United States Government

Department of Energy

memorandum

National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

DATE FEB 27 2004

REPLY TO ATTN OF OOM 1GS-014

SUBJECT LASO/LANL Response to DNFSB Letter

TO Everett H Beckner NA-10 HQ/FORS

Attached is the Los Alamos National Laboratory (LANL) response to Defense Nuclear Facilities Safety Board (DNFSB) concerns related to the lightning protection system, the WETF site, and the electrical distribution system at the CMR Facility (Attachment 1) Also attached is a directive memorandum I have sent to LANL concerning the issues outlined in this memorandum (Attachment 2)

Per attachment 2 and 10CFR830 Subpart B, the Los Alamos Site Office (LASO) has required all hazard analysis and accident analysis scenarios, including lightning, to be re-evaluated in the update to the WETF DSA LASO is also pursuing an NNSA independent review using the Senior Safety Advisers and Subject Matter Experts to assess the overall effectiveness of the lightning protection system at WETF Other safety measures are also being pursued in Attachment 2 including upgrade of the WETF fire barriers around the storage room

Per Attachment 2, LANL has been directed to prepare TSR implementation procedures that specify minimum operability requirements for safety SSCs and time intervals permitted before actions must be completed Sufficient surveillance and maintenance controls shall be developed to support any systems designated as safety class The above actions should be completed and implemented prior to the end of September 2004

Regarding the DNFSB issue related to CMR electrical distribution system safety classification, per Attachment 2 LASO has directed LANL to conduct a thorough review of the electrical distribution system as part of the CMR BIO upgrade Submittal of the BIO upgrade is required not later than April 30, 2004

Further questions should be directed to Gerald Schlapper, Senior Safety Advisor, (505) 665-7111 LASO will provide periodic updates to DNFSB staff on progress on these items

Ralph E Erickson
Manager

Attachments

cc
See Page 2

cc w/attachment
X Ascanio, NA-124, HQ/GTN
S Pierpoint, NA-124, HQ/GTN
R Erickson, OOM, LASO
D Martinez, OOM, LASO
G Schlapper, OOM, LASO
G Rodriguez, OPL, LASO
C Steele, SABT, LASO
F Bell, OFO, LASO
G Nanos, DIR, LANL, MS-A100
J Angelo, PS-DO, LANL, MS-C347
C Keilers, DNFSB

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Department of Energy

memorandum

National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

DATE February 26, 2004

REPLY TO ATTN OF SABM Steele

SUBJECT Requirements for Safety Concerning WETF and CMR Facilities

TO Jim Holt, Associate Laboratory Director for Operations, MS-A104
Steve Yarbro, NMT Division Leader, NMT-DO, MS-A104
Steve Girrens, ESA Division Leader, ESA-DO, MS-P946

I am aware of issues concerning the Electrical Distribution System (EDS) at Chemistry and Metallurgy Research (CMR) in terms of its safety classification The Los Alamos National Laboratory (LANL) has already accepted the action to conduct a thorough formal review of all safety systems against DOE-STD-3009-2002 CH2, including the EDS in the Basis for Interim Operations (BIO) update This update is due to LASO not later than April 30, 2004 This memo is to reinforce this commitment to this office

For the Weapons Engineering Tritium Facility (WETF), in accordance with 10CFR830 Subpart B, DSA update requirements, I want to specifically reinforce that all new data, Unreviewed Safety Question Document (USQD) issues, including lightning issues, container issues, etc , are to be reviewed against the existing Document Safety Analysis (DSA) Hazards Analysis (HA) and accident Analysis (AA) to ensure that the appropriate HA and AA scenarios are modified in the DSA and tracked through any required modification to the TSRs in a formally traceable manner

Further, NNSA reevaluation of the fire accidents has indicated that the frequencies have resulted in the conservative estimate that there may be a significant increase in the frequency of facility fires involving Material-At-Risk (MAR) in the facility While one could continue to revisit the probability estimates and possibly defend them as lower, this is not viewed at this point as value added

With regard to the WETF fire barriers, I am directing LANL per this memorandum in accordance with the "Benefit-Cost Analysis in Support of WETF Structures Upgrades Project" that the fire barrier between storage Room 124 and adjoining process area 120 barrier be upgraded from 1-hour equivalent to 2-hour equivalent at an estimated cost per the study of about $50k This direction continues to apply even if the cost escalates to $200k Should the total cost exceed this amount, please notify this office ESA-DO should pay close attention to the requirements assumed in the Fire Accident Analysis to include not only adiabatic partitions but also constrained fire scenario requirements in partition design

I expect aggressive pursuit of containerization of the MAR in approved containers, particularly including the new ASME stamped containers I would like a monthly update on the progress on this issue sent to my office

For all nuclear facilities at LANL, LANL shall create clear and enforceable Technical Safety Requirement (TSR) implementation procedures that specify operability requirements These actions shall be completed and implemented not later than September 2004 These actions will be reviewed by the Office of Facility Operations for adequacy

Ralph E Erickson
Manager

X Ascanio, NA-124, HQ/GTN
D Martinez, DM, LASO
G Schlapper, SSA, LASO
C Steele, SABM, LASO
J Vozella, ADFO, LASO
G Rodriquez, PL, LASO
C Keilers, DNFSB, LASO
J Holt, ADO, LANL, MS-A104
D Satterwhite, PS-OAB, LANL, MS-K561

Electronic distribution Only
R Cramberg, SABT, LASO
L Knoell, SABT, LASO
R Tom, SABT, LASO
N Sandoval, SABT, LASO
R Janke, SABT, LASO
D Nez, SABT, AL
J Houghton, SABT, LASO
J Fredlund, SABT, LASO

Los Alamos
NATIONAL LABORATORY

James W. Angelo, Division Leader
Performance Surety Division
P O Box 1663, Mail Stop C347
Los Alamos, New Mexico 87545
505-665-5550/Fax 505-665-0318

Date January 29, 2004
Refer to PS-DO 04-006

Dr Gerald A Schlapper
Senior Safety Advisor
Los Alamos Site Office
528 35th Street
Los Alamos, NM 87544

Dear Dr Schlapper

Subject: Response to DNFSB Letter dated August 19, 2003

Following a review of electrical and lightning protection systems by the DNFSB at LANL, the Board issued a letter on August 19, 2003 that identified concerns involving the lightning protection system at WETF and the functional classification of safety systems at the CMR facility Subsequent to submitting our original and follow-up responses, additional information relative to these concerns was discussed with the Board's staff during telephone conferences on November 4 and 5, 2003

Attached, please find copies of the LANL responses to the DNFSB inquiries on WETF lightning protection and CMR electrical system safety classifications These responses re-summarize the Board's concerns, as we understand them, and provide LANL's response to clarify and address the additional Board concerns

Please contact me if you require further information

Sincerely,

Sept Dick for J.A

James W Angelo
PS Division Leader

Cy James L Holt, ADO, A104
Stephen L Yarbro, NMT-DO, E500
Derek J Gordon, NMT-14, E578
Steven P Girrens, ESA-DO, P945
Carol R Sutcliffe, ESA-TSE, C927
Stephen J Black, ESA-TSE, C927
IM-5, A150
PS-DO Files

Los Alamos
NATIONAL LABORATORY
memorandum
Engineering Sciences and Applications
ESA-TSE, Tritium Science and Engineering

To/MS	James Angelo, PS-DO, MS C347 Pat Volza, PS-2, MS C347
From/MS	Carol Sutcliffe, ESA-TSE, MS C927
Phone/Fax	7-1510/Fax 5-1226
Symbol	ESA-TSE-04-016
Date	January 28, 2004

SUBJECT: WETF RESPONSE TO DNFSB LETTER DATED AUGUST 19, 2003

Background

Following a review of electrical and lightning protection systems by the DNFSB at LANL, the Board issued a letter on August 19, 2003 that, in part, identified concerns about the lightening protection system (LPS) at the Weapon Engineering Tritium Facility (WETF) Additional information relative to these concerns was discussed with the Board's staff during a telephone conference on November 4, 2003 This paper summarizes and responds to the concerns involving the WETF lightning protection system

The DNFSB concerns as expressed in the cover letter are summarized as follows

1 "The Documented Safety Analysis (DSA) for WETF which was approved in April 2002 but has not yet fully implemented, identifies the lightning protection system as a safety-class control for certain accident scenarios A study completed in March 2003 analyzing potential lightning threats to the facility revealed that WETF's existing lightning protection system could not be expected to perform it's credited safety function "

2 " WETF does not appear to be maintaining this system [the LPS] in a manner commensurate with its approved safety SSC level classification "

Response to Concern #1

In reading the report attached to the DNFSB letter, the credited safety function is "arc prevention" (Broderick to Fortenberry, 8/1/03) The interpretation of the Morris report included in the DNFSB report is not entirely accurate The quote from the March 03 study by M Morris is "The lightning protection system on WETF cannot be expected to prevent arcing and subsequent current flow from lightning on piping and ventilation shafts in the building areas used for tritium storage and handling " The WETF DSA does not credit the safety function of "arc prevention" for the LPS Regarding the safety function of the LPS, the WETF DSA states in accident scenario 3 4 2 4 (Lightning Strike to WETF), "Due to the uncertainty in the possible effect of lightning on the tritium inventory in WETF, a study to further constrain this uncertainty is listed as a planned design and operational improvement in Section 3 3 2 3 1 " Chapter 4 (Table 4-1) of the DSA describes the safety function as "Prevents damage to tritium containment volumes (including vessels, TGCS, TGHS, and TWTS) within the facility during and following evaluation basis accidents (EBAs) "

The recent study on WETF by Kimball Merewether of Sandia National Laboratory concludes that:

- Lightning initiated fire and lightning initiated "thermal or mechanical breach of the thinwalled tubing of the TWTS" are the most significant lightning-related risks to WETF.
- "While it is true that the design of the lightning protection system and facility cannot prevent arcing, either the LPS or facility will provide the lighting attachment point, and, based on current division alone, one or the other will conduct at least half of the total current, assuming that arcing occurs". And,
- Given the protective feature of the LPS and the facility structure to provide lightning current division, "a scenario that results in the breach of a single [i.e., one or more tritium] storage containers is incredible itself."

The Merewether report also calculated a significant increase in the frequency of lightning to WETF resulting in a USQ. NNSA required USQD as a Condition of Approval, confirm the Safety Class Design Feature designation of the LPS (COA #3), and requires a further evaluation of "lightning hazard reduction factors that are already integral to the facility that may be applied as reduction factors in the DSA accident scenario"(COA #2). Inherent in this requirement is a reevaluation of the fire accident and lightning strike scenarios and validation of the selected control set (COA #4).

It should be noted that the WETF LPS is only one of several controls for fire and lightning scenarios in the approved WETF DSA. Other controls include inventory controls, Tritium Containers, Combustible Loading, Fire Walls, Fire Suppression, Facility Structure, the Tritium Monitoring System, UPS and evacuation training.

Response to Concern #2

The NNSA required TSR page change (1/21/04) for the Design Feature of the LPS defines the Performance Criteria of the LPS. Chapter 4 (Table 4-1) of the DSA describes the safety function as "Prevents damage to tritium containment volumes (including vessels, TGCS, TGHS, and TWTS) within the facility during and following evaluation basis accidents (EBAs)". The system is designed and maintained to NFPA 780, which is a TSR requirement reaffirmed by the January 21,2004, NNSA response to the lightning frequency increase USQ.

The LPS is a TSR Safety Class Design Feature of the Facility Structure. Inspections of the WETF LPS by trained lightning protection engineers identified environmental exposure and initial installation deficiencies. Identified deficiencies of the LPS mainly consisted of maintenance items (e.g., degradation of bonding connections) and surge protection issues. FWO-FM-5 and ESA-TSE placed a priority on resolving these issues and repairs. All identified deficiencies have been corrected. The LPS was inspected by LANL on October 23rd and 24th, 2003 and re-inspected by an external certified UL inspector November 6, 2003. Both inspections found that the WETF LPS was fully NFPA 780 compliant.

The NNSA approved WETF TSRs (revised by the 1/21/04 NNSA required TSR page change) establishes the minimum required In-Service Inspection frequency (annually) The ESA-TSE In-Service Maintenance Procedure implements the TSR requirements and contains the procedure for repair of deficiencies and inspection Implementation of a new WETF work control process has ensured appropriate categorization and response to any deficiencies that are identified This process ensures a safety basis review of all work, including FWO/KSL work packages, which were not consistently reviewed previously ESA-TSE is working closely with FWO-FM5 to ensure all changes are reviewed and ECNs are issued before changes are implemented to ensure configuration management

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Distribution
A Andrade, ADWEM, MS A107
W Fox, ADWEM, MS A107
S Girrens, ESA-DO, MS P945
S Black, ESA-TSE, MS C927
M Rogers, ESA-TSE, MS C927
J Tingey, ESA-TSE, MS C927
QA File
ESA-TSE File

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Ideas That Change the World

memorandum

Nuclear Materials Technology Division

To/MS Jim Angelo, PS-DO, C347
From/MS Derek Gordon, NMT-14, E578
Phone/Fax 5-1951/5-8978
Symbol NMT-14 04-007R1
Date January 26, 2004

CMR RESPONSE TO DNFSB LETTER DATED AUGUST 19, 2003

Background

Following a review of electrical and lightning protection systems by the DNFSB at LANL, the Board issued a letter on August 19,2003 that, in part, identified concerns involving the functional classification of safety systems at the CMR facility and requested a response to these concerns within 30 days Subsequent to submitting our original response (Reference 1), additional information relative to these concerns were discussed with the Board's staff during a telephone conference on November 5, 2003 This paper re-summarizes the Board's concerns involving the functional classification of safety systems that are applicable to the CMR facility and provides our response to clarify and address the additional Board concerns

The DNFSB concerns are summarized as follows

1) The CMR BIO identifies a number of safety-significant structures, systems, and components (SSCs) Some of these SSCs, including the ventilation system, rely on electrical power to operate Although it provides an important support function for credited safety systems, the electrical distribution system (EDS) is currently designated as general service, which is not consistent with the functional classifications of systems it supports Compensatory measures being used to address this concern should also consider the possibility that the facility lifespan could exceed the current 2010 facility termination estimate as a Hazard Category 3 nuclear facility

2) The continuous air monitors (CAMs) do not have backup power In this case, the worker evacuation action that results from a loss of power eliminates the need for the CAMs' safety function under facility blackout conditions However, the timely and safe evacuation of CMR personnel (the action eliminating the need for the CAMs' safety-significant function) requires emergency lighting Thus, the emergency lights and their dedicated backup power sources appear to serve a safety-significant function and ought to be functionally classified accordingly

Response to Concern #1

The EDS is classified as a support system for various SS SSCs in Chapter 4 of the BIO Identification of the safety support systems in the BIO was in line with the philosophy of the BIO preparation effort, which was to generally follow the guidance of DOE –STD-3009-94 although the BIO, having been produced in 1998, technically comes under the precepts and safety basis expectations of DOE-STD-3011-94 (effective November 1994) Use of DOE-STD-3009 as a guide resulted in development of a more detailed Hazard Analysis than typically required for BIO's, generation of accident analyses that compared off-site exposure to the Evaluation Guidelines for selection of safety class SSCs, and selection of safety significant SSCs for both defense in depth and worker safety In 1998, TSRs were technically not required for a BIO but were produced under the sponsorship of DOE Although DOE-STD-3011-94 did not require this level of detail in a BIO, it was done for CMR to get a clear perspective of the risk involved with operating the facility These additional measures were taken solely at the request of DOE and with the support of LANL

The EDS is classified as a support system for various SS SSCs for worker safety The safety functions provided by the supported SS SSC are not required upon a loss of power because worker safety is assured by evacuation, which is the necessary worker action following a loss of power In accordance with safety guidance and requirements, evacuation preserves the intended safety function defined in the BIO and implemented in the Facility TSRs CMR workers are instructed to take this action Therefore, a SS designation is not required in accordance with the precepts of DOE-STD-3009, as well as other guidance in DOE Orders 5480 23, 5480 22, and DOE-STD-3011 The BIO and TSRs have also been formally determined by DOE to meet the requirements of 10CFR830 Subpart B Evacuation of the CMR facility has occurred successfully numerous times in it's roughly >50 year lifetime during power outages

Although the support system designation of the EDS was considered to be appropriate for the remainder of the CMR facility life due to the facility configuration, operating characteristics, and accident analysis (as previously noted in Reference 1), the BIO and interim TSRs are going through the final stages of an update and system classifications must be reconsidered in light of current guidance Recent management forecasts for facility termination and DNFSB concerns over the safety SSC level classification of some safety systems at CMR have emphasized the importance of reevaluating system classifications In particular, this re-evaluation will review the role of EDS in keeping ventilation up and allowing ventilation to provide a defense in depth role behind the safety class fire suppression system In addition, the NNSA Los Alamos Site Office has called for a full revision of the CMR BIO to be completed by the first quarter of CY 2004 In this review, NNSA and LANL will assess the safety SSC level classification of CMR safety equipment against the current DOE-STD-3011 and DOE-STD-3009 In addition, if additional risk is identified, this review will assess the need for compensatory measures based on the latest forecast for facility replacement

Response to Concern #2

A loss of power event presents hazards to workers that, for the duration of the egress period, constitute standard industrial hazards (e g , inadequate lighting, location of egress routes and exits) Due to the nature of these hazards as standard industrial hazards, the controls to prevent or mitigate them are managed in accordance with the Life Safety Code Emergency lighting is one such control required by the Life Safety Code, and is fundamentally no different than Life Safety Code requirements for marking egress routes or posting illuminated exit signs Consequently, due to their role in mitigating a standard industrial hazard during a loss of electrical power, emergency lights do not warrant treatment as a SS SSC, but rather are treated similarly to other controls required by the Life Safety Code to mitigate these hazards Per DOE-STD-3009 and all other applicable nuclear safety basis guidance and requirements, NFPA life safety codes are not required to be elevated to SS or SC SSC levels in terms of nuclear safety bases requirements However, under the separate requirements of NFPA, compliance with the life safety code is important Inspections by LANL occur frequently to ensure compliance with NFPA life safety codes

Reference

1 "CMR Response to DNFSB Letter Dated August 19, 2003," NMT-14 03-074, dated September 15, 2003

cc
Chris Steele, DOE LASO, A316
Derek Gordon, NMT-14, E578
Paul Sasa, NMT-DO, G746
Gary Kellund, NMT-14, G745
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Tim Ferris, FWO-CMR, G746
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