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Security Officer Tactical Training Issues Involving ESS Equipment

Prepared by S. L. K. Rountree

Sandia National Laboratories

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Prepared by
S. L. K. Rountree

Sandia National Laboratories
Albuquerque, NM 87185

Prepared for
Division of Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
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ABSTRACT

Security officer tactical training issues are discussed in relation to the possible implementation of the Tactical Improvement Package (TIP), utilizing the Engagement Simulation System (ESS) equipment, by nuclear power plant licensees for security officer tactical training. The ESS equipment provides the capability to simulate engagement conditions between adversaries armed with weapons which have harmless laser transmitters. A brief discussion of the TIP is presented, along with some concerns and considerations in the use of the TIP.

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EXECUTIVE SUMMARY

The document contains a brief discussion of the Tactical Improvement Package (TIP) which utilizes Engagement Simulation System (ESS) equipment and discusses its possible application to response training for security officers at nuclear power plants. Included are concerns and considerations in the use of TIP, a summary and discussion of the information obtained from the TIP document¹ data questionnaire, a section of observations noted during an exercise with ESS equipment at a nuclear power plant, and a discussion of unresolved issues which relate to the use of ESS equipment. The purpose of this document is to present the issues, however controversial, in a single document available to utilities/training officers to make their own evaluations of the uses and the possibilities of the ESS equipment.

A final section discusses possible methods of data collection of utility/security officer/security management opinion on the ESS equipment, such as the planned Security Officer Tactical Training - Laser Engagement Simulation workshop, and methods of information dissemination concerning the existence of TIP/ESS and concerning the organization of any future security officer training workshops.

SECURITY OFFICER TACTICAL TRAINING ISSUES
INVOLVING ESS EQUIPMENT

1.0 INTRODUCTION AND PURPOSE OF THE PROJECT

Recent development of a Tactical Improvement Package (TIP) has led to concerns and considerations regarding its use and implementation by commercial nuclear facility licensees. The document, Tactical Improvement Package,¹ contains the information that would be useful to a licensee using the Engagement Simulation System (ESS) equipment for security officer training exercises without additional outside assistance. ESS evolved from the original Multiple Integrated Laser Engagement System (MILES) equipment developed by Xerox Electro-Optical Systems (EOS) under contract to the U.S. Army Office of the Project Manager for Training Devices (PM-TRADE).

The purpose of the project is to gather information in the areas of security officer training needs, training with ESS equipment, training modes, facility and equipment requirements, possible problems and drawbacks with ESS, and considerations of the preceding areas in relation to safety, personnel, social, legal, operational, organizational, and economic aspects. There is a need to evaluate the potential impacts resulting from the development and demonstration of the TIP and its possible use by nuclear facility licensees for security officer tactical training. The Security Officer Tactical Training - Laser Engagement Simulation workshop was planned as a vehicle for data and information gathering. The emphasis of the workshop was to be on the application of the TIP, utilizing the ESS equipment, for security officer tactical training needs within the response function. Subsequent cancellation of the workshop has led to a less detailed consideration of the concerns and issues regarding the use and implementation of the TIP by commercial nuclear facility licensees.

2.0 EQUIPMENT IMPLEMENTATION

The U.S. Army uses MILES laser devices and receivers to simulate real-time fire effects in full-scale battlefield training exercises. Although MILES currently is limited to the simulation of direct-fire weapons with relatively flat trajectories, it has been implemented for helicopters, tank guns, anti-tank missiles, rocket launchers, machine guns, and rifles.^{2,3}

The National Training Center (NTC) at Fort Irwin, California, is equipped for force-against-force maneuvers, an example of which is the "Gallant Eagle 80" exercise which took place in March 1980. The two-week war game involved over 25,000 soldiers, airmen, and marines supported by 140 tactical aircraft, nearly 600 tanks and armored personnel carriers, and over 100 helicopters.⁴ By fiscal year 1984, the NTC is expected to conduct two-week training exercises for 42 armor and mechanized infantry battalions each year.^{2,4}

MILES also has been used on a smaller scale by the Army -- pitting squads against small groups of "enemy defenders" -- as a realistic training tool for soldiers to discover what they did right or wrong in an action, and why.⁵

Differences in the military and Department of Energy (DOE) equipment usage have resulted in several changes to the MILES equipment. Among these are improved close-in "kill" characteristics, a soft cap head array of receivers, and an ability to remotely reset a participant with a controller gun. The modified system is referred to as the Engagement Simulation System (ESS).⁶

Sixteen DOE facilities with a nuclear material responsibility have used the laser equipment for small force exercises. The DOE Albuquerque Operations Office Transportation Safeguards Division has used the MILES equipment in training exercises for the courier force that transports government-owned nuclear material. Additional organizations that have participated in laser equipment exercises include the U.S. Navy, Marines, Air Force, National Guard and Reserve units, the Federal Bureau of Investigation, local law enforcement agencies, and security forces from four commercial nuclear power plants.^{6,7}

Sandia National Laboratories initiated a loaner program to provide DOE facilities with the laser equipment on an annual three-month loan basis. The extended time frame allowed facilities to conduct exercises at the most convenient times. Since force-on-force exercises involve fairly large numbers of people, they are not always practical for DOE facilities. An additional system upgrade involves radio-controlled, laser sensitive pop-up targets placed along a course through which the participant progresses.⁶

The remaining sections of this document discuss the Tactical Improvement Package and the use of ESS equipment by commercial nuclear facility licensees.

3.0 TACTICAL IMPROVEMENT PACKAGE (TIP)

The Tactical Improvement Package¹ (TIP) document contains the information required by a nuclear facility licensee to utilize the ESS equipment for security officer exercises without additional outside assistance. Background information and observations based on ESS equipment familiarization exercises at four licensee nuclear power plants are included in the TIP document. Results from a sample data questionnaire, given in the document, are summarized. Two Instructor's Guides are given in the appendices to aid users of the TIP with ESS equipment. A video tape presentation that complements the written text is available on loan from the U.S. Nuclear Regulatory Commission (NRC).

The ESS equipment provides the capability to simulate engagement conditions between armed adversaries. The ESS equipment consists of weapons with laser transmitters and harnesses with laser detectors to intercept the transmissions and translate them into "hit" (neutralization) and "near miss" signals. The reality of the engagement simulation is reinforced, since survivors and nonsurvivors are determined impartially and accurately by the immediate feedback of ESS.

The data questionnaire and the utilities' results are given in this document. The data sample is small and biased, since results are available only from three of the four utilities which hosted and participated in the ESS equipment familiarization exercises. Although general conclusions should not be drawn from the questionnaire results, some insight can be gained from the small sample of opinions. Specific impressions noted by one observer of the exercises at one nuclear power plant are included to give additional insight and possible suggestions for the use of ESS equipment.

4.0 CONCERNS AND CONSIDERATIONS IN THE USE OF TIP

The underlying concerns in the application of ESS/TIP to the response function by nuclear facility licensees were discussed briefly in the announcement brochure for the Security Officer Tactical Training - Laser Engagement Simulation workshop,⁸ reproduced in Appendix A. The intent was to solicit response in the following areas of concern:

- a) Operational. How should response and tactical training be conducted? How often? What should the role of ESS exercises be in such training? Where should training exercises be conducted? What are the available options in acquiring ESS equipment?
- b) Organizational. How are nuclear facility management and security officer training staff expected to perceive ESS training? Does management support response and tactical training?
- c) Personnel. How is it perceived that security officers will react to ESS exercises? How will ESS exercises impact safety considerations and health and fitness requirements?
- d) Legislative. Should future regulations require security officer training at centralized sites, at approved facilities, or at current licensee training locations?
- e) Economic. Will the benefits from ESS/TIP training outweigh the costs?
- f) Legal. Do ESS exercises encourage or discourage the use of excessive force?
- g) Social. How will the public perceive ESS/TIP? What is the anticipated reaction of the news media? What are the best ways to interact with the news media?

The underlying concerns were to be addressed in the following four general workshop sessions:

- a) Training Needs
- b) Training Modes/Facility and Equipment Requirements
- c) Possible Problems with ESS
- d) Social, Legal, and Economic Considerations

A brief description of each topic is given in the reproduced brochure in Appendix A. A more detailed topic outline is given in Appendix B.

This document includes a general discussion on topics within each of the four session areas and gives the information obtained from the data questionnaire. As the data sample is extremely small, generalized results should not be drawn from the sample. It is hoped that the discussion and the questions posed throughout this

document will aid the reader in evaluating the possible uses of ESS/
TIP by nuclear facility licensees for security officer tactical
training.

5.0 INFORMATION FROM THE DATA QUESTIONNAIRE

As mentioned previously, four commercial nuclear power plants hosted ESS equipment familiarization exercises. To obtain data on their opinions of the utility of ESS to their security training programs, the data questionnaire from Appendix C of the TIP document¹ was developed and distributed to the four licensees. Twenty-six individuals from three of the four licensee facilities responded. The data obtained was discussed briefly in the TIP document.¹ The contents and tabulation of the results of the actual TIP questionnaire⁹ are as follows:

UTILITY OF LASER-EQUIPPED TRAINING WEAPONS
IN THE LICENSED NUCLEAR INDUSTRY

The following questions concern your perceptions of laser-equipped training weapons (such as the Engagement Simulation System) is intended to provide to Sandia National Laboratories preliminary feedback from those licensees exposed to laser-equipped training weapons and methods.

In your opinion, does laser technology provide a capability that would be useful for security force training or exercise?

() Yes 26
() No 0

How useful do you believe that such technology would be in training or exercise?

() Not very useful 0
() Moderately useful 2
() Very useful 24

Do you feel that laser technology could be useful for security force evaluations?

() Yes 26
() No 0

How useful would the technology be for evaluation?

() Not very useful 0
() Moderately useful 3
() Very useful 23

In your opinion, could joint exercises involving site security personnel and local law enforcement personnel using laser technology significantly improve the responsiveness of local law enforcement personnel?

() Yes 25
() No 1

Do you feel that training or exercise with laser technology can affect security force morale?

() Yes 26
() No 0

What degree of improvement (if any) in security force morale would result from the application of laser technology?

- No improvement 0
- Moderate improvement 3
- Significant improvement 23

Do you believe that the use of laser technology could significantly influence the overall efficiency of security forces?

- Yes 26
- No 0

Is it feasible to conduct exercises using laser technology and blank ammunition on owner-controlled property or at a normally used training facility?

- Yes 25
- No 1

Under certain conditions, it appears that regional training facilities might be an appropriate vehicle for training or exercise involving laser technology. Is a regional approach feasible, and does such an approach warrant further investigation?

- Yes 22
- No 2

Who should operate and maintain such a regional facility?

- An association of licensees 13
- A third party 6
- NRC 5

Does the concept of mobile training teams (available to exercise a security force at the licensee's site) warrant further investigation?

- Yes 25
- No 1

Who should provide and operate such teams?

- An association of licensees 13
- A third party 5
- NRC 6
- Other 2

The "third party" option referred to in the above question could be under contract to (and therefore under the control of) either the NRC, a licensee, or a licensee association. Which, from your point of view, is more desirable?

- () An association of licensees 13
- () A licensee 2
- () NRC 11

At the present time, the NRC does not plan to use laser technology as an evaluation tool; however, there are many alternatives open to the NRC and the licensed community should the evaluation option be seriously considered later. For example, evaluation during initial training by a licensee or nonlicensee training organization, evaluation after initial training by a licensee training organization, evaluation during specific retraining periods by a licensee training organization, or evaluation by NRC are some of the many possibilities. NRC evaluations could, for example, be conducted at the end of an initial training cycle, during the operational inspection cycle, or during special safeguards assessments.

If laser technology were to be used as an evaluation tool, would it be feasible to conduct exercises within the protected area?

- () Yes 22
- () No 4

If laser technology were to be used inside the protected area (whether for training or evaluation), the following issues might be of concern. Are any of these potential areas of concern, in your opinion, significant enough to influence management attitude against the use of laser technology?

		<u>No</u>	<u>Yes</u>	
• maintaining normal security	20	()	()	6
• possible injury to participants	22	()	()	4
• disruption of normal operations	10	()	()	16
• possible media attention	13	()	()	13
• reaction of nonparticipating employees	9	()	()	17
• -----		()	()	
• -----		()	()	

Given the fact that the time required to learn to operate laser-equipped training weapons is relatively short, do you think it would be necessary for the NRC, prior to an evaluation using the technology, to make the equipment available for licensee familiarization and exercise?

- () Yes 18
() No 8

The following list describes possible areas of concern in using laser technology. Please indicate the relative importance of each of the areas by ranking them beginning with the number 1 for the highest priority concern. If any additional areas are of concern, please add them to the list and include them in your ranking.*

- cost of hardware and associated consumables (e.g., blank ammunition)
- potential requirement for revision of training plans
- legal ramifications (e.g., could such a system tend to foster the use of an inappropriate or illegal degree of force?)
- liability concerns
- safety of participants
- maintenance of hardware
- potential for modifications of equipment
- possible increased media interest in training methods
-

The respondents were favorable to the use of laser-equipped weapons, such as ESS, in their security officer training programs. The respondents felt that laser technology could be useful for security force evaluations in addition to training and exercises. They felt

* No composite ranking is available. Refer to the discussion in Section 5.0 for general ranking trends.

the use of laser technology could significantly improve the morale and overall efficiency of the security forces and could improve the responsiveness of the local law enforcement personnel through joint laser technology exercises involving site security personnel and local law enforcement personnel. Most respondents believed that regional training facilities might be feasible and that the regional approach warranted further investigation. The concept of mobile training teams to conduct exercises at the licensee's site also was felt to warrant further investigation.

There was diversity of opinion in who should operate and maintain a regional training facility and in who should provide and operate mobile training teams. There also was no consensus as to who should control a third party that might be under contract to offer a training facility or mobile training teams. A large majority of the respondents said it would be feasible to conduct exercises within nuclear power plant protected areas. Most did not feel that the issues of maintenance of normal security or possible injury to participants would significantly influence management attitude against the use of laser technology. On the other hand, about half of the respondents did feel that management attitude could be adversely influenced by the following issues: disruption of normal operations, possible media attention, and the reaction of nonparticipating employees.

The last question on the TIP questionnaire listed possible areas of concern in using laser technology and required the respondents to rank the areas according to relative importance. The cost of hardware and associated consumables was fairly uniformly ranked number one. The liability concerns, the maintenance of hardware, and the safety of participants were ranked second as areas of concern, followed by the concern about potential for modifications of equipment. The final group of areas of concern included legal ramifications, potential requirement for revision of training plans, and possible increased media interest in training methods.

The previous discussion on the results of the respondents' ranking of areas of concern is intended to give a relative indication of the response. The only area of agreement was that the cost of hardware was the area of greatest concern. The standard deviations in the other areas of concern were generally 50% as large as the means of the rankings for each facility, so a definitive composite ranking of the areas of concern is unavailable.

6.0 OBSERVATIONS FROM AN ESS EXERCISE

This section gives specific impressions noted by a single observer of the exercises held at one nuclear power plant.¹⁰ The information is included to give additional insight and possible suggestions for the use of the Engagement Simulation System (ESS) equipment.

Personnel participating in the familiarization exercises for the ESS equipment primarily were from the security contractor for the nuclear power plant, with additional participants from the nearby police departments.

The exercises were held in a field adjacent to the plant. Two wooden buildings were erected on the site along with numerous false-front type barriers. In addition, metal drums, a metal shed, a trailer, and tall grass and weeds provided cover for the participants.

Two exercise scenarios were used primarily. The first consisted of two opposing teams each trying to capture a can purportedly containing nuclear material. The second scenario placed one team in and around a building containing the can of nuclear material. The team members were supposed to be willing to give their lives to protect the nuclear material from the attacking terrorist team.

The following impressions were noted:

- a) The participants expressed wide acceptance of and support for the weapons familiarity exercises. Their backgrounds differed widely from the required security training to Vietnam experience. Many security officer participants expressed a desire for implementation of an ESS training facility for tactical response and small force exercises specifically aimed at nuclear power plant security forces.
- b) The purpose of the demonstration exercises was equipment familiarization through easily understood scenarios. The few people whose disparaging remarks were overheard, assumed the purpose to be a nuclear facility response force training program rather than familiarization exercises. Such an extension, as a future goal, might be well received.
- c) A member of the local police department noted the similarity of the field exercises to police training and expressed a desire to see the ESS equipment used in police training and skills maintenance exercises.
- d) Reactions were varied. Some participants said the "adrenalin was really flowing" while others professed no tension at all. All participated actively and appeared to take the team competition seriously, especially in the latter sets of exercises. Fierce competition would need to be avoided in

any future training facility so as to not foster bad feelings between groups that need to work together - such as security forces and local police.

- e) A few minor problems, blamed on equipment malfunction, were due to the protection afforded by the grass and weeds which bent the laser beams and the mishandling of equipment caused by nervousness and the reality of the simulation equipment.
- f) The participants' progression through a set of exercises, of approximately four hours in duration, showed an improvement in radio communications and tactical response and deployment. The use of snipers was not always effective due to the unrealistic protective capabilities of the tall grass and weeds.
- g) Participants appeared to be divided on the use of radio communications. Initially, use was minimal and then gradually increased to include intelligence gathering and dissemination. Several players switched to hand signals upon discovery that the radio noise gave away their positions. The cumbersome use of the radio also was critical - especially in scenarios of short duration with significant weapons use. The radio tied up one hand which was needed for weapon firing.
- h) Numerous personnel participated in several sets of exercises. The primary purpose of equipment familiarization thus became of secondary importance. The exercises became more of a game. The use of alternate scenarios - hostage negotiations and uneven opposing sides and weapons' capabilities (i.e., five defenders with shotguns versus ten attackers with semi-automatics) - helped alleviate the problem of repeat scenarios and added a touch of realism to the exercises.
- i) The night exercises presented an opportunity to use the night vision devices - hand held, mask, and mounted scopes. The night vision devices were not received enthusiastically, but that could be due to the large amount of artificial lighting from the nearby power plant grounds which diminished the effectiveness of the devices.
- j) The participants preferred the semi-automatic weapons to the shotguns; but in a nuclear power plant setting, the confined area would lessen the weapons' differences. The type of weapon in general use on the job at the nuclear power plant should be taken into account.
- k) The body receivers provide unrealistic receiving targets in certain circumstances. Personnel behind telephone poles, presenting a side view to the opposing team, did not register near miss and neutralization signals as their receivers were obstructed.

A future goal could be the establishment of a regional facility to be used by multiple nuclear power plants for response training and skills maintenance exercises to provide a uniformity to security force training for the response function. The use of an enclosed building area would enhance realistic training, but performance feedback and evaluation would be difficult without visual observation of the entire exercise. Some measurement of the killer and the killed, along with time and positions, could prove invaluable in recreating the exercise for feedback discussions and training. Good skills, tactics, and small force coordination are more important in the learning experience than the final tally of survivors and nonsurvivors.

7.0 UNRESOLVED ISSUES

While readers may not totally agree with the following discussion, the intent is to address various issues which require consideration when using ESS equipment:

- a) The merits of ESS for demonstration/familiarization versus tactical training versus evaluation purposes.

From the information gathered from the TIP data questionnaire⁹ and the Institute of Nuclear Materials Management (INMM) Physical Protection Workshop,¹¹ the consensus is that the use of ESS equipment is relatively good for security officer morale and training. The information is subjective and based on a small biased sample, but it does highlight stated opinions and concerns of the session attendees and the questionnaire respondees. Several people in the INMM sessions were familiar with the ESS equipment and had participated in or observed ESS exercises. One facility had two separate security forces. The DOE force had frequent unannounced exercises and exercises with the ESS equipment, while the other force did not. Comparing the two security forces, the exercises appeared to exert a positive influence on those participating in the exercises. It was determined that good training is necessary for effective security officers. The use of exercises with ESS equipment may contribute to good training, although it is not the only contributing factor.

The data questionnaire respondees felt that laser technology could be useful for security force evaluations. In an INMM session,¹¹ the attendees debated the effectiveness of ESS for evaluation. Many believed that standardized exercises could be used to objectively evaluate security force tactical abilities. Others cautioned that the effectiveness of a nuclear security force or of a security officer should not be based solely on the outcome of a limited number of exercises with ESS equipment. A person could "survive" an exercise by hiding or could be a "casualty" while demonstrating good response skills. An exercise with ESS equipment more appropriately might be used as a learning experience with discussions and feedback on the good and bad response actions shown by each participant. In a similar way, a facility should not "fail" an exercise solely because the adversaries penetrate the facility or "kill" all defenders.

It appears that TIP demonstration exercises utilizing the ESS equipment work well for laser equipment familiarization. The potential exists for the ESS equipment to be used by nuclear power plants for tactical training, but it is recommended that specific exercises be developed for learning and practicing required tactical skills. Once specific exercises have been established for training of tactical skills, these same exercises can be used to evaluate the participant's acquisition of those tactical skills. One can only evaluate specific skills and cannot extend the evaluation to cover overall security offi-

cer effectiveness. It is hoped that a combination of target range skills, specific tactical skills exercises, and physical fitness/well-being can be used to determine strengths and weaknesses of security officers.

- b) The application of the TIP with ESS equipment to the entire versus selected members of a nuclear security force.

There is a need to provide tactical training tools to all people who may be members of a response team. However, several points, which may be facility-specific, must be considered. Does the response team consist of rotating or permanently assigned team members? It may be easier to coordinate absences with rotating members, but there may be advantages to having permanently assigned members that work well with each other and can anticipate the actions of the other team members. Knowledge of the abilities and limitations of fellow team members could prove invaluable. Whenever a response team consists of permanently assigned members, do they train together as a team? Are their vacations coordinated? How are absences due to sickness handled? A team that trains and responds as a permanent team may be disrupted and be less efficient whenever a member is absent. Dedicated response team versus individual tactical training is dependent on facility-specific response force manning procedures.

If there are members of the security force who perform security-related tasks but will never be called upon to respond to an adversary intrusion, these people probably will not need additional training with ESS equipment. However, if members of the response force are periodically selected from the entire security force based on a given performance measure, then all security officers who want to train and become eligible for the response team should be allowed to participate in ESS exercises.

- c) The potential risks to the safety of the security force, the work force, and the public.

Since ESS exercises are physically strenuous, there is a health risk for participants who are physically unfit. If there are security officer health and physical standard requirements to be met prior to exercise participation, the risk is reduced. Risks to participants in ESS exercises are discussed in the TIP document and include broken bones and a few minor lost-time accidents.¹ Because of the physical stress on the body during the exercises, there is a possibility of cardiovascular problems for those persons who have adjusted to a relatively sedentary lifestyle.

If exercises are conducted in the vicinity of the facility to determine the effectiveness of the security force, safety precautions must be taken to prevent the security officers from apprehending the exercise team members with undue force or from responding to actions so as to affect the normal operations or

the safety of equipment at the installation.¹² The exercise could affect or endanger the work force if the exercises were unannounced or were conducted within a work area. The risks to the public would appear to be minimal as long as exercises are conducted within the facility boundary.

- d) The projected licensee training modes and equipment costs of employing the TIP package with ESS equipment at licensee nuclear facility sites, at industry-wide regional facilities, or at an industry-wide centralized facility.

The possibilities for acquisition of the ESS equipment are numerous and range from outright purchase by a nuclear facility or group of facilities, to training at a facility operated by NRC or by a third party, to participation in an equipment "loaner" program. Xerox Electro-Optical Systems (EOS) developed the original Multiple Integrated Laser Engagement System (MILES) equipment. Sandia National Laboratories (SNL) incorporated modifications into the equipment and coordinated the Department of Energy (DOE) equipment loaner program which is being turned over to EG&G, Inc. Appendix C contains a discussion, provided by EG&G, on the DOE "loaner" program and ESS equipment costs, as well as condensed material from a brochure by Defense Management Group on their plans to offer a training program.

The relative merits of industry-wide regional training facilities, an industry-wide centralized training facility, and portable training films/equipment for use at licensee nuclear facility sites must be evaluated as well as the time frame of equipment availability. Responsibility for equipment maintenance is an issue that would have to be determined.

Disadvantages and advantages probably could be determined for the various training options. One issue of importance would involve the tradeoffs of safety versus security. A high security facility with no available area for tactical maneuvers could present both safety and security problems. Disruption of normal facility operations could occur. Advantages and disadvantages of the different training modes probably would be site-specific.

Equipment costs will vary depending on the training mode chosen and whether the equipment is purchased or leased through a "loaner" program. The discussion in Appendix C gives an approximate cost of \$2,000 for each laser transmitter/detector pair. This is consistent with the estimated costs given by two other sources of "\$1,500 for one infantryman"¹³ and a "\$2,300 price tag for each MILES set (M-16 transmitter/harness)."⁷ The specific pieces of MILES equipment desired, the number of equipment sets required, and the associated equipment (boresight target, controller gun, etc.) desired will determine the overall cost.

e) The social and legal impacts.

The social impacts issue is primarily concerned with the anticipated reaction of and the best ways to interact with the news media. One facility which hosted ESS exercises promoted a good press response by inviting members of the press to observe and take photographs of the exercises. Good relations with members of the press can foster positive perception of the ESS exercises by the public in general.

Positive public perception appears to be an important issue. If the public incorrectly considers the security officers to be engaging in dangerous war games, there may be a public outcry. The public may incorrectly consider the facility security to be reduced, if tactical training maneuvers with laser weapons are conducted on site. Good interaction with the public and the fostering of a good press response could have an overall positive effect on the public.

There is concern about the liability of a licensee using the ESS equipment if a participant is injured during an exercise. An indemnification form was used by Sandia National Laboratories for release from liability due to injuries and had to be signed by all nongovernment and non-Department of Energy exercise participants. As mentioned in part (c) of this section, broken bones and a few minor lost-time accidents have been sustained by ESS exercise participants.

Since the ESS equipment does not use live ammunition nor put the exercise participant in a personally risky situation, there is concern that the use of ESS exercises may encourage the use of excessive force. An exercise participant who might be more cautious in an actual encounter with an adversary, might exhibit traits of aggression in a nonthreatening exercise.⁶ Since there are no data comparisons between actual security officer/adversary encounters and tactical exercises, generalizations on whether ESS exercises encourage or discourage the use of excessive force are highly speculative. A comparison could be made between two groups of security officers - one participating in ESS exercises and the other group not participating.

Impartial observers could then compare each group's actions and response to a mock attack on the facility to ascertain any significant differences. In the absence of test data, the person in charge of security officer training should be sensitive to whether the use of exercises with ESS equipment in a training program discourages, encourages, or has no effect on the participants' use of excessive force.

The issues in the preceding paragraphs may not be resolved in the near future due to an absence of pertinent data. Each facility that wishes to implement exercises with ESS equipment should at least consider and resolve the issues for its own specific application.

8.0 INFORMATION DISSEMINATION AND DATA COLLECTION

The Security Officer Tactical Training - Laser Engagement Simulation workshop was scheduled to collect data and to provide input both to the Nuclear Regulatory Commission (NRC) and to the nuclear utility industry on possible future applications of the TIP exercises with the ESS equipment. However, the workshop was cancelled by the NRC due to an insufficient number of interested participants. A workshop is considered an excellent forum to discuss the use of ESS equipment.

A pre-workshop planning questionnaire could be distributed to determine the amount of interest and the best time period for a workshop. Utility region meetings could be utilized to disseminate information about any future workshop and to anticipate the actual response interest. Dispersal of the video tape film that complements the written TIP document could be used to acquaint those unfamiliar with the ESS equipment of its existence. Since the TIP document was distributed after the original workshop registration deadline, there may be increased interest in a future workshop.

An additional video film, not part of the TIP package consisting of the TIP document and accompanying film, gives the highlights of the Tactical Improvement and Security Force Evaluation Program.¹⁴ This film was under consideration for use at the planned workshop to tie the facility familiarization exercises and the TIP documentation together and to explain the past history of the program.

9.0 CONCLUDING REMARKS

This document has given a brief discussion on the Tactical Improvement Package (TIP) and has presented some concerns and considerations in the use of TIP exercises with ESS equipment. Discussions on the information obtained from the TIP document data questionnaire and the unresolved issues give a small sample of biased opinions and areas requiring evaluation prior to the use of ESS equipment for security officer training for the response function. The purpose of this document is to present the issues, however controversial, in a single document to be used by utilities/training officers to make their own evaluations of the uses and possibilities of the ESS equipment.

Since cost is a major consideration, TIP exercises with ESS equipment may need to be demonstrated as an effective tool in security officer training before interest and acceptance become widespread. An equipment "loaner" program, similar to the one discussed in Appendix C, might be used for effectiveness demonstration going beyond those exercises previously sponsored for familiarization by the NRC at four nuclear power plants.

Appendix A

ANNOUNCEMENT BROCHURE

This appendix contains the announcement brochure for the Security Officer Tactical Training - Laser Engagement Simulation workshop which was to be held October 10-13, 1982.⁸ The brochure, reproduced in its entirety, gives the overall purpose of the planned workshop, the general concerns and considerations to be considered in the application of ESS/TIP to security officer tactical training, and a breakdown of issues to be included in the four session topics.

The brochure may be utilized for future workshop planning or may be used to extract topics and issues of concern for discussion and possible resolution by personnel involved in security officer training for the response function.

registration

Deadline July 25, 1982

A nominal registration fee of \$25 will include workshop materials and banquet. Guest banquet reservations will be provided at \$20 each. Lodging charges are the responsibility of the attendee. You are urged to send the enclosed registration form as soon as possible but **not later than July 25, 1982**, so that your space at the workshop may be reserved. Attendance will be limited to 100. Room reservations will be provided on a first-come first-served basis. The workshop will be held at the conclusion of the International Hot Air Balloon Festival, which makes early hotel reservations a necessity.

location

The workshop will be held at the Marriott in Albuquerque, New Mexico. The centrally-located Marriott Hotel is within walking distance of two large shopping malls. Arrangements have been made with the Marriott for a rate of \$48 per night for a single (\$58 per night for a double) for the evenings of Sunday, October 10, through Tuesday, October 12, 1982. The rate will be honored either prior to or following the above dates subject to the availability of rooms. Due to the high demand experienced by hotels during the International Hot Air Balloon Festival, **the deadline for reservations is July 25, 1982.**



Sandia National Laboratories



sponsored by
Sandia National Laboratories
Nuclear Regulatory Commission

October 10-13, 1982
security officer tactical training
laser engagement simulation
Albuquerque, New Mexico

security officer tactical training laser engagement simulation

The industry-wide workshop will discuss the desirability and feasibility for implementing a Tactical Improvement Package (TIP) utilizing Engagement Simulation System (ESS) equipment for security officer training exercises at nuclear power plants and fuel cycle facilities. ESS evolved from the original Multiple Integrated Laser Engagement System (MILES) equipment developed by Xerox for the U.S. Army. Industry perception of security officer tactical training needs and the role of ESS/TIP in meeting those needs will provide input data to the U.S. Nuclear Regulatory Commission (NRC) on the possible application of ESS/TIP to the training and evaluation of the skills required to perform the response function.

Attendees are encouraged to read the document *Tactical Improvement Package Development*, NUREG/CR-2400, prior to the workshop to familiarize themselves with TIP. The TIP contains the information required by a licensee nuclear facility to utilize the ESS equipment for security officer training without outside assistance. It consists of two Instructors' Guides and a video tape presentation. Copies of the document will be available for attendees at registration.

The workshop, sponsored by Sandia National Laboratories Albuquerque (SNLA), in conjunction with the NRC, will be held in Albuquerque, New Mexico, October 10-13, 1982, to provide timely input both to NRC and to industry on possible future applications of ESS/TIP and to use the laser engagement range facilities at SNLA for demonstration purposes.

For more information, please contact:
Dr. Suzanne L. K. Rountree, Division 4416
Sandia National Laboratories
P. O. Box 5800
Albuquerque, New Mexico 87185
(505) 844-4379

workshop emphasis

The following general workshop concerns and considerations in the application of ESS/TIP will be addressed in specific workshop sessions.

Operational. How should response and tactical training be conducted? How often? What should the role of ESS exercises be in such training? Where should training exercises be conducted? What are available options in acquiring ESS equipment?

Organizational. How are nuclear facility management and security officer training staff expected to perceive ESS training? Does management support response and tactical training?

Personnel. How do you perceive security officers will react to ESS exercises? How will ESS exercises impact safety considerations and health and fitness requirements?

Legislative. Should future regulations require security officer training at centralized sites, at approved facilities, or at current licensee training locations?

Economic. Will the benefits from ESS/TIP training outweigh the costs?

Legal. Do ESS exercises encourage or discourage the use of excessive force?

Social. How will the public perceive ESS/TIP? What is the anticipated reaction of the news media? What are the best ways to interact with the news media?

proposed agenda

Sunday Evening, October 10, 1982

6:00 p.m. Registration and Get Acquainted
Cocktail Party (Cash Bar)

Monday, October 11, 1982

8:00 a.m. Late Registration
8:30 Opening Session
Introduction to the Workshop
Keynote Speaker
10:00 Coffee Break
10:15 Introduction to the Laser
Engagement System and Equipment
11:45 Lunch (Provided by Attendee)
1:00 p.m. Range Demonstration
Workshop Participants' Hands-on
Experience
Tactical Engagement Demonstration
4:30 End Session
Dinner Provided by Attendee

Tuesday, October 12, 1982

7:15 a.m. Breakfast for Workshop Moderators
8:30 Session I
10:00 Coffee Break
10:15 Session II
11:45 Lunch (Provided by Attendee)
1:00 p.m. Session III
2:45 Coffee Break
3:00 Session IV
4:30 End Session
6:00 Cocktail Hour (Cash Bar)
7:00 *Banquet

Wednesday, October 13, 1982

8:30 a.m. Session Summaries
10:30 Coffee Break
10:45 Question/Answer Panel
Closing Remarks
12:00 Noon Adjournment

*On Tuesday evening, October 12, a banquet at the Marriott will feature a dinner speaker.

session topics

SESSION I – Training Needs

- **Training Needs.** Will discuss the merits of range versus tactical training, dedicated response team versus individual tactical training, and contingency event drills.
- **ESS Training.** Will discuss the implications and desirability of NRC requirements of ESS training for security officers at all nuclear facilities and the role of ESS/TIP in meeting perceived security officer tactical training needs.
- **Evaluation.** Will discuss the possibility of using ESS equipment and TIP training exercises for evaluation purposes.

SESSION II – Training Modes/Facility and Equipment Requirements

- **Possible ESS Training Modes.** Will discuss the relative merits of industry-wide regional training facilities, an industry-wide centralized training facility, and portable training films/equipment for use at licensee nuclear facility sites.
- **Safety Versus Security.** Will discuss the tradeoffs of safety versus security in the three training modes.
- **Training Facility Requirements.** Will discuss the requirements for a good training facility.
- **Equipment Availability.** Will discuss the availability of ESS equipment.

SESSION III – Possible Problems with ESS

- **Usage and Implementation of ESS/TIP.** Will discuss the merits of ESS for demonstration/familiarization versus tactical training versus evaluation purposes and the guidance available and needed for effective implementation of the

TIP package with ESS equipment by a security officer training staff.

- **Safety and Personnel Considerations.** Will discuss the safety considerations to the security force, the work force, and the public from possible application of ESS/TIP training exercises and the security officer health and physical standard requirement concerns prior to exercise participation.

SESSION IV – Social, Legal, and Economic Considerations

- **Social.** Will discuss the anticipated reaction of and the best ways to interact with the news media.
- **Legal.** Will discuss whether or not there are negative impacts – encouragement of the use of excessive force – with ESS exercises.
- **Economic.** Will discuss the ESS equipment cost, maintenance, and benefits.

session format

The workshop will feature four session topics with all attendees discussing the same topic. In each session, a moderator will address all attendees to "set the stage" for that session. Division into small groups may be necessary to facilitate improved discussion and interchange of ideas. A moderator will be present in each small group to direct the discussion, call for input from each attendee, and ensure that important points are recorded. A summary of the important points discussed will be presented at a general session Wednesday morning. A question/answer panel will follow.

sandia national laboratories, SFEE range demonstration

Arrangements have been made by Sandia National Laboratories for a trip to the Security Forces Experimentation and Evaluation (SFEE) Range for all workshop participants. Attendees will observe a small force engagement exercise using the MILES/ESS laser equipment and be able to fire the various weapons. Bus transportation for this demonstration will be provided.

special attractions

The workshop begins the Sunday immediately following the Institute of Nuclear Materials Management (INMM) Physical Protection Review to be held October 5-8, 1982, in Albuquerque.

The workshop registration day will coincide with the last day of the International Hot Air Balloon Festival. The sight of over 500 multicolored balloons filling the early morning sky is spectacular. The week-long Balloon Festival will conclude Saturday and Sunday mornings, October 9 and 10, 1982, with mass balloon ascensions beginning at dawn each day. City bus service to the Balloon Festival will be available from one of the shopping centers within walking distance of the Marriott.

Albuquerque's Sandia Peak Aerial Tramway is the world's longest. The tram carries passengers on a 4,000-foot vertical climb up the mountain's rocky west face to the top of the 10,000-foot peak. Dining facilities are available at the peak and the base of the tram.

The Old Town area of Albuquerque, dating from 1706, offers adobe shops, galleries, and restaurants clustered around a plaza and San Felipe de Neri Church.

Within walking distance of the Marriott are two large shopping malls, restaurants and casual dining facilities, movie theaters, and city bus service.

Appendix B

DETAILED TOPIC OUTLINE

This appendix contains a more detailed outline of the four proposed workshop sessions discussed in the announcement brochure from Appendix A. The four main session topics are as follows:

- I. Training Needs
- II. Training Modes/Facility and Equipment Requirements
- III. Possible Problems with ESS
- IV. Social, Legal, and Economic Considerations

Each topic is decomposed into subtopics with questions posed on the different areas of concern. The outline is not complete in its treatment of the areas of concern but does suggest questions that may need to be resolved prior to the use of ESS/TIP for security officer tactical training.

SECURITY OFFICER TACTICAL TRAINING
LASER ENGAGEMENT SIMULATION

I. Training Needs

A. Training Needs

1. What are the tactical training needs of nuclear facility security officers? How should these training needs be met?
2. Should there be dedicated response team, small group, or individual tactical training?
3. What are the merits of target range versus field tactical training?
4. What are merits of static versus dynamic (pop-up) ranges?
5. How much realism in the scenarios/locale is desirable?
6. Should there be contingency response drills using contingency procedures (on location)?
7. Is there a need for day/night exercises?
8. What are the communications requirements among team members?
9. How often should training/retraining be required?
10. Is there a need for national tactical radio frequencies for security operations, separate from utility and/or business bands, at nuclear power plants?

B. ESS Training

1. What are the implications and desirability of an NRC requirement for ESS training of security officers at all nuclear facilities?
2. Is there a need for more security officer tactical training?
3. What is the role of ESS/TIP in meeting perceived security officer tactical training needs? Will ESS/TIP meet those needs? How?
4. How should ESS/TIP be applied to response training?

5. How should response and tactical training using ESS be conducted? How often?

C. Evaluation

1. What is the possibility of using ESS equipment and TIP training exercises for evaluation purposes - by NRC or by licensees?
2. What types of evaluation are possible (individual, team, security force, facility)?
3. How should ESS/TIP be applied to evaluation of skills? (Training evaluation involves the identification of specific performance goals and objectives and the measurement and trainee performance/management feedback of how well the desired goals have been met.)
4. Is there a need for ESS measuring devices and the reproduction of ESS results and alternatives (by computer simulation) for evaluation/training purposes?

II. Training Modes/Facility and Equipment Requirements

A. Possible ESS Training Modes

1. Where should training exercises be conducted?
2. What are the relative merits of industry-wide regional training facilities, an industry-wide centralized training facility, and portable training films/equipment for use at licensee nuclear facility sites? What are the advantages and disadvantages of each?
3. Would your facility be willing to conduct/host ESS/TIP exercises?

B. Safety Versus Security

1. What are the tradeoffs of safety to personnel versus security of the facility in the three training modes of on-site, regional, and centralized training facilities?
2. Will greater familiarity with tactical training lead to higher security and safer response procedures (due to greater tactical confidence and less carelessness)?
3. What are the tradeoffs of safety versus security to the facility? How do safety requirements and security requirements interact?

4. Can exercises be held at operating nuclear facility sites?

C. Training Facility Requirements

1. What is industry likelihood of using a regional training facility(s)? Give suggestions for the facility location(s).
2. What are the requirements of a good training facility - outdoor field with false-front buildings, building/warehouse for indoor training, generic nuclear power plant/fuel cycle facility mock-up, replica of actual facility, or cancelled or deactivated facility?
3. How much realism in the scenarios/locale is required for effective training?

D. Equipment Availability

1. What are the available options in acquiring ESS equipment? What are the advantages and disadvantages of each?
2. Is there a need for greater availability of ESS equipment? In what form - equipment only, equipment and instructors, centralized training center?

III. Possible Problems with ESS

A. Usage and Implementation of ESS/TIP

1. What are the merits of ESS for demonstration/ familiarization versus tactical training versus evaluation purposes?
2. Is the guidance available with TIP sufficient to meet the needs for effective implementation with ESS equipment by a security officer training staff?
3. Should training using ESS be required for all members of a nuclear security force or for selected members only - dedicated response team(s)?

B. Safety and Personnel Considerations

1. What are the safety considerations to the security force, the work force, and the public during ESS/TIP exercises?

2. Are there participant safety problems to consider?
3. Should there be security officer health and physical standard requirements to be met prior to exercise participation? Are Appendix B requirements sufficient?
4. How will ESS exercises impact safety considerations and health and fitness requirements?
5. Are there relationships between security officer physical conditions and tactical response capabilities?
6. What is your perception of security officer's reaction to ESS exercises?

IV. Social, Legal, and Economic Considerations

A. Social

1. What is the anticipated reaction of the news media?
2. What are the best ways to interact with the news media?
3. Would possible news media attention affect the use of ESS?
4. How will the public perceive ESS/TIP?
5. How are nuclear facility management, security management, and security officer training staff expected to perceive ESS training?
6. Will management support response and tactical training using ESS?

B. Legal

1. What are the legal aspects that should be addressed prior to ESS training?
2. What liabilities could the nuclear facility licensee be subject to as a result of ESS training?

C. Economic

1. What does ESS equipment cost? Would there be a large enough equipment demand to encourage commercial manufacture? What are available options in acquiring ESS equipment? Is there interest in an equipment loaner program?

2. Who should maintain ESS equipment? What cost could be expected in terms of manpower and dollars to maintain equipment?
3. What benefits may be achieved through the use of ESS equipment? Will the benefits from ESS/TIP exercises outweigh the costs?
4. What are the advantages, disadvantages, and costs of the three training modes of on-site, regional, and centralized training facilities?
5. What party(s) should be responsible for major training facility costs (NRC, licensee, utility association, third party, etc.)?

Appendix C

LASER EQUIPMENT

Appendix C contains a discussion, provided by EG&G, Inc., regarding their interest in participating in an NRC licensee Engagement Simulation System (ESS) program. It contains a discussion on the Department of Energy (DOE) "loaner" program and ESS equipment costs. Sandia National Laboratories and EG&G have been involved in an equipment "loaner" program for DOE facilities.

The appendix also contains condensed material from a brochure by Defense Management Group on their plans to offer a training program for response personnel.

This appendix is included for informative purposes only and is not to be construed as an endorsement of EG&G or of Defense Management Group. It must be noted that the original equipment was developed by Xerox Electro-Optical Systems (EOS).

EG&G DISCUSSION

The Tactical Improvement and Security Force Evaluation Program has demonstrated the effectiveness of ESS for training security forces at the NRC licensee nuclear reactor facilities. How to best implement the ESS System to provide this training still remains to be resolved. The equipment is not inexpensive -- each laser transmitter/detector pair costs approximately \$2,000; and a complete training set consists of a firing unit/detector harness pair plus ancillary equipment. A typical provisioning for a training program at a nuclear facility would be 20 to 30 such sets of equipment. For every licensee to purchase a complete complement of the equipment would represent a significant investment. Since it is probable that the ESS equipment would not be kept in continuous use at any one facility, a more cost effective solution would be for the licensees to share a limited number of ESS equipment sets.

A further advantage of sharing is the requirement for repair and maintenance of this rather sophisticated equipment. If each facility owns its own equipment, each facility staff will have to include highly specialized electronics technicians capable of, and dedicated to, repairing and maintaining the equipment. The solution DOE has implemented for its ESS operation is a "loaner" program. Sandia National Laboratories, with subcontract help from EG&G (a DOE Integrated Contractor), maintains the government-owned ESS equipment, coordinates delivery on a loan basis between approximately 20 DOE facilities, provides short-term training and orientation to the facility Security Training Managers to assure that the training programs are well planned and properly implemented, and provides expert consultation as required during the execution of the training programs. Generally, a package of ESS equipment is loaned to a facility for a period of about 3 months. This allows the facility to schedule use of the equipment around its operational requirements. Sandia and EG&G personnel arrange for the shipping of the equipment to the facility after thorough checkout in Albuquerque, and then in coordination with the facility Security Training Manager provide the consultation and support which that particular facility requires. Damaged or inoperative units are sent back to Sandia for repair or replacement. Using this method, a relatively small number of systems (6 packages, 20 sets per package) are continually rotated between the DOE facilities. Also a relatively small number of full-time personnel (approx. 4) are able to provide the necessary system repair, maintenance and coordination.

Effective in FY83 the DOE loaner program is being transferred entirely to EG&G. EG&G will take over full responsibility for the coordination, repair, and maintenance activities.

A similar sort of arrangement would appear to be advantageous for implementing an ESS training program for NRC licensees. Two options are apparent. First, similar to the case of DOE, the licensees as a collective body could purchase the necessary stock of ESS equipment, weapons, blank ammunition, radios, etc., then hire a

contractor, like EG&G, to provide coordination, instruction in use of the equipment, repair, and maintenance. Assuming that each nuclear reactor facility would have a package of equipment for three months out of a year and given approximately 80 licensees, twenty to 25 loaner packages would be required. (Each loaner package would consist of approximately 20 detector/transmitter pairs and ancillary equipment.) The estimated cost of 20 complete loaner packages plus the necessary support equipment could approach approximately \$2,000,000; but based on past experience, a staff of 7 to 10 people could coordinate and manage a loaner program of this magnitude.

Another option would be for a private company, perhaps a commercial division of EG&G, to provide both the ESS equipment and coordination, instruction, repair, and maintenance services. This would relieve the licensees of the large initial investment to purchase the equipment. Instead this investment would be amortized in the fee the company would charge the licensees for its services.

EG&G has expressed an interest in, and is exploring the financial feasibility of, both these options. EG&G plans to be in a position to discuss specifics about their potential participation by early 1983, when perhaps the recently cancelled Security Officer Tactical Training workshop will be rescheduled.

DEFENSE MANAGEMENT GROUP DISCUSSION

Defense Management Group (DMG)* plans to offer a Mobile Conflict Simulation Program (MCS) effective August 1983. This program is modeled after the U.S. Army Tactical Engagement Simulation (TES) and the Training & Evaluation Programs (ARTEP). The MCS training program is based on the highly successful Multiple Integrated Laser Engagement System (MILES) produced by Xerox's Electro-Optical Division for military clients.

The use of MILES equipment in Tactical Engagement Simulation has enjoyed an impressive eight year performance history with the U.S. Army.

The MCS training program consists of a three component system designed to maximize the field performance capabilities of armed response personnel during two-sided, opposing force, tactical free-play training exercises. The military training method of Train-Evaluate-Train is used to ensure that mistakes are identified and corrected and that the unit's response proficiency is significantly increased before proceeding to new material. Each Training & Evaluation Outline is constructed to allow easy incorporation into the Training & Qualification section of the client's existing Security Plan. DMG will provide the training equipment and expertise on a lease basis to all qualified customers.

*Defense Management Group is in the process of becoming incorporated and will change their name to Counterforce Technologies Corporation.

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DISTRIBUTION:

J. C. Giles
EG&G Washington Analytical Services Center, Inc.
2450 Alamo Ave., SE
P.O. Box 9100
Albuquerque, NM 87119

Bill Pollard
Defense Management Group
P.O. Box 174
Smithfield, VA 23430

Sandia National Laboratories:

400 C. Winter
1000 J. K. Galt
1600 D. B. Schuster
Attn: M. M. Newsom, 1620
R. C. Maydew, 1630
D. J. Rigali, 1650
5200 W. C. Myre
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6410 A. W. Snyder, Acting
6411 A. S. Benjamin
6412 J. W. Hickman
6414 D. M. Ericson, Jr.
6415 D. C. Aldrich
6430 A. W. Snyder, Acting
6431 N. R. Ortiz
6432 L. D. Chapman (5)
6432 K. G. Adams
6432 S. L. K. Rountree (15)
8214 M. A. Pound
3141 L. J. Erickson (5)
3151 W. L. Garner (3)

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S. L. K. Rountree

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Sandia National Laboratories
Albuquerque, NM 87185

11. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code)

Division of Safeguards
Office of Nuclear Material Safety & Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

13. SUPPLEMENTARY NOTES

14. ABSTRACT (200 words or less)

Security officer tactical training issues are discussed in relation to the possible implementation of the Tactical Improvement Package (TIP), utilizing the Engagement Simulation System (ESS) equipment, by nuclear power plant licensees for security officer tactical training. The ESS equipment provides the capability to simulate engagement conditions between adversaries armed with weapons which have harmless laser transmitters. A brief discussion of the TIP is presented, along with some concerns and considerations in the use of the TIP.

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