Summary of Nuclear Explosive Safety Study (NESS) Senior Technical Advisory Panel (STAP) Observations on the NESS Process for the Period 2000-2003

The recommendations and "opportunities for improvement" listed below should be kept in the context of the conclusions and "general impressions" provided by the STAP during the February 2002 and June 2003 meetings.

February 2002 Conclusions:

- Current NESS process is generally well implemented.
- Principal safety issues are being addressed.
- Some concerns exist with the rigor and context of input data and briefings (e.g., weapons response and hazards analysis).

June 2003 General Impressions:

- Progress with 2002 Recommendations.
- Improvements evident in input documentation and NESS process.
- Further improvements possible.

A. Recommendation from November 2000 STAP/DNFSB meeting:

A.1. Arrange for an annual meeting between the STAs and DNFSB to share observations.

Background/Details:
During the November 2000 meeting, one of the STAs, Dr. Garrick, recommended that the STAs meet with the DNFSB on an annual basis to share their observations, and the DNFSB concurred. Mr. Beck agreed to the annual meeting. Dr. Fingerlos, who attended the meeting and was later given responsibility for dealing with STA issues (from a Nuclear Explosive Safety Division (NESD) perspective), took this as direction and established an annual meeting.

Status: Accepted -- Approved by the Assistant Deputy Administrator for Military Application and Stockpile Operations (NA-12) during meeting

POC: NESD (Jim Fingerlos)

Comments:
NESD took the action to schedule the "Annual" meetings held in February 2002 and June 2003. The current STAP Charter is attached.

The following includes the recommendations made in February 2002 – June 2003.

B. Recommendations from February 2002 STAP/DNFSB meeting:

B.1. Initiate a modest program of collecting, eliciting, and processing experience data to support reasonable and realistic safety analyses.

Status: Accepted

POC: NA-121 (Kamiar Jamali) and PXSO (Don Brunell)

Comments:
We agree that a modest program of collecting operational and test data, where appropriate, could benefit the HAR development process and its utility. After 10CFR830, "Nuclear Safety Management," controls in the TSR Integrated Implementation Plan (TSRIIP) are implemented; it would be appropriate to look for opportunities to do this. The TSRIIP will not be completely implemented until FY05. Target date for completion is the end of FY2005.

B.2. Begin phasing quantitative risk assessment thought process for weapons response analyses and hazards analysis.

Background/Details:
The title "Begin phasing [in] quantitative risk assessment thought process for weapons response analyses and hazards analysis" comes directly from the STA slides used to brief the DNFSB. In the discussion, this referred to starting a limited probabilistic risk assessment of some high-consequence events such as HE drops, where, if good data were developed, there is the potential to remove some controls without impacting safety [or, conversely, identifying the need for more controls]. The direction to start this effort needs to come from Headquarters because it will require both Pantex and Lab resources. There has been no discussion of rushing into a full PRA of any Pantex operation. Everyone recognizes that a full PRA will require time and resources that are currently unavailable.

Status: Partially accepted

POC: PXSO (Don Brunell)

Comments:
Desirable elements of a PRA-type approach will be reviewed for appropriate inclusion in Pantex AB documents. These can include a ranking of accident scenarios in each of the major consequence categories of HEVR and IND. The target date for completion of this review is September 30, 2005.

B.3.
Introduce an unrestricted, out-of-box component to the safety study review process.

Background/Details:
Lessons-learned meetings have been held on NESSs, but they were scheduled by the project teams some time after the studies ended and frequently did not happen due to other priorities. Beginning with the W62 NESS, a lessons-learned meeting was scheduled by the NESS Chair immediately after the study. The NESS Chair should determine the need for such a meeting. Such meetings are generally applicable to program studies and master studies and not to Operational Safety Reviews, Joint Nuclear Explosive Safety Reviews, and limited-scope studies of short duration.

Status: Accepted and closed

POC: NESD (Jim Fingerlos)

Comments:
The following text has been added to the NESS Process Guide: "The NESSG Chair should arrange for a lessons-learned meeting immediately after a program or master study is completed. This should happen before the members and project team leave. Such lessons-learned meetings are probably unnecessary for OSRs, JNRs, and limited-scope studies of short duration. The NESSG Chair, with input from the project team, should determine the need for lessons-learned meeting after OSRs, JNRs, and limited-scope studies of short duration. The focus of the lessons-learned meeting is passing on those things done well and those that need improvement to other project teams. They should avoid innuendo. They are a mechanism for capturing good ideas, improving the quality of programs and studies, and instructing new personnel. These meetings should be planned to last a full day." This was implemented at the close of the W62 SS-21 NESS.

B.4. Implement practices that result in greater interaction of weapons response analysis and the nuclear explosive safety process.

Background/Details:
It is a requirement that the NESSG members receive and review the input documentation prior to the Final Planning Meeting. DOE-STD-3015, "Nuclear Explosive Safety Study," suggests that the members have between 5 and 10 working days for this review. The members are again to have 15 to 20 working days after the Final Planning Meeting to prepare. Normally the weapons response is briefed during the first days of the study. However, questions usually arise during the studies that require follow-on briefings during the study. During the W62 study, these follow-on briefings were intentionally held off until just prior to deliberations to prevent repeated appearances by the briefers. The laboratory representatives on the W62 project team helped to facilitate the necessary follow-ups. It is hoped that such practices will help improve the interaction between the NESSG and the weapons response analysts. However, schedules often are tight, and the project team requests that the review period prior to the study be shortened. This does

not allow the NESSG adequate time to prepare prior to the study and results in more questions later in the study. It was suggested by the W62 Project Team that the initial laboratory and project team briefings be presented during an extended Final Planning Meeting. However, the schedule slipped, and the members did not receive the input document until 2 working days prior to the Final Planning Meeting. As a result, the project team asked to have the briefings at the beginning of the study as usual. If the DOE-STD-3015 time frames were held to, holding the initial briefings during the Final Planning Meeting would address this recommendation and provide for greater interaction with both the weapons response analysts and the rest of the project team.

Status: Accepted

POC: NESD (Jim Fingerlos)/BWXT Project Teams

Comments:
The NESSG Chairs have experimented with holding the technical briefings during the Final Planning Meeting. This was done during the August 2003 W88 Accelerated Bay Tooling NESS and the W78 SS-21 NESS. This has allowed a more focused review of the input documents and follow-up briefings during the NESS.

NNSA will add conducting the technical briefings during the Final Planning Meeting to the NESS Process Guide as an option to be considered for both NESSs and OSRs. However, this will continue to be a decision jointly made by the Project Team and NESSG Chair. This change will be included in the revised NESS Process Guide which should be published by September 30, 2004.

C. "Opportunities for Improvements" From June 2003 STAP/DNFSB Meeting:

C.1. Scheduling of Nuclear Explosive Safety Studies

Background/Details:
The STAs have a concern with the NESS scheduling process. This concern has been precipitated by delays in 2002-2003. While the schedules identify many studies and activities over a 2- to 3-year period, very few have definitive time slots until just a few weeks before the actual studies and after several cycles of schedule and delay. This may be compromising the selection process of NESSG members and technical advisors. Delayed studies may increase risks if the studies are held on ongoing operations or on master-study topics.

Status: Accepted

POC: NA-121 (Chuck Westfall)

Comments:
The independent reviews must come at the end of the project. The projects are subject to delays, resource allocation issues, incentives, plant closures, and other factors. The studies cannot be performed until the plant is ready, the input documentation is ready and reviewed, internal reviews have performed, etc. As a result the NESS and readiness assessment will always be subject to schedule delays and changes. However, NA-121 will track upcoming NESSs with increased vigor to "encourage" all associated parties to accomplish tasks necessary to complete the NESSs on schedule.

C.2. Importance-Ranking of Safety Scenarios

Background/Details:
High Explosive Violent Reaction (HEVR) and Inadvertent Nuclear Detonation (IND) scenarios should be importance-ranked by the weapons response experts to assure adequate review. The current Authorization Basis (AB) and Hazards Analysis Report (HAR) approaches are not useful in identifying major risks and weaknesses, since all risks are "controlled" by the time the HAR is complete. The deliberations sometimes are lengthy. Efficiencies might be introduced with a more visible track of the important safety issues as suggested above to avoid unnecessary deliberation on issues of little or no importance to IND and HEVR scenarios. Ranking and integrating the risk scenarios would provide a metric for testing relevancy of issues and most likely contribute to keeping the discussions more focused. The basis for the rankings should be documented.

Status: Partially accepted

POC: NA-121 (Kamiar Jamali)

Comments:
Deriving importance measures from an ordered list of point-estimate accident probabilities is a step that can be reviewed for applicability to Pantex AB. The target date for completion of this review is September 30, 2005.

C.3. Avoiding the "Audit" Mentality

Background/Details:
It is important that the NESSGs retain the posture of independent safety review, not just compliance with regulations. In this regard, there is room for sharpening the language of the NES deficiency summaries. Often the deficiencies are couched in the language of standards, orders, and directives, not in the language of the real safety issue. The thought here is that we should be engaging in a "safety study" not an "audit". The first perspective should be safety, and then we should satisfy ourselves that there is full compliance.

Status: Accepted

POC: NA-121 (Chuck Westfall)

Comments:
This issue may be one of semantics rather than substance. The NESSG's charter is to ensure that controls are adequate to meet the NES Standards. The contractors are held to the NES Standards. As a result, findings are usually written against compliance with a standard. While this might seem like an audit approach, the standards are such that most any issue of NES importance can be written against one or more standards. Nonetheless, we agree that NES deficiency statements should reflect a safety shortfall as opposed to a failure to satisfy requirements.

C.4. Better Use of Human Performance Measures

Background/Details:
There is insufficient evidence of a contemporary human performance measurement program, especially for the bay and cell operations. Pantex might benefit from a review of successful, widely used programs in industry.

Status: Under consideration

POC: PXSO (Don Brunell)

Comments:
After 10CFR830, "Nuclear Safety Management," controls in the Integrated Implementation Plan (IIP) are implemented; it would be appropriate to conduct such a

review. IIP will not be completely implemented until mid FY 2005. Target date for a decision is end of FY 2005.

C.5. Strengthening the Physics Representation

Background/Details:
It is believed that the NESSGs would benefit from greater representation of the physics discipline in the deliberations. Knowing some of the physics details of how the weapons work provides an important perspective on dealing with the question of "what can go wrong." During a NES study, questions arise that are not adequately addressed in the briefings, and to consider such issues often requires that first-principles knowledge be applied.

Status: Accepted

POC: NESD (Jim Fingerlos)

Comments:
The issue is the background, training, and confidence of the NESSG members. The knowledge of physics required by the Draft Nuclear Explosive Safety Functional Area Qualification Standard should be sufficient. Current NESSG members should consider attending courses at Los Alamos National Laboratory's Joint Nuclear Explosive Training Facility (JNETF), Sandia weapon-specific classes, and Sandia's WR708 course. The schedule of these courses is provided to the NES community on a bi-weekly basis in the announcement of the NES telecon.

C.6. Decompartmentalizing the Safety Information

Background/Details:
Decompartmentalizing the safety information into fully integrated risk scenarios would aid the process of review. While the focus is on the adequacy of controls, an understanding of the real safety issues is imperative to reach firm conclusions on controls. NESSG should not be satisfied with just taking the word of the input documentation, but should be in a position to challenge any aspect of the total safety case. The compartments are many and include the AB, master studies, technical safety requirements, design basis accidents, initial conditions, screening tables, and weapon response studies.

Status: Not accepted

POC: PXSO (Don Brunell)

Comments:
The proposal is not feasible given that the compartments stem from differing but related requirements. Each area has well defined inter-relationships (AB, Technical Safety

Requirements, Design Basis Accidents, initial conditions, screening tables, and weapon response studies). The Pantex AB is complicated by the nature of the weapons work. Time should be spent by the NESSG (or STAP) to understand requirements and how they are implemented at Pantex rather than to require the time and resources to provide more convenient packaging to aid "the process of review."

C.7. Consideration of Extended-Scope Reviews on Such Matters as the Need for a Particular Operation, Concurrent Operations, and Number of Workers Involved

Status: Not accepted

POC: NESD (Jim Fingerlos)

Comment/Status:

The need for a particular operation is purely a line management decision and not in the scope a NESSG. The need for concurrent operations and the number of workers involved are primarily line management issues. The NESSG and the DUURT (Deliberate Unauthorized Use Review Team) may have findings in these areas that require line management response – but any such findings would be process or facility related and should be dealt with during program or master studies.

C.8. Fine-Tuning the Staging of the NESS Process

Background/Details:
There is an opportunity to fine-tune the staging of the NESS process to further add to the efficiency and effectiveness of the safety studies. The current approach of (1) reviewing the input documentation, (2) receiving briefings from the project staff and experts, (3) observing operations, (4) deliberations, and (5) writing the report generally works well. However, experience indicates that by the time the NESSG gets into the deliberation phase, they are much smarter and often have questions that needed to be asked during the briefing phase. Sometimes the briefings are quite benign without much engagement, because the NESSG is just getting up to speed. Current practice is to recall some of the briefings, which requires more travel, preparation, and sometimes delays. The point is that a NESSG works iteratively, getting information first from the input documents; second from briefings that generally replicate what is in the input documents; and, third by observing operations, where risk scenarios are identified, causing the NESSG to go back to the input documents and briefings to see if the scenarios were adequately analyzed, resulting in more laboratory inputs. Part of the answer may lie in more emphasis on the technical briefings and less in the details of the procedures and a briefing process that is more interactive.

Status: Accepted

POC: NESD (Jim Fingerlos)

Comments:
Same comment as in B.4: It is a requirement that the NESSG members receive and review the input documentation prior to the Final Planning Meeting. DOE-STD-3015 suggests that the members have between 5 and 10 working days for this review. The members are again to have 15 to 20 working days after the Final Planning Meeting to prepare. Normally the weapons response is briefed during the first days of the study. However, usually questions arise during the study that requires follow-on briefings. During the W62 study these follow-on briefings were intentionally held off until just prior to deliberations to prevent repeated appearances by the briefers. The laboratory representatives on the W62 project team helped to facilitate the necessary follow-ups. It is hoped that such practices will help improve the interaction between the NESSG and the weapons response analysts. However, often, if not always, schedules are tight and the project team requests that the review period prior to the study be shortened. This does not allow the NESSG adequate time to prepare prior to the study and results in more questions later in the study. It was suggested by the W62 Project Team that the initial laboratory and project team briefings be presented during an extended Final Planning Meeting. However, the schedule slipped and the members did not receive the input document until 2 working days prior to the Final Planning Meeting. As a result, the project team asked to have the briefings at the beginning of the study as usual. If the DOE-STD-3015 time frames are held to, holding the initial briefings during the Final Planning Meeting would help answer this recommendation and provide for greater interaction with both the weapons response analysts and the rest of the project team.

The NESS process is continually evolving to become stronger.

NNSA will add conducting the technical briefings during the Final Planning Meeting to the NESS Process Guide as an option to be considered for both NESSs and OSRs. However, this will continue to be a decision jointly made by the Project Team and NESSG Chair. This change will be included in the revised NESS Process Guide which should be published by September 30, 2004.

C.9. Improvements in Use of the Training Bays

Background/Details:
The STAs see the advantages of using the training bays for observing the operations. They are much more accessible and there is less interference with production operations. There is a need for more creative arrangements to better simulate cell and bay conditions, not the least of which are the noise and distractions that come from other activities going on in the adjoining training bays.

Status: Not accepted

POC: PXSO (Steve Erhart)

Comments:
Because of the inability to completely and accurately simulate the facility interface, the PXSO Site Manager has directed all reviews occur in the planned facility, if available. If the NESS is performed in the training facility, then a NESSG walk-through will be conducted in the actual or representative facility configured for that operation. BWXT is also looking into creating a more permanent training facility that better represents actual bay and cell interfaces.

C.10. Procedure for Acting on Generic Issues

Background/Details:
There is need for a procedure for acting on generic issues. These are issues that apply to several weapon systems. The weapon-specific and master studies don't cover all of the safety issues that are shared by several different weapons systems. An example of a generic issue is the response of full-up weapons to various mechanical insults such as drops.

Status: Not accepted

POC: PXSO (Don Brunell)

Comment:
Generic issues arising from a NESS are part of the normal NESS deliberation process. There will always be some generic issues that could arise during NESSG proceedings. Each NESSG review is an independent process that may or may not agree with the previous NESSG study results.

C.11. Mechanism for Self-Assessing NESS Enhancements

Background/Details:
The lessons-learned meetings initiated in response to the 2002 recommendation (B.3.) goes part way. This recommendation is to hold a closed-door meeting among the NESSG members after a major study to look at opportunities to improve the NESS process. The annual NES Conference involves too many outside interests to be useful for this specific purpose.

Status: Accepted

POC: NESD (Jim Fingerlos)

Comments:

NESD will schedule a closed-door, NESSG-only meeting after the NESS in conjunction with the next lessons-learned meeting. The difficulty is keeping the NESSG members over after the study has ended. Additionally, the new STAP Charter requires the STAP to brief NA-121 following each NESS on process and proceedings as well as meeting with NA-121 semi-annually to discuss proposals, ideas, and comments for improving the overall safety review process associated with nuclear explosive operations.

C.12. Separate DVD for Unclassified Documentation

Background/Details:
The STAs were especially impressed with the efficiencies introduced through the use of DVD documentation and some of the improvements in the input document itself, especially in the quality of the HARs. The study process would benefit from having the unclassified documents available on a separate DVD or CD; the classified DVD would continue to contain both classified and unclassified documents. Opportunities for improving the DVD documentation include reader-friendly indexing across the documents in the DVD and across multiple documents and chapters.

Status: Not accepted

POC: PXSO (Steve Erhart)

Comments:
Development of the input documentation is very expensive and time consuming. Input documentation is inherently classified since a lot of items are linked to the classified process flow. Significant expense and effort would be expended to produce unclassified portions of the input document. This is more of a matter of convenience as opposed to missing vital information.

C.13. Assurance of Compatibility of DVD Input Documentation on Both PCs and MACs

Background/Details:
This is an issue brought up by one of the STAP members during the annual NES conference. One of the STAs uses a MacIntosh computer and could not read the DVD Input Documentation.

Status: Not accepted

POC: NA-121 (Chuck Westfall) and PXSO (Steve Erhart)

Comments:
NNSA employees use PCs. Federal and contractor personnel are expected to use compatible equipment.

D. Additional comment by DNFSB on concurrent NESS and RA reviews

Background/Details:
The DNFSB asked about this issue during the briefing; the STAP and Dr. Fingerlos responded. The DNFSB was especially concerned because this was an issue for the 2003 W62 NESS/RA reviews and the 1998 W62 review. The issue is not with concurrent reviews, but with concurrent demonstrations. The following text is from the 2003 W62 NESS report. "The concurrent NES study and RA compromised both efforts because of conflicting requirements. Each of these review teams has an important but substantially different role. The NESSG needs to closely observe the interaction of the PTs, tooling, and unit to determine if the process meets the three NES Standards. The RA has responsibility to review the formality and ability of the process to be successfully demonstrated to meet broad safety criteria. The NESSG's ability to closely observe interactions is hampered by the RA requirement to observe conduct of operations, adherence to person-person control, adherence to combustible loading controls, etc."
The RA Team Leads and NESS Chairs agree that for most programmatic NESSs, the RA and NESS observations should be separated. They are done concurrently to save project time and in some cases costs associated with rebuilding trainers.

The following has been suggested. The NESSG starts its study and observations. An RA team member – probably the RA Team Lead – attends the observations. This serves two purposes. First, the NESSG can pass non-NES issues to the RA as they arise. Second, the RA Team Lead can determine which, if any, of the demonstrations will be required to be performed for the RA. Because the NESSG generally takes 1-2 weeks for deliberations, the RA can easily complete its work prior to the NESSG ending – and long before the NESSG report is approved. Thus the start of operations would not be delayed. Because the RA does not need to see units that are fully potted etc, the rebuild for most trainers should be quick. This simple change to the RA/NESS agenda would solve the problems observed.

The proper place to document this is in the NESS Process Guide, which provides detailed guidance to the NESS Chair, but does not have the force of orders or standards. The schedule of demonstrations for both the RA and NESS should be determined in planning meetings. It is not always necessary to separate the demonstrations. There may be no reason to separate the demonstrations for the Paint Bay as an example. Leaving this guidance in the Process Guide allows the project teams, NESSGs, and RA Teams to exercise their best judgment on a case-by-case basis. During the final planning meeting the RA Team is expected to follow the NESS Process Guide requirements.

Status: Partially accepted

POC: NESD (Jim Fingerlos)

Comments:
The following text has been added to the NESS Process Guide.

"For most programmatic NESSs, the RA and NESS demonstrations should be separated. The concurrent NES study and RA demonstrations compromise both efforts because of conflicting requirements. Each of these review teams has an important but substantially different role. The NESSG needs to closely observe the interaction of the PTs, tooling, and unit to determine if the process meets the three NES Standards. The RA has responsibility to review the formality and ability of the process to be successfully demonstrated to meet broad safety criteria. The NESSG's ability to closely observe interactions is hampered by the RA requirement to observe conduct of operations, adherence to person-person control, adherence to combustible loading controls, etc.

The RA Team Leader will attend the NESSG demonstrations. This serves two purposes. First, the NESSG can pass non-NES issues to the RA as they arise. Second, the RA Team Leader can determine which, if any of the demonstrations, will be required to be performed for the RA. Because the NESSG generally takes 1-2 weeks for deliberations, the RA can easily complete its work prior to the NESSG ending – and long before the NESSG report is approved. Thus the start of operations would not be delayed. Because the RA does not need to see units that are fully potted etc, the rebuild for most trainers should be quick.

The schedule of demonstrations for both the RA and NESS should be determined in planning meetings. It is not always necessary to separate the demonstrations. There may be no reason to separate the demonstrations for the Paint Bay as an example."