 the reactor has basically been unable to return to operation due to a series of problems ever since.<sup>1</sup> Monju's restart was unsuccessfully attempted in 2010 and its future is in doubt.<sup>2</sup> Monju is the poster child for the unsuccessful TREAT reactor goal of advancing the nuclear fuel cycle.

The money DOE money creating more spent fuel in the absence of any plan for disposal or storage should instead be used for cleanup of Sandia National Laboratories Mixed Waste Landfill (MWL) that is contaminating Albuquerque New Mexico's drinking water aquifer. The radioactive and hazardous wastes in the MWL are in unlined pits and trenches under an improperly constructed dirt cover. Sandia has relied on a fraudulent groundwater monitoring network that does not provide reliable and representative groundwater samples. DOE/SNL's outrageous violation of the MWL Final Order requirement for its non-performance of the 5-year review requirement for the feasibility of excavation should be immediately addressed by DOE/NNSA/SNL.

The Draft EA should not be allowed to proceed without the provision of the operating history for the ACRR. The ACRR is currently the subject of a 2013 Freedom of Information Lawsuit (FOIA) filed in Federal District Court in Albuquerque regarding nuclear operations at SNL. <http://dockets.justia.com/docket/new-mexico/nmdce/1:2013cv01128/288517> DOE/NNSA/SNL have refused to provide information about the operating history for the ACRR for nearly three years. Until such operating history is provided, the public lacks any transparent review for operations at the ACRR and accident scenarios are nothing more than conjecture by DOE/SNL. DOE/NNSA/SNL are operating the ACRR as an unsafe nuclear facility with unresolved safety questions. (The DOE/NNSA/INL similarly fought against provision of safety documents under the FOIA for the Advanced Test Reactor (ATR) at Idaho for more than half a decade. The safety concerns for the ATR are numerous.)

The Draft EA states that:

“Accidents that could occur at ACRR are a function of the experiment design, reactor design, and reactor operation. The differences between operations at TREAT and ACRR required identification of scenarios specific to ACRR.”

The Defense Nuclear Facility Safety Board (DNFSB) has expressed safety concerns for the ACRR that are not considered by the Draft EA.

The ACRR lacks an adequate Design Safety Analysis (DSA). There is no safe operating margin for the ACRR. A possible explosion and meltdown of the ACRR are described by the Defense Nuclear Facilities Safety Board (DNFSB). Beginning in 2004, the DNFSB found numerous and serious operational flaws in the ACRR. In September 27,

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<sup>1</sup> T. B. Cochran et al., Fast Breeder Reactor Programs: History and Status, Research Report 8 International Panel on Fissile Materials, February 2010. [www.fissilematerials.org](http://www.fissilematerials.org)

<sup>2</sup> <http://www.japantimes.co.jp/news/2013/05/15/reference/monju-generating-only-misfortune/#.UsTNK7TaIm4>

2004 Linton Brooks, Administrator for the National Nuclear Security Administration (NNSA) was informed:

“The Defense Nuclear Facilities Safety Board (Board) recently reviewed an approved safety basis for a nuclear facility located at Sandia National Laboratories, New Mexico (SNLNM). Based on the Board’s review, as detailed in the enclosed report, the approved safety basis does not provide assurance that the operational hazards have been adequately analyzed and controlled.

“Many of the inadequacies identified in the safety basis appear to reflect fundamental weaknesses in the implementation of nuclear safety requirements at SNL-NM. The Sandia Site Office (SSO) has taken action to require improvements in SNL-NM’s safety basis methodology, but the inadequacies in this safety basis remain. Allowing these inadequacies to go uncorrected permits the startup of a facility without an assurance that all hazards have been adequately addressed.

“Allowing an inadequate safety basis to go un-corrected also compromises the longterm integrity of the change control system, which relies on adequate safety analyses to serve as a baseline for assessing the impact of future changes.”

In CANM’s letter of March 3, 2010 to the DNFSB, CANM identified the following concerns of SNL for the lack of ACRR earthquake safety and lack of ventilation confinement to the DNFSB:

“According to the conclusions of a January 7, 2005 Sandia White Paper Analysis written by the Nuclear Reactor Facilities Department (Attachment D to the March 3, 2005 letter of Linton Brooks to John T. Conway of DNFSB) an upgrade for the Highbay Reactor Room and components has not been accomplished and would require major redesign and reconstruction (p.2):

“Another conclusion of this assessment was that the Active Confinement System safety function (which would be accomplished by [systems and safety components] SSCs associated with the ACRR Highbay (Bldg. 6588, Room 10) and the Highbay Ventilation System could not be transitioned to Safety Class. One major issue is the seismic qualification of the Highbay itself. In order to provide active confinement, it is necessary that the Highbay survive a design basis earthquake (DBE). The DSA currently states that the structure would not likely survive such an event. In addition, the Highbay Ventilation System (HBVS) ductwork, filters, and fan must also continue operating following a DBE. Thus, transitioning to Safety Class status would involve major redesign and reconstruction of the Highbay and the HBVS.”

The DNFSB continued its statement of concerns in April 2012:

“The Board letter to DOE dated February 28, 2012, addresses issues identified by the staff concerning the ACRR safety basis and instrumentation and control systems. The enclosed report details the quality assurance and software quality assurance issues identified during these reviews and subsequent discussions with SNL personnel.”

The ACRR concerns of the DNFSB in February 2012 included the risk of an explosion at the ACRR.

Nothing in documents reviewed by Citizen Action indicates that major redesign and reconstruction regarding DOE seismic requirements were/are accomplished for the ACRR or that there is any adequate Design Safety Analysis (DSA) in place.

The Draft EA takes credit for pool water in the ACRR for protecting the public and is less than conservative for the full consequences of an accident. The Draft EA states (Section 4.2.3):

“The dose calculations take credit for the filtering capacity of the ACRR pool, but do not credit HEPA filters.”

The DNFSB pointed out that the Beyond Design Basis Accident (BDBA) analysis required for the ACRR requires an analysis of complete loss of pool water [http://www.radfreenm.org/old\\_web/pages/IndependentReviews/DnfsbLetterFeb2012ToNsaReAcrr.pdf](http://www.radfreenm.org/old_web/pages/IndependentReviews/DnfsbLetterFeb2012ToNsaReAcrr.pdf) :

*“Beyond Design Basis Accident (BDBA)*-The discussion of the BDBA (seismic event with complete loss of reactor pool water) in the DSA concludes that no damage or release would occur as a result of the accident. The Board's staff does not believe that the postulated BDBA scenario represents an appropriate BDBA for the facility. NRC Regulatory Guide 1.70 provides guidance for the analysis of BDBAs, as does DOE Standard 3009-94. The latter notes, "The [Title 10, Code of Federal Regulations, Part 830] requirement is that an evaluation be performed that simply provides insight into the magnitude of consequences of beyond DBAs (i.e., provide perspective on potential facility vulnerabilities). This insight from beyond DBA analysis has the potential for identifying additional facility features that could prevent or reduce severe beyond DBA consequences. Operational beyond DBAs are simply those operational accidents with more severe conditions or equipment failures than are estimated for the corresponding DBA" (p. 54). The BDBA currently presented in the DSA is not consistent with either of these documents. It does not consider a release that exceeds that of a DBA, and it does not provide insight into the identification of facility features that could provide additional prevention or mitigation of accidents with severe consequences.”

The DOE Draft EA does not take into account the Nuclear Regulatory Commission's recent generic Waste Confidence Environmental Impact Statement (NUREG-2157). The NRC included in its EIS estimates not only the public radiation doses (in rem) but also the economic impact of the accident including estimates of evacuation costs, relocation costs for displaced persons, property decontamination costs, loss of use of contaminated property through interdiction, crop, and milk losses. Estimates for NRC onsite property damage costs also include onsite cleanup and decontamination and repair of facilities. The DOE has chosen to pretend that only the radiation doses conveyed in a passing airborne plume are adequate to discuss for the consequences of potential accidents. DOE ignores the consequences of long-lived actinides that can contaminate Albuquerque's soil, water and air.

The public, even in New Mexico, deserves complete disclosure of the economic and important long term contamination considerations even if the ACRR reactor consequences are less than a full sized nuclear reactor. DOE's longstanding approach to rely on dilution of airborne released radiation does not satisfy the public need for protection.

THE SEISMIC HAZARD ASSESSMENT REQUIREMENTS IN 10 CFR 830 AS IMPLEMENTED BY DOE ORDER 420.1B ARE NOT IN PLACE FOR THE ACRR. DOE ORDER 420.1B requires major modifications for the rehabilitation of existing facilities to comply with Executive Order 12699 for the use of the appropriate seismic design and construction standards for new buildings. The four standards were issued over the years 2004 to 2008.

DOE/NNSA are not meeting DOE ORDER 420.1B requirements for Evaluation and Upgrade Requirements for Existing DOE Facilities such as the ACRR. Order 420 1.B requires DOE and Contractors to assess the need for a new or revised Probabilistic Seismic Hazard Analysis (PSHA) every ten years (see DOE Order 420.1B section c. 4).

Sandia is required to assess seismic hazard every 10 years but has failed to do so for the SNL site and including the ACRR. The reactor is in a building that SNL knows has not been made safe to withstand the earthquake for the ACRR. DOE/NNSA have not considered the requirements for upgrade of the ACRR. As stated above by Linton Brooks, the ACRR building requires major upgrade to meet seismic and ventilation requirements.

SNL has not provided the required Natural Phenomenon Hazard (NPH) assessment reviews for Sandia. The reviews must include a section on the seismic hazard.

There is no description of any seismic detection instruments located at Sandia, the number of such devices or any accurate data collected from the seismic instruments and provided in the EA

FROM PAGE IV-2 IN DOE ORDER 420.1B:

b. Evaluation and Upgrade Requirements for Existing DOE Facilities.

(1) SSCs [structures, systems and components] in existing DOE facilities must be evaluated when there is a significant degradation<sup>3(see footnote 3 below)</sup> in the facility safety

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<sup>3</sup> See DOE G 420.1-2 for additional guidance on significant degradation.

FROM PAGE 16 IN DOE G 420.1-2:

### **6.3 Evaluation and Upgrade of Existing DOE Facilities**

SSCs in existing DOE facilities should be evaluated in accordance with paragraph 1 of Section IV.2 when there is a significant degradation in the safety basis for the facility or if the provisions of Executive Order 12941 for existing facilities require a reevaluation of

basis. Evaluations must address the safety significance of the SSCs and the seismic requirements of E.O. 12941, Seismic Safety of Existing Federally Owned or Leased Buildings [Emphasis supplied].

(2) If the evaluation of existing SSCs identifies NPH [Natural Phenomena Hazards] mitigation deficiencies, an upgrade plan must be implemented on a prioritized schedule based on the safety significance of the upgrades, time or funding constraints, and mission requirements.

c. NPH [Natural Phenomena Hazards] Assessment.

(1) Both facility design and evaluation criteria must address the potential types of NPH occurrences. The NPH assessment must use a graded approach commensurate with the potential hazard of the facility.

(2) NPH assessment for new facilities must use a graded approach that considers the consequences of all types of NPHs. Site-wide information may be considered when appropriate.

(3) NPH assessments must be reviewed and upgraded as necessary for existing sites/facilities following significant changes in NPH assessment

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seismic mitigation. In general, a degradation of the safety basis would be identified as part of the USQ process.

If either of the conditions above are satisfied, the contractor/operator must establish a plan for evaluating the affected SSCs. The plan must incorporate a schedule for evaluation taking into account programmatic mission considerations, the safety significance of the potential failure of SSCs due to natural phenomena, and the cost/benefit of potential improvements. **The evaluation plan and schedule must conform to the provisions that implement Executive Order 12941** [Emphasis supplied].

The evaluation would only be conducted for the “affected SSCs”; that is, those SSCs for which a safety function would be required after or during natural phenomena. If the evaluation of existing SSCs identifies NPH mitigation deficiencies, the contractor/operator must evaluate the cost/benefit of potential improvements and establish an upgrade plan for cost beneficial improvements. The upgrade plan must incorporate a prioritized schedule for upgrading the SSCs. The upgrade plan must address possible time or funding constraints, the cost/benefit of anticipated improvements, and programmatic mission considerations.

The plan to upgrade existing SSCs to eliminate NPH mitigation deficiencies must be consistent with the Interagency Committee on Seismic Safety in Construction Standard, RP-4, and meet the provisions thereof, as a minimum. Guidance on the implementation of ICSSC RP-4 provisions is given in ICSSC RP-5. As indicated in Executive Orders 12699 and 12941, it is the intent of the Federal Government to ensure that both new and existing Federal buildings provide life safety and prevent property loss in the event of a seismic occurrence [Emphasis supplied].

methodology or site-specific information.

(4) An NPH assessment review must be conducted at least every 10 years and must include recommendations to DOE for updating the existing assessments based on significant changes found in methods or data. If no change is warranted from the earlier assessment, then this only needs to be documented [Emphasis supplied].

d. Seismic Detection. Facilities or sites with hazardous materials must have instrumentation or other means to detect and record the occurrence and severity of seismic events [Emphasis supplied].

### **Additional Comments**

1. The ACRR lacks a containment structure.
2. The Highbay Bldg. housing the ACRR is an unsafe structure that Sandia cannot or will not upgrade to withstand a large earthquake.
3. The inadequate Highbay Bldg. ventilation system cannot protect the public, SNL and Kirtland Air Force Base personnel against radiation release.
4. The ACRR is within the flight pathway shared by both Kirtland Air Force Base (KAFB) and the Albuquerque International Sunport. The Highbay Bldg. where the reactor is housed cannot withstand an airplane crash.
5. Sandia National Laboratory is the only National Nuclear Security Administration (NNSA) facility operating on a U.S. military installation, i.e., Kirtland Air Force Base. That fact alone creates reciprocal dangers not present at other military bases and not present for other national laboratories. This includes storage of approximately 2000 nuclear weapons at KAFB.
6. The minimal protections provided for commercial nuclear reactors in the U.S. do not exist at the Sandia ACRR.
7. The Department of Energy, which is supposed to be the guardian for public safety and the environment, has chosen to ignore violations of the Code of Federal Regulations, DOE Standards, American National Standards Institute (ANSI)/American Nuclear Society criteria for reactor safety systems and other regulatory guides. DOE is leaving in place the serious hazards and consequences for continued ACRR operations.
8. The consequences for release of radiation to workers and the public during an accident such as an airplane crash or seismic event with loss of reactor pool water have not been provided by the Documented Safety Analyses for the ACRR. This violates the Title 10, Code of Federal Regulations, Part 830 requirement is that an evaluation be performed that provides insight into the magnitude of consequences of beyond Design Basis Accidents (DBAs).
9. The continued operation of the ACRR is in the absence of the ability of the ACRR to adequately perform safety functions to protect the public and the environment.
10. The controls in place at the ACRR may not be adequate to protect the public and workers for the full scope of operations with large quantities of plutonium being vaporized in the reactor cavity.
11. The Documented Safety Analysis for the ACRR is inadequate.
12. Recently at least two Potential Inadequacies have issued for the ACRR.
13. Recent sporadic occurrences leading to uncontrolled rod motion have occurred.

14. Non-conservative assumptions have been applied to the calculations of dose consequences for workers and the public.
15. The ACRR does not meet the Nuclear Regulatory Commission's (NRC) Regulatory Guide 1.70, *Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants*, which is the Department of Energy's (DOE) recommended safe harbor for nuclear reactors.
16. The ACRR does not comply with DOE Standard 3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.
17. The reliability of the safety-significant protection and control systems are inadequate.
18. Significant ACRR fuel melting could occur during Design Basis Accidents (DBAs) from the unmitigated consequences of the vaporization of Pu-239 equivalent material between 10g and 9,600g.
19. SNL has furnished no reliable analysis by a validated computer code to determine the extent of melting that would occur during accidents.
20. Significant water boiling at the surface of the fuel rods could occur during fuel melting.
21. There are no limits on the amount of spent fuel that could be placed in the ACRR storage pool or description for how it would be disposed of.
22. The consequences that could occur from damage to the fuel in the ACRR storage pool are unknown for the Design Basis Accident.
23. SNL is allowing Pu-239 to be stored next to explosives in the ACRR facility. DOE is in non-compliance with the requirements of the Atomic Energy Act (42 U.S.C. Sect. 2011 - Sect. 2259) (AEA) to assure the proper management of source, special nuclear, and byproduct material.
24. SNL does not have any up to date Environmental Impact Statement for the facility.
25. Spending over \$900,000,000<sup>4</sup>, on new fuels research is typical mindset of the DOE as the industry promoter so that preference is given to new research over the analysis of and cleanup of its existing waste problems. Difficult and unattractive problems are left for the next management team and for future generations.

## ATTACHMENTS

Included Attachments to this email comment are fully included herein by reference to them.

#1 September 27, 2004 letter of DNFSB to The Honorable Linton Brooks  
Administrator, National Nuclear Security Administration, U.S. Department of Energy  
1000 Independence Avenue, SW, Washington, DC 20585-0701

#2 February 28, 2012 DNFSB letter to The Honorable Donald L. Cook  
Deputy Administrator for Defense Programs, National Nuclear Security Administration  
U. S. Department of Energy 1000 Independence Avenue, SW Washington, DC 20585-0104

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<sup>4</sup> INL/EXT-13-28597 Rev 2, Alternatives Analysis for the Resumption of Transient Testing Program, November 2013.



#3 April 18, 2012 DNFSB letter to The Honorable Donald L. Cook Deputy Administrator for Defense Programs National Nuclear Security Administration U.S.Department of Energy 1000 Independence Avenue, SW Washington, DC 20585-0104

#4 NNSA letter to The Honorable Peter S. Winokur, Chairman,Defense Nuclear Facilities Safety Board, 625 Indiana Avenue, NW, Suite 700, Washington, DC 20004

#5 Citizen Action New Mexico Presentation to the DNFSB on March 3, 2010.

Respectfully submitted,

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