DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

April 28, 1995

The Honorable Hazel R. O'Leary
Secretary of Energy
Washington, D.C. 20585

Dear Secretary O'Leary:

In late 1994 the Defense Nuclear Facilities Safety Board (Board) initiated a series of discussions with the Department of Energy (DOE) and its nuclear weapons laboratories. These discussions were focused to explore the most effective means of managing the safety of research and development (R&D) activities while maintaining the flexibility needed to conduct R&D in support of national security objectives. A Board staff issue paper summarizing these discussions is enclosed.

When Congress established the Board in 1988, it recognized that defense nuclear facilities involve unique hazards due to the presence of radioactive materials, such as plutonium. Because of these hazards, a disciplined approach to facility operations is required to protect workers, the public, and the environment and to assure that an accident does not render a facility useless for national security-related activities. This is also true of the weapons laboratories' defense nuclear R&D facilities.

However, activities at R&D facilities differ from those at production facilities by being more varied in scope, less routine, and of shorter duration. Because of the uncertain risks associated with some experiments, integrated safety management systems for nuclear R&D facilities need to include both traditional nuclear facility safety management mechanisms and well-defined and rigorously-implemented experiment safety review systems. Although the weapons laboratories have implemented various R&D experiment control systems, safety management systems that are truly integrated are still in development.

In discussing the issues associated with the development of integrated safety management systems tailored to the operations at R&D facilities, problems with the current DOE requirements system were reported by the laboratories:

1. Some sets of requirements are highly prescriptive and, as such, appear to provide little latitude for facility-specific or activity-specific interpretation.

2. DOE reportedly does not have an effective system for reviewing and approving exceptions or "equivalencies," even when documented laboratory practices can be technically justified as meeting the safety objectives of the requirements. Key contributing factors to DOE's inability to approve "tailored" implementation proposals appear to be:

    a. insufficient technically competent staff assigned to the task,

    b. a lack of clear acceptance criteria, and

    c. a reported widespread misperception within the DOE complex that the Board will view less-than-literal compliance with all safety-related requirements and guidelines as unacceptable.

3. The current DOE approach to safety audits, which are conducted for both line management and independent oversight purposes, is uncoordinated and inefficient. This results in multiple audits on overlapping topics with little time for corrective actions between similar audits.

In the Board's second recommendation (Recommendation 90-2), DOE was asked to identify the specific standards it considered applicable to the design, construction, operation, and decommissioning of its defense nuclear facilities. DOE's plan to implement Recommendation 90-2 includes a commitment to develop "Standards/Requirements Identification Documents," or S/RIDs, that are to "*contain the standards and requirements necessary to operate facilities or conduct activities with adequate protection of workers, the public, and the environment.*" The S/RIDs are to be developed by the organizations implementing the requirements, such as the laboratories, and to be reviewed and approved by DOE. Revision 5 of the Implementation Plan for Recommendation 90-2 provides for both site-wide and facility-specific S/RIDs that are intended to identify applicable and appropriate health and safety requirements.

An integrated, facility-specific nuclear safety management system, tailored to the scope of the activities planned and the range of hazards associated with those activities, is needed for each major defense nuclear facility at a site [such as TA-55 (Los Alamos National Laboratory), Building 332 (Lawrence Livermore National Laboratory), the Defense Waste Processing Facility (Savannah River Site), Building 707 (Rocky Flats Environmental Technology Site), and weapons assembly and disassembly buildings (Pantex)]. To develop such a system, the applicability of site-wide requirements (found in the site-wide S/RIDs), as well as associated Order or rule implementation programs, needs to be assessed. These tailored safety management systems would therefore include facility-specific S/RIDs , but need not include all requirements in DOE Orders and standards if the excluded requirements are formally determined and documented not to be applicable or appropriate. However, facility-specific safety management systems may

include requirements and management prerogative mechanisms that were not identified in the site-wide S/RIDs, but which have been determined by the operating organization to be necessary to ensure adequate protection of the public, the worker, and the environment from the hazards associated with the facility or activity. In addition, a truly integrated safety management system would include management and self-assessment elements (i.e., policies, procedures, safety commitees, etc.) that evaluate each specific activity proposed for a facility, to assure that the activity can be conducted safely within the analyzed and approved capabilities of the facility.

The weapons laboratories are at various stages of developing integrated safety management systems that, in effect, build on the intended concept of S/RIDs. The Board believes that the concepts of S/RIDs and integrated, tailored safety management systems, as discussed above, are mutually supportive. However, the reported difficulties on the part of DOE and the laboratories in processing exemptions or "equivalencies," suggest that adequate mechanisms and sufficient technically-competent DOE staff may not be currently in place to review and approve technical documents of this complexity. It should be noted, however, that the DOE safety rules promulgated to date contain explicit procedures for granting exemptions from specific requirements, in appropriate cases. Moreover, facility-specific S/RIDs were intended to only include those requirements in DOE Orders and other sources that are determined to be applicable and necessary to adequately protect public health and safety. Finally, contracts governing the laboratories provide mechanisms to prevent inapplicable or inappropriate safety requirements from being imposed. It is unclear, therefore, why these existing mechanisms are not sufficient, if they were to be exercised properly.

The Board recognizes the need to manage the safety of DOE's defense nuclear research and development operations in a manner that does not hamstring flexibility and the use of good science. The Board strongly believes that effective use of the S/RID process will accomplish this objective.

Therefore, in accordance with the issues identified in this letter, consistent with the intent of the Board's Recommendations 90-2 and 94-5, and pursuant to 42 U.S.C. § 2286b(d), the Board requests that DOE provide a report that addresses the following:

- The adequacy of the guidance given by DOE to the field to ensure that the integrated safety management systems under development at DOE's defense nuclear laboratories will contain and implement an appropriate set of safety requirements and adequate management structures that incorporate and are consistent with the intent of S/RIDs commitments.

- A description of how DOE plans to address the need for adequate technical talent, mechanisms, and acceptance criteria to review and expeditiously approve tailored integrated safety management systems at these laboratories, including appropriate disposition of proposed technically-justified equivalencies and exemptions.

- A summary of actions needed to coordinate DOE line management and independent oversight safety audits at the weapons laboratories.

The Board requests that the above report be submitted within 90 days of receiving this letter. If you need any further information in this connection, please let me know.

Sincerely,

John T. Conway
Chairman

c: The Honorable Thomas P. Grumbly
The Honorable Tara O'Toole
The Honorable Victor H. Reis
Mr. Mark Whitaker

Enclosure

95/2327

MANAGING THE SAFETY OF DEFENSE NUCLEAR RESEARCH AND DEVELOPMENT ACTIVITIES

This issue paper was prepared for the DNFSB by the following staff members:

Jan Preston
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with advice from the following outside experts:

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MARCH 23, 1995

MANAGING THE SAFETY OF DEFENSE NUCLEAR RESEARCH AND DEVELOPMENT ACTIVITIES

I. Issue Definition

How should defense-related nuclear research and development (R&D) activities be managed so as to:

- Minimize the risks to the health and safety of workers and the public, and to the external environment,
- Demonstrate the safety of the R&D environment to responsible laboratory management, to DOE management and oversight organizations, to other external agencies, and to the public, and
- Ensure that research and development that is required to support national security objectives can be efficiently and effectively pursued.

II. Background

A. **Authorizing History:** In 1988, Congress created the Defense Nuclear Facilities Safety Board (Board) as an independent oversight organization within the Executive Branch charged with providing advice and recommendations to the Secretary of Energy *"to ensure adequate protection of public health and safety"* at the defense nuclear facilities of the Department of Energy (DOE). In 1991, Congress expanded the Board's jurisdiction to include DOE's nuclear weapons production, surveillance, and dismantlement activities. As a result, the Board's responsibility was expanded to include health and safety oversight of DOE's stewardship of nuclear materials and weapons needed for the nation's nuclear stockpile. Included in this expanded responsibility is the conduct of defense-related nuclear R&D activities at the three nuclear weapon design laboratory organizations: the Los Alamos National Laboratory (LANL), the Lawrence Livermore National Laboratory (LLNL), and the Sandia National Laboratories in both New Mexico and California (SNL-NM and SNL-CA). At this time, no defense-related nuclear R&D is being conducted at SNL-CA.

In the documentation of the legislative history behind the establishment of the Board, the Senate Armed Services Committee identified two expectations for the Board that are germane to the issue discussed in this paper. The first expectation addressed the use of standards:

"The Board should assist the Department in establishing clear and rational safety standards and Orders. These standards, and the insights, analyses, and expertise gained in defining them, will provide the objective basis for measuring contractor performance, assessing the real safety status of facilities and determining what must be done to permit continued safe operation of the complex, ..."

The second addressed the issue of personnel and management structure within DOE:

"The Board is expected to raise the technical expertise of the Department substantially, to assist and monitor the continued development of DOE's internal ES&H [environment, safety, and health] organization, and to provide independent advice to the Secretary. Above all, the Board should be instrumental in restoring public confidence in DOE's management capabilities -- a clear prerequisite for the continued production of the nuclear materials vital to the nation's security."

B. **Recommendation 90-2:** In the Board's second recommendation (Recommendation 90-2), DOE was asked to identify the specific standards that it considered applicable to the design, construction, operation, and decommissioning of its defense nuclear facilities, including all applicable DOE Orders, regulations, and requirements. DOE was also asked to provide its views on the adequacy of the standards that were identified for protecting public health and safety at its defense nuclear facilities, and to *"determine the extent to which the standards have been implemented at these facilities."*

DOE's plan to implement Recommendation 90-2 includes a commitment to develop for its defense nuclear facilities "Standards/Requirements Identification Documents," or S/RIDs, that are to *"contain the standards and requirements necessary to operate facilities or conduct activities with adequate protection of workers, the public, and the environment."* The S/RIDs are to be developed by the organizations implementing the requirements, such as the weapons laboratories, and approved by DOE. As an interim measure, while S/RIDs are being developed, DOE stated that *"assessments for compliance with DOE Orders will be performed at operational facilities ...,"* again, including at the weapons laboratory facilities that conduct defense-related nuclear R&D. A program of conducting such Order compliance self-assessments, or OCSAs, was implemented by DOE.

C. **Scope of Staff Review:** Efforts have been made by DOE to implement Recommendation 90-2, but with little effectiveness. At the national weapons laboratories, in particular, resistance to the OCSA process and to S/RIDs development has been evident. In the Board's Fifth Annual Report to Congress, the Board noted that:

"Their [The laboratories'] resistance stems from the belief, not without some basis, that the constraints established in many DOE Orders, while appropriate for production facilities, are not appropriate for research and development activities."

The Fifth Annual Report further states:

"The Board has taken note of this concern, and its potential impact on the flexibility needed for creative defense-related research. The Board has initiated a new review of the presently-implemented safety management strategies at the laboratories, focusing on how the elements of those strategies compare with those for other operations of similar complexity and hazard level. During this review, the Board will evaluate whether the laboratories' safety management systems are equivalent to the intent of the DOE safety standards, even though different in detail."

This paper presents the results of this review of R&D safety management at the national weapons laboratories. It was conducted by members of the Board's Technical Staff (W. Andrews, A. Jordan, D. Owen, and J. Preston), and senior Outside Experts (J. Drain, D. Sewell, and G. Tape). The review was initiated in November 1994, and included technical interchanges at LLNL (January 24-25, 1995), at LANL (February 14-15, 1995), and at SNL-NM (February 16, 1995). (Final agendas are provided as Attachment 1.) Both Headquarters (Defense Programs, and Environment, Safety and Health) and Field representatives from DOE participated in all three technical interchanges at the laboratories. In addition, at each of the technical interchanges, the two non-hosting laboratories had participants present.

It should be noted that the review discussed in this paper, along with its results and conclusions, focus solely on R&D activities within defense nuclear facilities at the nuclear weapons laboratories. Broader applicability of some of the observations may be possible to other selected activities in the defense nuclear complex. However, the limited focus of the review effort undertaken suggests that caution should be used in extending the scope of the results.

III. Review Results -- "What the review team heard."

A. **How do "R&D Activities" Differ from "Production?"** : This review was initiated, in part, due to concern by the Board about the accuracy of the assertion (heard primarily from laboratory personnel) that defense nuclear R&D activities were being unnecessarily restricted by the current approach to DOE safety management at the laboratories. However, the current compliance-focused safety management approach

had also been characterized, on the basis of anecdotal evidence, as having a negative impact on safety, as well as on research creativity. The possibility that this second assertion had any credibility made the Board's review of the issue essential. As a first step, the review team sought to determine the unique characteristics of R&D activities that set them apart from "production-type" nuclear facility activities.

"Facility" vs. "Activity" Safety Management: A distinction needs to be made between R&D "facility" safety management and R&D "activity" safety management. Managing the safety envelope of an R&D facility includes the definition, maintenance, and operation of safety structures, systems and components important to safety. Managing the safety of an R&D activity requires analysis by technically knowledgeable personnel of the proposed experimental parameters and processes, and the associated range of possible hazards, to assure that the "worst-case" estimates of adverse consequences can be accommodated and contained by the experimental setup and the facility safety systems. To be successful, these two elements of an R&D safety management system must be well integrated.

Diversity, Duration, Scale, and Frequency: As stated above, the two elements of a safety management system for a nuclear R&D facility -- facility safety envelope management and experiment control -- must be well integrated. This integration task is substantial, since an R&D facility will usually be host to many different projects, with broad scope and degree of complexity. This diversity of activities is a fundamental difference between an R&D facility and a production facility. The duration of individual R&D projects is also highly variable, but they are usually completed in relatively short time periods. A "production run" is, by definition, relatively large-scale and repetitive, and the performance (including expected failures) can be more readily characterized. However, R&D activities, until they scale up to development/demonstration frequencies of operation, rarely become entirely "routine."

Personnel Qualifications: One difference often cited between R&D and production activities is the technical qualifications of the personnel performing the operations. The educational level of researchers is, on average, significantly higher than that of production technicians. The accompanying premise is that more highly educated individuals can operate safely with less formality of operations than is required for production personnel, since they have a deeper understanding and appreciation of the potential hazards involved. Although this assertion may be arguable, there exists a significant diversity (and some apparent conflict) of implementation of this premise at the nuclear weapons laboratories.

At one laboratory, for example, where highly-educated Principal Investigators (PIs) appear to directly conduct the majority of plutonium experimentation, a formal process exists to develop step-by-step experimental procedures. At another laboratory, where

certified plutonium handlers conduct all experimental tasks under the direction of the PIs, general operational safety procedures are approved for use that do not specify all of the experimental steps to be conducted. In both these cases, it is the responsibility of the PI to define all potential hazards and specific mitigation actions for each experiment. No firm conclusion could be reached from these disparate approaches about the degree of formality (i.e., definition of procedural steps) needed, for example, for plutonium R&D operations. With any approach, it is evident that some independent review of the PI's proposed experiment is needed (e.g., by an internal safety review committee).

B. What Problems are Reported to Exist with R&D Safety Management under the Current System? The review team found great diversity in the situations that exist at the three national weapons laboratories, relative to their types of R&D activities, the maturity of their safety management systems, and their ideas for the management of safety.

This section discusses what the review team heard during the technical interchanges at the laboratories. In summary, the laboratories reported problems with the current DOE compliance-based safety management system in four general areas.

General Problem Areas Reported:

(1) The degree of prescription of some requirement sets does not always support broad applicability across the weapons complex. The laboratories believe that DOE's lack of obtaining and incorporating field comments on proposed requirements contributed to this situation.

(2) DOE is reported not to have a working system to consider and approve exceptions or "equivalencies," when documented laboratory practices can be technically justified as meeting the safety intent of the requirements.

(3) As was the case throughout the complex, the laboratories (to varying degrees of integration and adequacy) previously had safety management systems in place that used the DOE Order requirements as guidance. At two of the weapons laboratories, it was asserted that the formal OCSA process resulted in few significant safety enhancements to their existing systems, relative to the costs involved. It must be noted, however, that one of the laboratories making this assertion has yet to commit to satisfactory implementation of OCSA. At the third weapons laboratory, the OCSA process appeared to highlight the need for improvement and integration of their approach to nuclear facility safety management -- they are now proposing to implement a significantly revised management system.

(4) The current DOE approach to audits is uncoordinated and inefficient. Multiple review groups representing several Federal and State agencies (including many separate DOE elements) are reported to often evaluate the same subject area consecutively, not building on previous results. These consecutive audits are often scheduled with inadequate time allowed to begin implementation of the corrective actions identified by the previous audits.

The laboratories were asked to identify their perceptions of the negative impacts that these four problem areas have, first, on safety, and, second, on R&D. The resulting discussions are reported below. It should be noted that these are the laboratories' positions, and do not necessarily have full concurrence from the review team as to their accuracy or significance.

Perceived Negative Safety Impact:

(1) Professional laboratory ES&H personnel are less available to "walk the floor" and provide direct safety advice/oversight, due to the demands associated with the frequency of audits and by ongoing compliance self-assessment and Order/Rule implementation plan development duties.

(2) Laboratory ES&H personnel state that the increase in their compliance-related workload has in effect eliminated their ability to participate in industry standards development activities, which they feel impacts their currency and competence.

(3) With the current funding structure employed by DOE and the laboratories, resources spent to implement "limited-value added" or "no-value added" requirements (for which exemptions do not currently seem to be obtainable) may leave fewer resources for non-mandated "good practices."

(4) Hands-on operations personnel, who do less actual R&D, have fewer opportunities to maintain proficiency in safety-critical tasks.

Perceived Negative R&D Impact:

(1) Laboratory ES&H personnel's response to assistance requests by PIs is impaired (slowed or limited) by the demands associated with the frequency of audits and ongoing compliance self-assessment and implementation plan development activities.

(2) Operations personnel (e.g., SNL-NM reactor operators) are called on to support audits, compliance activities, and implementation plan development, taking time away from their duties supporting R&D operations.

(3) The need to respond to constantly changing compliance targets (Orders, Rules, etc.), with no integrated response/approval mechanism, impacts the availability of resources for R&D, at a time when budgets are already being reduced.

This last impact is strongly asserted at the laboratories. Under the laboratories' cost accounting structure, the cost of programmatic (R&D) activities is indistinguishable from operational and infrastructure support costs. This structure does not presently support incremental funding requests to respond to the increased cost of implementing constantly changing requirements.

C. **Why is the Existing S/RIDs System not Currently being Embraced as a Solution to these Perceived Problems?** The "Standards/Requirements Program Overview" section of DOE's Recommendation 90-2 Implementation Plan (Revision 5) discusses the process for assessing the adequacy of "requirements imposed on specific sites or facilities," including determining what set of standards and requirements are "necessary and sufficient for safe operations." It was unclear why this existing process is not being used by the weapons laboratories as a mechanism by which the universe of safety requirements can be tailored for application to R&D facilities. The review team's discussions identified the following contributing factors.

(1) Laboratory personnel believe that S/RIDs will be a separate activity that will not be integrated into or reflect their day-to-day safety management efforts. They see S/RIDs, instead, as a stand-alone "list" of requirements, not as a safety management "system."

(2) The laboratories report than their experience with obtaining approval for technically justified exceptions to requirements, and with attempting to demonstrate the "equivalency" of their existing systems to prescribed requirements, has not been successful. They therefore believe that they will never be allowed to "tailor" their requirements through S/RIDs to anything other than a full list of the standards/requirements provided in the DOE Orders.

(3) The laboratories did not participate in the S/RIDs program until the DOE Order requirements were incorporated into their contracts within the last two years.

Both the DOE Headquarters and field personnel present appeared to concur with the laboratories' assessment that there is currently not a working system to consider and approve exceptions or "equivalencies," even when laboratory practices can be documented and technically justified as meeting the safety objectives of requirements [Item (2), above]. Contributing factors to this situation are reported to include: no clear understanding of who "owns" individual requirements within DOE (who therefore could approve exceptions), insufficient technically competent and field-

knowledgeable DOE staff, a lack of defined criteria for determining "equivalency," and a reported concern that the Board will view anything less than literal compliance with all safety requirements and guidelines as unacceptable.

It should be noted, however, that the DOE safety rules promulgated to date contain explicit procedures for granting exemptions from specific requirements, in appropriate cases. Moreover, facility-specific S/RIDs were intended to only include those requirements contained in DOE Orders that are determined to be applicable and necessary to adequately protect public health and safety. Finally, contracts governing the laboratories provide mechanisms to prevent inapplicable or inappropriate safety requirements from being imposed. It is unclear, therefore, why these existing mechanisms are not sufficient, if they were to be exercised effectively.

D. **What are the Perceived Problems with the Current Approach to Audits?** The laboratories report that the frequency, scale, and scope of audits (not all of which are focused on safety) have increased significantly, and are uncoordinated and inefficient. Multiple review groups, representing several Federal and State agencies (including many separate DOE elements), are perceived to often evaluate the same subject areas consecutively, without building on previous results. These consecutive audits seem often to be scheduled with inadequate time allowed to begin implementation of the corrective actions identified by the previous audits.

The laboratories also report that DOE auditors: (1) often review against baseline Order requirements only, rather than considering approved Order implementation plans that were "tailored" to the facility, (2) at times also treat "guidelines" as requirements for audit purposes, and (3) are not always technically qualified.

IV. Review Team Observations and Conclusions -- "What the review team learned"

The preceding sections document information provided during the review's technical interchanges about perceived problems with the current DOE safety management system. This section provides the review team's observations and conclusions about the information collected throughout the review. The term "observation" is used to report what the review team inferred from the provided descriptions of the laboratories' existing and proposed safety management systems, and on the follow-on discussions with DOE and laboratory personnel. The term "conclusion" is used to report problems that the review team concur exist, based on the information collected, discussions held, and follow-on analysis.

A. Observations:

Observation 1: The fundamentals of management of the safety envelope of an R&D facility, including the definition, maintenance, and operation of safety systems and structures important to safety, should be essentially equivalent to the management fundamentals for any other nuclear facility.

Some grading (reduction) of safety requirements and implementation rigor might be possible if the R&D facility is significantly smaller in size, or lower in complexity, hazard, and activity level than a dedicated production facility. [In fact, this was the intent behind the development of facility-specific S/RIDs, which were to identify applicable and appropriate health and safety requirements.] However, the definition and control of the facility hazards (via engineered safety features, operational controls, and appropriate maintenance) must account for the spectrum of experimental results (and the associated hazards) that are possible from the broad range of R&D activities that the facility is intended to host.

Experimentation is, by definition, an examination of reactions that are not completely understood. Therefore, it can be argued that operational envelope definition and control [i.e., Safety Analysis Reports, Operational Safety Requirements, Limiting Conditions for Operation, Technical Safety Requirements, etc.] for a nuclear R&D facility should be as rigorously pursued, and conservatively applied, as for a nuclear production facility with well-characterized, repetitive operations. In addition, other areas of safety management (such as radiation protection, fire protection, emergency planning, etc.) also do not appear to be affected by the nature of R&D activities.

Observation 2: Because of the uncertainties associated with experimentation, an integrated safety management system for a nuclear R&D facility needs to include a well-defined and rigorously implemented experiment-control system to manage the safety of the R&D activities themselves.

The weapons laboratories, to varying degrees of effectiveness, have R&D experiment control systems in place. A line of defense against an unacceptable outcome needs to be provided by review of the proposed experimental parameters and processes by technically knowledgeable personnel, with appropriate levels of independent checks and balances. Assurance must also exist that the "worst-case" estimates of potentially high consequences can be accommodated and contained by the experimental setup (another line of defense -- to protect the experimenter and prevent contamination or damage to the facility) and by the facility safety systems. To accomplish this "defense in depth," an approved "authorization basis" (i.e., Safety Analysis Reports, Technical Safety Requirements, etc.) needs to exist that fully identifies potential hazards from the

range of experiments, and the facility safety systems must be properly monitored and formally maintained.

Observation 3: With the exception of some Environmental Protection Agency and Department of Transportation requirements, the PIs generally reported that the laboratory facility management and ES&H personnel were able to keep them in compliance with the requirements, without significant direct impact to the conduct of R&D activities.

It should be noted that, even with the perceived impacts that the laboratories reported to the review team, the PIs reported that the laboratory facility management and ES&H personnel successfully support them in identifying, interpreting, and assisting in satisfying the safety requirements. This observation was somewhat unexpected by the review team, since it is inconsistent with one of the assertions that contributed to the initiation of this review. This situation appears to be a direct result of significant effort by facility management and laboratory ES&H Staff to take responsibility for compliance activities, while supporting the PIs and "keeping them honest."

Laboratory personnel stated that, in their view, there is a strong need for DOE to engage external regulators to negotiate appropriate implementation of requirements. It was noted, however, that DOE field organizations were reported as more successful negotiating with EPA field representatives than were DOE Headquarters personnel with EPA Headquarters.

B. Conclusions:

Conclusion 1: The requirement to conduct OCSA succeeded in causing the laboratories to evaluate the comprehensiveness of their existing safety management systems.

There was, and remains today, great variability in the way in which the laboratories manage both their facility safety and their R&D activity safety. At these R&D facilities, some variability in safety management (more or less rigor) is appropriate, based on the specific nature of the activities performed, and the associated hazards. The mandate to conduct OCSA has contributed to new initiatives by all three laboratories to propose submittal, and DOE approval, of "Standards-based Safety Management Systems" or "Authorization Bases." These proposed management systems, as they currently stand, are also highly variable, and would require significant, competent technical review prior to approval.

Conclusion 2: The current DOE approach is not meeting the objectives of Recommendation 90-2 for the management of the safety of R&D activities at the national weapons laboratories.

The current sets of DOE safety requirements are not written in a way that they can be uniformly implemented for all activities in the complex. The laboratories believe that the S/RIDs process should be replaced with an evaluation of the adequacy of their integrated safety management systems in meeting the intent of the requirements for R&D activities. However, the development and implementation status of the laboratories "integrated safety management systems" is highly variable at this time. DOE's Implementation Plan for Recommendation 90-2, and the principles of an integrated safety management system, require R&D facilities to include the requirements necessary for safe operations (as intended by S/RIDs), plus the laboratory policies, guidance, experiment safety review and control system, organization, program structure and management oversight to implement the requirements.

It appears that DOE and the laboratories may not be taking effective advantage of the mechanisms currently available (i.e., rule exemptions, contract terms, etc.) to structure technically adequate safety management systems that do not impose a burden of inappropriate requirements. In any case, the existing DOE system to evaluate and approve equivalent approaches to meeting the intent of the requirements is not working for the R&D laboratories, due to people, guidance, and an apparent lack of empowerment, will, or both. Technically competent DOE review groups and review criteria are needed to determine equivalency and to recommend approval based on whether the alternate proposals provide a level of protection adequate to achieve the safety objectives of these Orders, Rules, or Standards.

It appears that pilot programs to expedite the development and approval of integrated safety management systems at the high potential hazard nuclear R&D facilities (e.g., TA-55, B332, SPR, etc.) could be considered. The national laboratories may have some of the elements of such systems already implemented. The laboratories could be encouraged to integrate and consolidate all ongoing compliance and implementation activities, with the exception of OCSA, which is a prerequisite, into these pilot programs. This might necessitate renegotiation of some implementation schedule commitments to the Board, but could ultimately result in efficiencies in actual implementation.

Conclusion 3: DOE is not effectively managing/coordinating the safety audit schedule for the laboratories -- resources to audit, as well as to respond, are not being used effectively or efficiently.

Many safety audits are currently being conducted strictly according to the originator requirements, as interpreted by the individual auditor, rather than to the requirements of implementation plans, facility ES&H procedures, or other approved interpretive ("tailoring") documents. DOE has not been coordinating the scheduling of audits to be constructive and efficient. Actions generally have not been taken to minimize duplicate reviews, allow the results of like-reviews to support coordinated corrective action development, allow reasonable times for corrective actions to be implemented before additional review, or minimize the disruption of the programmatic activities.

If "integrated safety management systems" or "authorization bases" (which would incorporate the appropriate facility S/RIDs) are approved by DOE, audits of actual activities in facilities need to focus on these, rather than on the underlying Rules, Orders, or Standards. Qualification and appropriate training of auditors would also need to be ensured.

ATTACHMENT 1

NFSO
Nuclear Facilities Safety Office

Lawrence Livermore National Laboratory

AGENDA
ES&H in the R&D Environment
Defense Nuclear Facilities Safety Board
DNFSB Staff: Wayne L. Andrews, Albert G. Jordan, and Jan Preston
Outside Experts: John F. Drain, Duane Sewell, and Gerald F. Tape

January 23-25, 1995

Date/Time	Subject	Location	LLNL Participants
Monday, January 23			
2:00	Badging	Westgate Badge Office	A. Garcia
3:00-4:00	Introduce DNFSB Team and Discuss Agenda	B235 R2080-Silver	D. Fisher
Tuesday, January 24			
8:00-8:05	Introduction	B235 R1090-Gold	A. Garcia
8:05-8:15	Inbriefing: Objectives of Staff Visit		J. Preston
8:15-9:45	ES&H Overview: Current Status and Future Directions		D. Fisher
9:45-10:00	BREAK		
10:00-12:00	The Process of ES&H Management for R&D in LLNL Nuclear Facilities		
10:00-11:00	*Management of ES&H Requirements for R&D in the Plutonium Facility (Category 2 Nuclear Facility)*		D. Alves
11:00-12:00	*Management of ES&H for R&D in Category 3 Nuclear Facilities*		M. Mintz
12:00-1:00	LUNCH		
1:00-2:00	Discussion of Clean-Slate Alternatives for Managing ES&H for R&D in DOE Nuclear Facilities		D. Fisher and List 4
2:00-3:00	Discussion of DNFSB Questions		G. Cummings and List 4
3:00-3:15	BREAK		

HOST: Abel Garcia, NFSO
CONTACT: Angel Weigel, 510-422-5654
CLEARANCE: SRD, Sigma 3 Visual

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AGENDA
ES&H in the R&D Environment
Defense Nuclear Facilities Safety Board
DNFSB Staff: Wayne L. Andrews, Albert G. Jordan, and Jan Preston
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January 23-25, 1995

Date/Time	Subject	Location	LLNL Participants
Tuesday, January 24 (Continued)			
3:15-5:15	Group Interviews/Discussions	B235 R1090-Gold	
3:15-5:15	*Principal Investigators*		See List 1
Wednesday, January 25			
8:00-12:00	Group Interviews/Discussions (continued)	B235 R1090-Gold	
8:00-9:45	*Nuclear Facility Managers*		See List 2
9:45-10:00	BREAK		
10:00-11:30	*Key ES&H Support & Management (Safety/Regulations/Management)*		See List 3
11:30-12:00	Executive Session (By Invitation Only)	B235 R1090-Gold	W. Andrews/A. Garcia
12:00	Adjourn		

DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB)

Health and Safety in Performing R&D at DOE Weapons Laboratories

LOS ALAMOS NATIONAL LABORATORY
LOS ALAMOS, NEW MEXICO

AGENDA
(Rev. 6, 2/15/95)

Review Participants: **Albert Jordan, DNFSB Staff**
Donald Owen, DNFSB Staff
Jan Preston, DNFSB Staff
John Drain, DNFSB Outside Expert
Duane Sewell, DNFSB Outside Expert
Gerald Tape, DNFSB Outside Expert

Tuesday, February 14

Morning	ESH-DO Conference Room, TA-59, OH-29, Room 101	
8:00 - 8:10	Welcome	J. Jackson, DD
8:10 - 8:15	Introductions	M. Patterson, DIR/CPT
8:15 - 8:30	DNFSB Staff Objectives	A. Jordan J. Preston
8:30 - 8:45	ES&H Overview	D. Erickson, DESH
8:45 - 9:15	Facility Management Model	S. Crider, FSS
9:15 - 9:45	Facility Manager #1 Perspective	D. Carathers, ESA-FM
9:45 - 10:15	Facility Manager #2 Perspective	D. Post, NMT-8
10:15 - 10:30	**Break**	
10:30 - 11:30	Roundtable Discussion with Facility Managers	D. Post, NMT-8 D. Carathers, ESA-FM S. Crider, FSS L. Haynes, CST-FM E. Mullens, NIS T. Drypolcher, CST-FM
11:30 - 12:30	**Working Lunch** (By Invitation Only) Panel Discussion of DNFSB Questions with Directors	J. Jackson, DD D. Erickson, DESH A. Gancarz, DCST R. Burick, DESA T. Baca, DEMP B. van der Hoeven, DFSS B. Matthews, DNMT

Afternoon

12:30 - 12:50	Principal Investigator	S. Yarbro, NMT-2
12:50 - 1:10	TSE Group Leader	D. Carlson, ESA-TSE
1:10 - 2:00	Roundtable Discussion with Principal Investigators	S. Yarbro, NMT-2 D. Carlson, ESA-TSE R. Anderson, NIS-6 R. Paternoster, NIS-6
2:00 - 2:20	Program Manager's Perspective	T. Neal, NMRT
2:20 - 2:40	Division Director's Perspective	A. Gancarz, DCST
2:40 - 3:00	**Break**	
3:00 - 4:00	Roundtable Discussion with ES&H Personnel	B. Hargis, ESH-5 L. McAtee, ESH-1 H. Howard, ESH-3 J. Graf, ESH-DO S. Schilling, ESH-14 R. Smale, ESH-12 R. Brake, ESH-7 K. Alvar, ESH-4

Wednesday, February 15, 1995

8:00 - 8:15	Need for an Integrated Standards Based Management System	D. Harbur, DIR/CPT
8:15 - 8:35	Overview	M Patterson, DIR/CPT
8:40 - 9:00	Performance Based Approach	J. Loud, AA-2
9:00 - 9:15	Functional Area Structure	D. Harbur, DIR/CPT
9:20 - 9:45	Standards	L. Gritzo, PDNW
9:45 - 10:00	**Break**	
10:00 - 10:20	Implementation	M. Patterson, DIR/CPT
10:20 - 10:55	Assessments and POCs	D. Derkacs, AA-2
11:00 - 11:30	TA-55 Management Walk Around Program	J. Loud, AA-2
11:30 - 11:50	Jump Starting the New Process	R. Robertson, ESH-OIO
11:50 - 12:25	Pilot Program - 10CFR835	J. Graf, ESH-DO

12:30 - 1:00	Closing Discussion (By Invitation Only)	J. Jackson, DD M. Patterson, DIR/CPT D. Erickson, DESH B. Matthews, DNMT D. Harbur, DIR/CPT R. Burick, DESA T. Baca, DEMP B. van der Hoeven, DFSS K. Brittin, DAA

Facilitation: Larry Andrews, DNFSB Liaison

Agenda for DNFSB Staff Visit to Sandia National Laboratories
February 16, 1995 - 8:00 a.m. to 5:00 p.m.
Building 802, Conference Room 3190

DNFSB Visitors: Albert G. Jordan, Donald F. Owen, Jan Preston, John F. Drain, Duane Sewell and Gerald F. Tape

Subject: How Sandia Manages Health and Safety in Performing Research and Development

8:00 - 8:45 Introduction and welcoming remarks
8:00 - Mike Zamorski, Deputy Area Manager, KAO
8:30 - 8:45 - Remarks from the DNFSB Staff

8:45 - 9:30 How Sandia manages Health and Safety in performing research and development -- a management perspective
M. Lynn Jones, Vice President, Laboratories Services Division

9:30 - 9:45 Break

9:00 - 10:30 How Sandia manages Health and Safety in performing research and development -- line perspective
James K. Rice, Director Reactor Engineering Technology Center

10:30 - 10:45 Break

10:45 - 11:30 Roundtable discussion with principal investigators

11:30 - 12:55 Lunch - (No host - space reserved at the Coronado Club)

1:00 - 2:00 Roundtable discussion with facility managers

2:00 - 2:10 Break

2:10 - 3:10 Roundtable discussion with ES&H professional staff

3:10 - 3:20 Break

3:20 - 3:35 Laboratory objectives and management architecture
Virgil Dugan, Executive Staff Director

3:35 - 4:20 An improved framework for operational requirements
Don Schueler, Executive Staff Support

4:20 - 4:30 Break

4:30 - 5:00 Wrap up discussion