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SEALS TASK FORCE ACTIVITIES

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ABSTRACT

The Department of Energy (DOE) established the seals task force in 1986 to scope the extent of seals problems, develop guidelines and criteria, and recommend improvements. Recent task force activities have been to update the Safeguards Seals Reference Manual produced in 1986, lay the groundwork for seal standardization, and make recommendations for general and specific seals problems in the field. This paper will discuss the manual updates and other general task force activities.

INTRODUCTION

Safeguards seals continue to be used extensively within the DOE complex to provide indications of tampering and unauthorized containment breaching. Approximately 100,000 to 150,000 seals are used per year within the DOE in material control and physical security applications. The majority of these are used as tamper indicators on material storage containers, shipping containers, and security doors.

In the late 1970s, a substantial effort[1] was devoted to identifying and testing seals which had potential applicability to protection of nuclear materials. As time has progressed and new types of seals are introduced by commercial suppliers, this data base becomes of limited value in selecting and using new seals. Furthermore, the inspection and evaluation activities in the last few years have highlighted broad variation in the use and effectiveness of seals systems and practices. These observations stimulated the DOE's Office of Safeguards and Security (OSS) to establish a task force comprised of seals users to assess the current situation. The specific goals of the task force were to scope the extent of seals problems, develop guidelines for the selection and use of seals, and provide recommendations for an appropriate long-term program. The major initial goals have been met by the issuance of the Safeguards Seal Reference Manual[2]. This manual has been widely used by the DOE and other communities. Comments and recommendations from these users, as well as changes in the DOE orders, have stimulated a revision of the manual. After discussing the manual revision, other issues being addressed by the task force will be addressed and a brief summary of recent developments presented.

The task force has consisted of many individuals representing most of the DOE complex. The constituency has varied considerably depending on other specific commitments at times of task force activities. All contributions have been helpful and are gratefully acknowledged. This paper summarizes the contributions of the collective group.

SAFEGUARDS SEAL REFERENCE MANUAL REVISION

The task force developed this manual to assist nuclear facility personnel in selecting, procuring, and applying the proper seals for safeguarding nuclear material. The intent was not to give detailed, step-by-step procedures for developing a safeguards seal system for a facility; instead, the goal was to provide information which would allow such a system to be developed and implemented by a facility to meet its site-specific requirements. The manual helps the user develop a seal system that can be integrated with other elements of a safeguards system. Typical applications, selection criteria, general application procedures, and identification of commercial sources of seals are provided. It includes 1) an introductory section which summarizes the role and characteristics of seals, considerations in using seals effectively, and other safeguards systems with which seals may interface; 2) a section on implementing a seals interface; 3) suggestions for selecting the proper seal; 4) a general procedures guide; and 5) a recent survey of many commercially-available seals.

In the Fall of 1988, a request was sent from headquarters to the field offices for suggested improvements to include in the manual revision. The responses were grouped into four categories- those that could be readily included, those that

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needed additional discussion to obtain a task force consensus, those that needed development funding beyond the ad hoc level, and those that were beyond the authority of the task force, i.e., those that rely on DOE decisions and initiative. These responses were extremely helpful in directing the task force toward meaningful manual revisions. The following paragraphs summarize the responses and the category to which they were assigned.

The items designated for near-term inclusion in the manual were those where consensus existed among the task force that we could provide useful guidance to the field. The responses included:

- Add a training guide - The task force had already begun planning for this and had generated an extensive outline for training. The addition to the manual will be coordinated with seals training being planned by the Central Training Academy (CTA).
- Expand the discussion on seals limitations and strengths.
- Rewrite the sections related to the superseded DOE orders.
- Enhance the example procedures.
- Expand the discussions on reliability, durability, detection capabilities, and system integration - This can be done in a general sense, but specific details will vary from application to application and site to site.
- Expand the quality assurance section - This expansion will apply to assuring quality in the procured product. Overall seals program quality is the thrust of the entire manual.
- Expand the discussion of suspect seals - Some general guidelines can be added.
- Expand the sections dealing with audits and audit trails.
- Be more specific on final disposition suggestions.
- Include more guidance on physical security seals use.

Some responses suggested consideration of items which the task force could not agree on how to address or agreed should not be in a general manual.

- Seals retention after removal - The thrust of this suggestion was to provide a procedure and/or central facility to examine seals after removal to be assured that the seal hadn't been tampered with. This is similar to the actions taken in international seals use. Domestic applications do not use as unique an identifier as does the international community, so the value of a post-removal inspection is less. Additionally, many seal removals are followed by material assay measurements which provide timely confirmation of the contents.
- Guidance on seals relative to Inspection and Evaluation Audits - Some useful information could be presented in this area but to comprehensively address this issue is a formal DOE responsibility.
- Seals applications to measurement standards - Most standards are already enclosed in a tamper-indicating container. Seals applications to many other areas such as instruments, doors, cabinets, electrical connectors, etc., could be added but these uses may be too specific for the general manual.

Many good comments were received relative to improvements in the seals system which would be beneficial. These areas need to be supported by DOE funding or commercial initiative to bring them to fruition.

- An expert system for seal selection criteria - The knowledge base exists throughout the community to provide input for such a tool.
- In-situ verification of seals - The international community is pursuing this approach. A cost-effectiveness evaluation needs to be done to determine if the domestic application could benefit significantly from in-situ verifiable seals.
- Specific reliability/durability/detection capabilities - Extensive testing and evaluation is needed to develop this product.
- Quantitative seals assessment tools to aid in selection, integration, and application - Perhaps the ASSESS evaluation tool could provide a starting point.
- Computer-assisted training methods - CTA may consider this for their mobile training program.

Some of the responses received were considered to be beyond the purview of the task force, but we have tried to motivate some activity in these areas. Most of them related to the desire to standardize seals and seals use.

- Selection of a limited number of accepted seals - The intent is to allow facilities to select and procure seals without concern as to their acceptability by the auditing organizations. DOE/CH conducted a survey to ascertain the community opinion relative to standardization of several items including seals. The majority of responses were favorable to standardizing on a few seals.
- Common Procurement of Seals - This has particular advantages to a small user who can order seals from a common government source and be assured that all seals procurement requirements have been met. The DOE/CH survey indicated that this approach is also generally favored by the community.
- Vendor Security - The degree of emphasis placed on this is dependent on whether the role of seals and their potential

compromise is considered to be significant.

The task force is actively addressing the items in the first category for inclusion in the manual revision. Additional responses on the second category of items will be appreciated to aid in their disposition. The third category items are primarily dependent on the provision of funding. The DOE is actively pursuing the issues raised in the fourth category. The DOE efforts include putting seals in their proper perspective as related to the other safeguards elements which provide defense in depth. The resolution of issues in this area is hoped to lead to a consistent expectation of seals across the complex.

RECENT SEALS DEVELOPMENTS

Recent seals developments for domestic applications have come mainly from commercial suppliers with varying degrees of stimulation from DOE contractors. Companion papers in this conference cover several developments and approaches.

The Cobra Seal has been developed for the international safeguards community to provide in-situ verification. This seal, which uses photo records for verification, is designed such that the fiber optic loop used to seal an object is the feature that is checked for tampering. This seal[3] will undergo field evaluation late in 1989.

The ongoing development of material tracking systems[4,5] may also have positive impacts on seals systems. A system which indicates movement or tampering in real time can replace or complement some of the major functions in a seals system. The lack of an alarm from such a system constitutes information similar to a positive check of seals integrity. If such active devices are used on sealed containers, a seals report can also be automatically generated by the real-time system. A DOE contractor facility has implemented a hard-wired real-time reporting system which allows them to considerably reduce the time required and radiation exposure required to accomplish seals verification. Such implementations are expected to enhance and perhaps replace seals functions as technology progresses.

CONCLUSIONS

Seals will continue to play an important role in providing effective safeguards for nuclear materials. The development of relatively standard procedures for seal use will aid facilities in utilizing them effectively. Advancements in seal technology are occurring which can improve verifiability, tamper protection, and operational compatibility of seals.

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