Date: 15 June 2023

Subject: CSSG Face-to-Face Meeting

Participants:

Present –Brady, Bowen, Hayes, Heinrichs, Hopper, Wilson, Braden Saltus (DNFSB staff), McLaughlin,

Virtual- Eberle, McKamy, Reynolds, Trumble, Hicks, Alwin

Agenda	
Welcome/Introduction	Hayes
Minutes from May 25 CSSG Telcon	Hayes
Status Actions from Self-Assessment	Brady
Draft Tasking on Infractions	Bowen/McLaughlin
Update NCSP Mission and Vision	Bowen
CSSG Membership	Hayes/Brady
Round Table	All
Next Meeting	All

Discussion:

Welcome/Introductions

Roundtable introductions. Braden Saltus, DNFSB staff from Washington, D.C. was welcomed.

CSSG Minutes from Previous Meetings

Minutes from the virtual meeting 25 May 2023 have been delayed.

Hayes brought up the discussion of moderator control from that meeting. Discussion ensued related to the status of ANS 8.22. The openness of standards meetings was brought up. As a result of COVID, these meetings do not have the broad outside attention previously received as a result of direct integration with ANS meetings. Request to consider reinstating open meetings.

- Bowen received an action to facilitate the 8.22 WG meetings and work to include LANL and other sites that may be potentially impacted by revisions.
- Wilson received an action to engage the CSCT on this topic.
- Hayes received an action to complete the 25May minutes.

Status Actions from the Self-Assessment (SA)

Good progress is being made on the actions from the CSSG SA (Tasking 2022-02). The SA tracking matrix was updated and is included in these minutes (Item 1).

Pending CSSG Tasking on Site-wide Criticality Safety Infractions

McLaughlin distributed a draft of the tasking. The response to the draft called to notice an NCSP tasking on this topic which is already underway.

IPD4 Learning from Experience (LFE) is an ORNL task led by Andy Prichard (subcontractor, retired PNNL). The intent of the database is to gather information related to NCS infraction events and incidents to be shared globally with NCS practitioners. Security concerns have been discussed. The intent is to keep the information in the database site agnostic with only lessons learned information provided. The database will be shared on some DOE website and the NCSP website is the desired location. Early discussions with LLNL make this appear feasible. The UK intends to submit information to the database as well.

The decision was made to suspend work on the draft tasking pending the outcome of the NCSP task which is a more detailed and fully funded activity.

Pending CSSG Tasking on Defining Role of Emeritus Members

Just prior to this meeting a draft was distributed to volunteer Emeritus Members, Calvin Hopper and Kevin Kimball. Jerry McKamy also contributed input to the draft and has volunteered to participate.

- A current full member of the CSSG is needed to lead the Tasking.

The draft document is attached to these minutes (Item 2).

Update NCSP Mission and Vision

Doug Bowen gave an update on the current NCSP activity to update the NCSP Mission and Vision. The intent of this 5-year update is to review activities and note where making progress relative to the goals set out in the mission and vision. The objective is to identify any gaps with these goals. The site managers have been asked for their input. This will be a topic for discussion at the July BEM (Budget Execution Meeting). The update to the Mission and Vision should be published in March 2024.

McKamy made a suggestion that the NCSP consider identifying interim steps for line items to improve tracking progress.

CSSG Membership

M. Brady announced that due to personal reasons she must step down to an Emeritus Member role as quickly as possible.

This change brings several actions:

1. Identify her replacement her role as Deputy Chair and determine how to transition the Chair/Deputy Chair change that should have happened at the end of this FY
2. Identify a new CSSG member ASAP
3. Suggest replacements for her roles in the NEA as a member of both the Nuclear Science Committee and the Working Party on Nuclear Criticality Safety from which she will also be resigning.

At the change of the current FY Brady was to assume the role of CSSG Chair allowing Hayes to step down. The suggestion was that a new Deputy Chair should be elected and fill that role for at least 1 year before Hayes steps down. Another choice would be to ask a previous Chair to step back into the role of chair if it is desirable that the new Deputy Chair serve a full 3 years before becoming Chair. The intent of the 3 year limit in the CSSG Work Instructions was to limit the term of the Chair and permit more frequent turnover.

- Brady submitted the name of Kevin Reynolds as a candidate for Deputy Chair, to which he agreed.

As Deputy Chair, Brady agreed to form a Nominating Committee to seek a new member.

- Submit names and emails of potential candidates to her as well at least 2 volunteers to serve as members of the Nominating Committee to be selected by Hayes
- As an aid for the Nominating Committee, Brady also requested CSSG members who may have plans to transition in the next 3-5 years to pass that information along to facilitate candidate ranking and possible mentoring recommendations.

As guidance for identifying potential candidates, she offered the following based on the discussions around the last member selection. Desirable candidates are those that: exhibit leadership and are energetic; a federal employee would be highly desirable; show interest and expertise in DOE Orders and Standards; have a programmatic background in NCS; have interest/expertise in Nuclear Data; and candidates who are mid-career. CSSG is currently heavily weighted by LANL personnel and by retirees so these candidates should be carefully considered. The intent of the Nominating Committee would be to identify 3 target candidates and pursue them relative to their interest and their management approval.

Although not directly related to CSSG, as she steps down from her NEA roles, Brady would like to suggest candidate replacement with an NCS background. If anyone has suggestions for names she should put forward she would appreciate hearing them. Current thoughts include

identifying Dave Heinrichs as a potential replacement for her role as an NSC (Nuclear Science Committee) member.

Roundtable:

NCSP update. The NCSP Budget Execution Meeting (BEM) is scheduled for July 19. Site managers are working on the 5-year plan. Zerkle is developing nuclear data priorities to be distributed. Luis Leal is returning to ORNL.

DNFSB criticality safety reviews are still in progress. These reviews seem to be going well but are resource intensive for the sites.

Topics for future CSSG Taskings was a topic of discussion. Suggestions included tracking the SRPPF status, LLNL Superblock standup, state and health of DOE field office in terms of NCS capability.

Hayes mentioned a DOE initiative SAFER to integrate AI machine learning into safety analysis. McKamy mentioned that this has been around and that he wrote an article stating his concerns.

- Brady will distribute a copy of the article at the end of the minutes (Item 3).

There is an NCSP proposal call for FY25 to go out in February. New Tasks will be limited by the available budget (probably less than $1M). CSSG will be asked to assist proposal reviews.

Next CSSG Meetings:

Next Teams meeting is scheduled for July 6. Teams meetings have been scheduled for every six weeks.

The next Face-to-Face meeting will be with the ANS Winter meeting in Washington, DC. We will attempt to schedule the CSSG meeting on the morning of Thursday, November 16.

- The suggestion was made that perhaps Angela could write a note of appreciation to the ANS Executive Director for their continued support providing space for CSSG Face-to-Face meetings in conjunction with ANS meetings.

The meeting was adjourned.

Item 1

Recommendation Category	Specific Recommendation	Status
Revise Charter and Work Instruction	**1, 2a, 2b, 2c, 3, 5, 8, 9, 10, 15, 16, 17, 18, 19**	Approved by NCS Manager and posted to NCSP website COMPLETE
Proposed Taskings	**6** DOE-wide review of criticality safety infractions	Decision to suspend tasking in favor of NCSP Activity COMPLETE
	21 Define emeritus member role	Draft distributed, Need a current CSSG member to lead
NCSP Manager Action	**7** Improve DNFSB staff interface	COMPLETE
	13 Establish DOE Regulatory Liaison role with CSSG	COMPLETE
	20 Decide if mentoring is in the CSSG scope	COMPLETE Angela confirms mentoring potential new CSSG members in scope
CSSG Chair/Deputy Chair Action	**4** Schedule regular calls on 6-week basis	Teams Meeting established through OCT 2023 COMPLETE
	11 Post CSSG technical presentations on the NCSP website	COMPLETE
	12 Select CSSG member (Current or Emeritus) to function as CSSG Regulatory Liaison	In Progress
	14 Post CSSG briefings to DOE at discretion of NCSP Manager on the NCSP website	In Progress

Item 2

CSSG TASKING 2023-02

Date Issued August XX, 2023

Task Title:

Role of CSSG Emeritus Members

Task Statement:

The CSSG is tasked to define the role of it's Emeritus Members (EMs). The recent CSSG Self-Assessment (Tasking 2022-02) included the recommendation to better define the role of the CSSG EM in order to improve the overall impact of the CSSG by more effectively utilizing their expertise.

The primary roles foreseen for the EMs include but are not limited to:

1. Maintain ties to the original purpose and intent of the CSSG as a response to DNFSB Recommendation 97-2.
2. Maintain the balance, effectiveness, and influence of the CSSG in fulfilling its founding objectives.
3. Provide guidance on maintaining the CSSG on criticality safety programs across the DOE Complex and avoid redundancy with the NCSP technical program.
4. Advise CSSG Nominating Committees regarding identifying ideal attributes of the next CSSG candidate relative to the balance of the CSSG and its ability to identify address DOE-wide criticality safety issues.
5. EMs with specific expertise to fulfill the roles of CSCT liaison and interface with the CSSG point-of-contact regarding DOE Directives, Standards and Guides.
6. At least one Emeritus member should be appointed to participate in periodic CSSG Self-Assessments.

The report should address funding for these EM roles. A budget should be determined as part of the , to be managed by the NCSP Task Manager to cover these costs. The ORNL contracting process may be better aligned with supporting manpower rather than travel. This should be taken into consideration when discussing potential roles. The majority of the roles foreseen for EMs can be fulfilled with remote communication. Mentoring for potential future CSSG members should be encouraged to be provided by their home organizations as part of their professional development. Developing guidelines for this mentoring could be a task under the NCSP Training and Education objective.

Period of Performance:

It is estimated that the report should be available to the CSSG at-large within a month of this task being assigned. Within 2 weeks of receipt of the report, the CSSG should have a consensus report for submittal to the NCSP manager.

Resources:

Contractor CSSG members will use current year NCSP CSSG support funding; DOE members will use their office funding. Emeritus members will participate as volunteers.

The CSSG Tasking Working Group members are:

- Current CSSG member, Lead
- Jerry McKamy
- Kevin Kimball
- Calvin Hopper

Task Deliverables:

Provide a report with specific recommendations for the role of EMs as a group as well as possible roles based on specific expertise of individual EMs. The report should also address potential funding for these EM roles and responsibilities for that funding.

Additional INPUT from McKamy to be considered:

Greetings Colleagues!

I know there's interest coming from the recent self assessment in how to engage Emeritus members. Here is some mud thrown on the wall in no particular order or priority. Disclaimer: I'm not advocating for any of these in particular. I'm just hoping to stimulate the conversation.

1. Regulatory Liaison for the CSSG: Kevin Kimball. No one better at it than he is.

2. Allocate a little annual funding to support each Emeritus member attending one FTF CSSG meeting every 2 years. Maybe have funds for one Emeritus member at each FTF and rotate amongst the Emeritus members?

3. Continue the practice of allocating task funding to Emeritus members on an as-needed case-by-case basis.

4. Give Emeritus members 0.5 votes/each to engage them and get input?

5. Annually have an Emeritus Panel Discussion at an ANS NCSD session.

6. Sponsor one Emeritus talk/paper at an ANS meeting. Perhaps have an annual call for Emeritus members to propose talks/papers and the CSSG pick from the submittals.

7. Since the Emeritus members have more flexible time constraints, consider using Emeritus members for familiarity site visits with a view of just advance scouting and promoting continual awareness of issues before they become crises and reporting back to the CSSG. Not a review. Not an audit. Literally a show and tell, informal, conversational visit for two or three days at selected sites on some periodic basis. These might be best characterized as "listening" visits.

8. Might there be benefit of a Founding/Emeritus Members Heritage Panel series to collect the history of the CSSG/NCSP and views on NCS trajectory going forward from a viewpoint of all that's transpired since 1997? Recored it as an IPD activity? All of us Founding members are aging out. I'm the youngest and nearly 70 already.

9. I don't know what form an Emeritus mentoring activity would look like. Maybe ask each Emeritus member to identify something they individually would like to mentor on and transfer perspective on and hold a colloquium at a NCSP event/meeting? Record it? When I was at the DNFSB mentoring their young NCS staff I held seminars that we recorded with all the staff present and there was always a recorded Q&A session at the end. I presented on various ANSI/ANS-8 Standards, 1158, How to review a CSE, How to Conduct a NCS Program Site Review, things like that. Mine are still there at the Board BTW and I think Ryan Eul has used them in the recent past.

Ok. That's enough for y'all to shoot at for now.

Cheers!

Jerry

Item 3 (Source NNSA Tech Bulletin 2017-

The Greatest Threat to DOE Criticality Safety Programs: Managing Change

Dr. Jerry N. McKamy, formerly with NA-511 staff

The single biggest threat to DOE criticality safety programs is unintended and undetected consequences due to change. This article is intended to document some of those past changes and stimulate thought on how DOE and its Contractors can best anticipate, detect and mitigate potential adverse impacts on criticality safety brought on by change.

Implementation of the ANSI/ANS-8 Standards and elimination of the practice of storing solution in unfavorable geometry vessels have dramatically reduced the frequency of criticality accidents in the U.S. and worldwide. The last U.S. criticality accidents in a NNSA defense facility occurred in 1958. From 1958 until 1989, there were no criticality accidents and no programmatic shutdowns in DOE facilities due to criticality safety concerns. However, there have continued to be major work stoppages at DOE facilities resulting in plant, laboratory, and facility shutdowns with enormous impacts on mission and costing the DOE millions of dollars to restore operations.

Here is a representative list of major DOE facility shutdowns due to criticality safety program problems:

• 1994-1996 Y-12 Enriched Uranium Operations due to Inadequate Conduct of Operations and Inadequate Documentation of the Criticality Safety Basis (DNFSB Recommendation 94-4)

• 1994-1995 Rocky Flats Plutonium Recovery Operations resulting from a near-miss criticality accident in Building 771

• 1996-1997 Rocky Flats Plutonium Stabilization Activities due to discovery of inadequate criticality safety mass controls of some legacy waste drums containing hydrogenous waste

• 1997-1998 Livermore National Laboratory (LLNL) B332 Plutonium and Stockpile Support Operations due to discovery of numerous criticality safety infractions

• 1998-1999 Hanford Plutonium Finishing Plant due to numerous criticality safety infractions
• 2007-2008 Los Alamos National Laboratory (LANL) PF-4 Plutonium Operations due to discovery of inadequate flowdown and implementation of controls from criticality safety evaluations
• 2013-2016 LANL PF-4 Plutonium Operations due to inadequate conduct of operations and disintegration of the nuclear criticality safety group.

In every instance cited above all the symptoms were produced by organization change which resulted in instability of the criticality safety function.
Changes that resulted in the instability in the criticality safety programs include the following:
• Abrupt Change in DOE Technical Expectations,
• Site/Lab Contract Change, and
• Mission Change.

The impacts of these changes can be rapid. It takes as little as six months for a robust, functioning, compliant criticality safety program to become completely ineffective. That's about how long it takes for senior technical managers to leave, senior technical staff to leave, and for management to reorganize the criticality safety function such that they are no longer independent of operations. This happened at LLNL in 1996. Sound criticality safety programs take 5-10 years to build from a state of disarray but can, and have been, destroyed in less than a year. These rapid changes in the health of criticality safety programs can go undetected by standard oversight and Contractor Assurance practices because these only look for the symptoms of problems which might not be detected until system collapse or an accident occurs. Let's briefly look at the history of major facility shut-downs due to instability in the criticality safety function and then attempt to offer a way to monitor the onset of these issues before the consequences become inevitable.

Change in DOE Technical Expectations

In the early 1990s DOE changed its technical expectations for documentation of criticality safety evaluations. DOE went rapidly from accepting an 'expert based' system where the safety and operational knowledge resided in long-tenured personnel to requiring a 'standards based' system where everything related to analysis and control of the criticality accident hazard had to be documented in a way understood by DOE auditors. The pace of change in technical expectations could not keep up with the labs' and sites' ability to maintain safe operations, reconstitute criticality safety evaluations to new and emerging expectations, and revise operating procedures to drive increased formality. Y-12 was shut down by imposing this standards based expectation on the facility abruptly, largely due to the interaction of the Defense Nuclear Facilities Safety Board (DNFSB) and their Recommendation 94-4. The 1996 Rocky Flats shutdown was due to a backwards looking imposition of higher analysis and control expectations on

existing legacy waste drums. In both the Y-12 and Rocky Flats cases, nothing was actually unsafe as found. What was missing was documentation of the safety in a form that DOE could understand in light of its standards-based approach.

In subsequent years, as the Department moved systematically through its sites to standardize its criticality safety programs, the change to the standards/formality of operations base eventually caught LANL in 2005. In this case, LANL and DOE should have had ample warning and begun to transition towards a standards-based criticality safety program, but did not until forced to do so. It should be noted that the Los Alamos Site Office had no resident criticality safety subject matter expert on staff prior to 2005. The forcing function was an invited comprehensive criticality safety assessment of LANL by the DOE Criticality Safety Support Group (CSSG) in 2005. Subsequent to this review, the DNFSB staff discovered flawed criticality safety evaluations, failure to implement controls, and a failed configuration management system in the LANL PF-4 storage vault. Contributing to this situation in the storage vault was the loss of the criticality safety engineer who prepared the original evaluation and lack of knowledge transfer to those following him. Along the line a higher plutonium mass limit was approved without understanding the upset conditions and engineered controls required. The as-found condition of the PF-4 vault was safe but did not meet the ANSI/ANS-8 requirements for margin of subcriticality. This led to revising all the criticality safety evaluations for the vault and a redesign of storage shelves in Rooms B & I. The root-cause of the PF-4 stand-down and subsequent comprehensive Augmented Limit Review process for all criticality safety evaluations was the abrupt transition from an expert based system to a standards based system.

Contract Change

Contract change driven by DOE was a major reason for criticality safety problems at Hanford PFP in 1997 and contributed significantly to the LANL problems in the 2010-2013 time frame. In the former case, the Department experimented with a ‘Management & Integration’ (M&I) contract where site functions would be performed by multiple contractors, not the traditional Management & Operations Contractor. In the Hanford M&I case, the criticality safety function was actually outsourced to a sub-contractor located in another state and the criticality safety evaluations were literally mailed in based on task-orders from the site.

In the latter case with LANL, transition to a new contractor with its new articles of incorporation assigning mission functions to specific corporate teaming partners resulted in a change of senior safety management leadership leading to senior safety managers with virtually no comparable criticality safety experience. The major initiator for the collapse of the criticality safety program in this environment was the loss of an experienced senior manager with good working relationships with the criticality safety staff. A senior criticality expert reported directly to the Division Leader at the time. The replacement senior manager pushed the senior criticality expert down in the organization which accelerated the de-stabilization of the program, and eroded the independence from operations of the criticality safety function. Management actions led directly, almost deliberately, to the complete disintegration of the criticality safety function over a two

year period at which point the Laboratory was left with but a single junior qualified criticality safety engineer, culminating in the shutdown of PF-4 in 2013.

In 2011-2012 the NNSA and LANL had several formal written reports and briefings warning explicitly of the imminent demise of the criticality safety organization and loss of staff. The DOE Criticality Safety Support Group (CSSG) warned NNSA and LANL in 2012 that LANL would lose about 70% of its mission capability and take five years to recover.

Mission Change

Mission change played the dominant role in the 1994 and 1997 shutdowns of Rocky Flats and the Lawrence Livermore National Laboratory (LLNL), respectively. Rocky Flats was from inception a nuclear weapons component manufacturing plant. In the early 90's, with its change from a production site to a decommissioning site, Rocky Flats transitioned from the Office of Defense Programs to the Office of Environmental Management. The management culture flipped rapidly from a focus on safety and weapons production to being risk averse to environmental fines levied by the state of Colorado under Resource Conservation and Recovery Act (RCRA) laws. What was plutonium product one day was RCRA regulated waste the next. The workforce came to fear RCRA violations and fines more than a criticality accident and quickly began acting as if a criticality accident could not happen with so-called waste.

In the case of LLNL when DOE decided it no longer needed two fully capable national weapons laboratories with redundant plutonium capabilities, the University of California offered a voluntary early retirement program at LLNL and the long-tenured criticality safety manager and many senior staff retired. The criticality safety function and depleted remnant staff were rapidly split-up and made subservient to operations.

Two of these major facility shutdowns were anticipated and leading indicators were documented but all went unheeded for a year or more. The criticality safety manager at Rocky Flats wrote two formal warning memos to senior plant management during the year ahead of the August 1994 Building 771 near-miss event warning bluntly that a criticality accident was about to happen in that facility.

Again, these very explicit, documented warnings (both at Rocky Flats and at LANL) went unheeded by both the contractor and DOE because they didn't fit neatly into standard oversight boxes and the 'accident' hadn't happened yet.

Fixing the Problem

NNSA and DOE need to do a better job of change management, recognizing the importance of the individual managers and their expertise in maintaining stable criticality safety programs.

The proceedings of the 1999 Criticality Safety Self-Improvement Workshop document (page 13 of the presentation "What's Wrong with NCS Programs?") presents some

leading indicators of problems in maintaining a stable criticality safety function stemming from weaknesses in contractor management:
• Weak or Nonexistent Nuclear Criticality Safety Policy ○ Unclear Roles & Responsibilities
○ NCS Group and Staff Report Directly to the Line Operations (also manifests itself as 100% direct funding from Operations)

• The NCS Manager reports too low in the Organization ○ No Institutional (i.e. indirect) NCS Funding (this should be about 30% of the FTE equivalent for the NCS Staff)
○ No Management Assessments of NCS

When Contractor changes occur, DOE and NNSA should select key individuals on contracts who have demonstrated knowledge and skill in managing criticality safety. DOE and NNSA should select Contractors who propose organizations with criticality safety being clearly independent of operations, receiving substantial indirect funding under the control of the NCS manager, have the NCS Manager report no more than two levels below the plant president or lab director, and have a robust system whereby the plant president/lab director maintains awareness of the NCS program health. Contractor Management (in ANSI/ANS-8.19 vernacular this means line management up to and including the senior most official, not the criticality safety manager) should implement best practices for Nuclear Criticality Safety Committees as recommended by the DOE CSSG which may be found on the DOE Nuclear Criticality Safety Program website. A good example of a strong and vigorous Nuclear Criticality Safety Committee is the one put in place at LANL during the Laboratory's efforts to reconstruct their criticality safety program in the aftermath of the 2013 shutdown.
One of the least used leading indicator metrics from the 1999 Self-Improvement Workshop is the one of whether or not the contractor NCS Manager has about 30% Full Time Equivalent for the NCS staff worth of money at their discretion. For example, in the late 1997 time-frame, a Hanford facility had allocated only about $500k/yr. total to criticality safety leading up to the shut down when it is obvious that anything less than about $2-5M/yr. was the figure of merit for the operations and size of the facility.
Why is this metric so powerful? First, it ensures that the criticality safety staff is functionally independent of line operations as required by ANSI/ANS-8.19. Second, it permits the NCS Manager to provide for staff development in the form of participation in ANSI/ANS Standard Development, attendance and publication at national conferences, and participation in offsite and onsite technical professional development opportunities. This contributes to the ANSI/ANS-8.19 requirement for Management to provide personnel familiar with the physics of criticality and encourages stability in the NCS staff. Third, it permits the NCS Manager to allocate staff to addressing fundamental safety infrastructure needs (analogous to the old Readiness in Technical Base and Facilities program in NNSA operating budgets). No single line operations manager will fund these kinds of activities (i.e. new workstations, upgraded cross-section sets,

upgraded/updated monte-carlo codes, upgrading plant/lab wide legacy criticality safety evaluations with known deficiencies, producing standardized policies, programs, and procedures across the site/lab, etc.). This helps, in part, to address the ANSI/ANS-8.19 requirement to identify and correct deficiencies and prevent their recurrence and also the requirement for NCS staff to remain current in advances in the physics and technology of criticality safety.

The key backstop to early detection of unintended consequences of change is frequent communication with subject matter experts close to the work. The Department has qualified criticality safety personnel at its field and site offices. These professionals make up the Federal Criticality Safety Coordinating Team (CSCT). Senior DOE Management should engage in regular discussions with their respective CSCT members to identify rapidly changing conditions that could adversely affect criticality safety. Conventional audit and review strategies produce lagging indicators. Information on leading indicators (such as a senior manager leaving and reorganization of criticality safety or mass departure of senior criticality staff) come from regular free-flowing technical information (in the form of open discussion and dialog, not formal reports or metric reporting) from the field/site up the line management chain. This dialog is essential to be able to detect and mitigate adverse impacts of change with sufficient time to intervene.

Contract expectations, award fee structures, and funding allocation for the NCS group are useful leading predictors of the health and stability of the criticality safety function.

The good news is that all of these recommended criteria and metrics are already part of the formal DOE infrastructure. They are incorporated into lines of inquiry in DOE-STD-1158 for contractor self-assessments. Reliance upon, and retention of, personnel by both Contractors and DOE who are familiar with the physics of nuclear criticality and with associated safety practices to furnish technical guidance appropriate to the scope of operations is essential. DOE management should rely upon the expertise resident in the DOE Criticality Safety Support Group (CSSG) working in concert with the Federal Criticality Safety Coordinating Team (CSCT) to anticipate and prevent criticality safety program instability at the earliest sign of onset.