

Preparation, Conduct and Evaluation of Exercises to Test Security Contingency Plans at Nuclear Facilities



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PREPARATION, CONDUCT AND
EVALUATION OF EXERCISES TO TEST
SECURITY CONTINGENCY PLANS
AT NUCLEAR FACILITIES

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INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 2018

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FOREWORD

States have responded to the risk that nuclear or other radioactive material could be used for malicious purposes by engaging in a collective commitment to strengthen the protection and control of such material and to respond effectively to nuclear security events. They have agreed to strengthen existing international legal instruments, and have established new ones, to enhance nuclear security around the world. Nuclear security is fundamental to the use of nuclear technologies and to applications where nuclear or other radioactive material is used or transported.

Each State carries the full responsibility for nuclear security; specifically, to provide for the security of nuclear and other radioactive material and associated facilities and activities; to ensure the security of such material in use, storage or transport; to combat trafficking and the inadvertent movement of such material; and to be prepared to respond to a nuclear security event.

This publication is intended for use by persons responsible for the development and implementation of nuclear security exercises at nuclear facilities. It provides a single source of advice on developing and maintaining an effective and comprehensive nuclear security exercise programme pertaining to all aspects of effectively testing contingency plans. It focuses on the methods for evaluating physical protection systems by way of drills and response force exercises that test the training and readiness of guards or response forces to malicious acts.

This publication focuses primarily on assisting operators. States and competent authorities may also find it useful in supporting licensing and inspection of physical protection systems. It provides advice on developing, conducting and evaluating an effective and comprehensive contingency response programme for nuclear facilities with regard to all aspects associated with security exercises. It constitutes a starting point for organizations that have not previously established or managed contingency response programmes and exercises, as well as a reference for organizations that wish to validate or improve their existing programmes.

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1. INTRODUCTION

1.1. BACKGROUND

A key aspect of an operator's responsibilities is to ensure that all physical protection measures employed as part of the overall physical protection system operate as designed. The use of exercises allows for the evaluation and demonstration of the effectiveness of the facility's physical protection system and provides additional benefits such as validation of plans, policies and procedures, capability assessments, testing and evaluations, as well as training and qualifications.

Contingency response exercises are a critical component of an effective physical protection system. Exercises provide a unique insight into the state of readiness of the security organizations responsible for the physical protection of a nuclear facility during a nuclear security event.¹ Realistic exercises can form a basis for the continued improvement of the physical protection system by identifying areas of vulnerability.

In addition to ensuring that the facility physical protection system is effective, exercises can also support the State's physical protection regime by exercising the external response to a nuclear security event. Typically, external response is provided by State law enforcement, security or military organizations that are external to the operator's control. Depending on the scope, exercises can bring together security response agencies, national security decision makers, competent authorities, operators and fire and medical responders.

To be effective, contingency response exercises need to be well organized and professionally conducted. The evaluation of exercises should focus on constructive improvement potential since each exercise represents a significant investment in terms of effort, financial resources and personnel. Therefore, it is important for each exercise to yield the maximum benefit. This benefit depends primarily on the quality of the preparation, conduct and evaluation of the exercise.

This publication draws on the core methodologies provided in *Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency* [2]. However, specific adaptation for nuclear facilities has been made and specific examples from other organisations have been included, where relevant.

1.2. PURPOSE

The purpose of this publication is to provide practical guidance for facility operators to efficiently and effectively prepare, conduct and evaluate security contingency response exercises.² The competent authority responsible for creation of the State's contingency response exercises could also use this publication to prepare, conduct and evaluate State-level contingency response exercises.

1.3. SCOPE

This publication addresses contingency response exercises at facilities where physical protection measures are developed and implemented to meet competent authority requirements. In accordance with a graded approach, contingency plans are developed and exercised so that theft and sabotage targets are protected to appropriate levels against the current defined threat.

This publication focuses on the process involved in preparing, conducting and evaluating partial and large-scale exercises (i.e. drills or force-on-force exercises). For less complex exercises (e.g. tabletop exercises (TTXs) and limited-scope drills), the process is conceptually the same. However, the level of effort and the time needed to prepare the exercise are reduced and some parts of the process described in this publication may not be needed. For such exercises, the guidance provided in this publication is an example of information that organizers could consider in development of contingency response exercises.

The preparation, conduct and evaluation of large-scale exercises usually involve the coordination of several organizations. Large-scale exercises demand a great deal of effort and need the input of several organizations or sub-organizations and disciplines to yield good results. Conversely, drills and TTXs demand less preparation and coordination and are usually easier to evaluate [2].

¹ The term 'facility' implies nuclear facility.

² In this publication, the term 'contingency plan' refers to a security contingency plan.

This publication does not specifically address the preparation, conduct and evaluation of the State's contingency response exercises for nuclear security events. However, it does consider the interaction of State response organizations with the implementation of the operator's contingency plan with relevant examples.

This publication does not include exercises on emergency response to any nuclear or radiological emergencies that might result from a nuclear security event. However, it does address the safety and security interfaces that would arise during a nuclear security event (e.g. interfaces between contingency plans and emergency response plans) relating to a contingency response at nuclear facilities. It takes into account the IAEA Emergency Preparedness and Response (EPR) publications and is consistent with, and complementary to, other guidance publications issued and in preparation within the Nuclear Security Series (NSS), including other technical guidance supporting NSS-13, *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)* [3], and NSS-14, *Nuclear Security Recommendations on Radioactive Material and Associated Facilities* [4].

The structure of this publication, including the subject headings and topic planning areas, is similar to that in Ref. [2]. This approach was selected in order to facilitate the use of both publications in a harmonized manner by relevant national authorities and organizations. However, the contents of the two publications differ due to the type of information that is to be handled; the target audiences and their cultural considerations for the exercises; the significant differences in how security exercises are conducted and evaluated; and the focus on security priorities and objectives relative to a threat. Within this publication there is reference to emergency response and the associated organizations that would work cooperatively during the course of a nuclear security event. However, specific actions of those organizations in the course of the exercise are not specifically addressed; those organizations can refer to Ref. [2] for guidance.

This publication also used *Radiological Emergency Preparedness Exercise Manual* (FEMA, 1991) [5] as a source of general information.

1.4. STRUCTURE

Following this introduction, Section 2 describes concepts of exercise planning, conduct and evaluation, including the different types of exercise that can be held, their characteristics, the exercise specifications and how the results can be used to improve performance. Section 3 describes the planning process involved in organizing an exercise. Section 4 identifies the conduct and evaluation of a security exercise, the information that should be included in the exercise material, and the organization and process for controlling and evaluating the exercise, including information that should be included in the player, controller and evaluator guides. The appendices contain detailed information to illustrate some of the key concepts described in the main text.

2. CONCEPTS

2.1. CONTINGENCY RESPONSE PROGRAMMES AND EXERCISES

In accordance with Fundamental Principle A of the *Amendment to the Convention on the Physical Protection of Nuclear Material (CPPNM)* "responsibility for the establishment, implementation and maintenance of a physical protection regime within a State rests entirely with that State" [6]. The Amendment to the CPPNM clearly states that a physical protection regime needs to provide for the protection of nuclear facilities and nuclear material in peaceful domestic use, in storage and during transport.

An important element of the physical protection regime is that the State ensures that facility operators develop and implement contingency plans and procedures to respond to unauthorized removal of nuclear material, sabotage or attempts to do so. In keeping with Fundamental Principle K in Ref. [6], it is also necessary for the State to ensure that these plans are exercised to verify that they will work properly when they are activated. There is a need to exercise contingency plans at the State level, the operator level, or at both levels simultaneously.

Ref. [3] addresses contingency plan exercises in:

- Para. 3.13: "The State should ensure that evaluations include exercises to test the physical protection system, including the training and readiness of guards and/or response forces."
- Para. 3.60: "The coordination between the guards and response forces during a nuclear security event should be regularly exercised. In addition, other facility personnel should be trained and prepared to act in full coordination with the guards, response forces and other response teams for implementation of the plans."

- Para. 3.61: “Arrangements should be made to ensure that during emergency conditions and exercises, the effectiveness of the physical protection system is maintained.”
- Para. 5.41: “Evaluations, including performance testing, of the physical protection measures and of the physical protection system, including timely response of the guards and response forces, should be conducted regularly to determine reliability and effectiveness against the treat. These should be carried out with full cooperation between the operator and response forces. Performance testing of the physical protection system should include appropriate exercises, for example force-on-force exercises, to determine if the response forces can provide an effective and timely response to prevent sabotage.”
- Para. 5.42: “Contingency plans should be prepared to counter malicious acts effectively and to provide for appropriate response by guards and response forces. Such plans should also provide for the training of facility personnel in their actions.”
- Para. 5.50: “The State should ensure that operators and appropriate State response organizations conduct exercises to assess and validate the contingency plans prepared by the operators and the State organizations, and also to train the various participants on how to react in such a situation.”

Facility contingency plans may include considerations and arrangements for State liaison, notification, exchange of information and assistance. The operators should exercise their contingency plans taking into consideration State-level responsibilities that may affect operator-level responsibilities, including (as appropriate) emergency and contingency arrangements such as those for initiating State response to unauthorized removal or attempted removal, an act of sabotage or attempted sabotage.

The frequency with which exercises are held depends on the purpose and scope of the exercise and the regulatory requirements. NSS 27-G, *Physical Protection of Nuclear Material and Nuclear Facilities (Implementation of INFCIRC/225/Revision 5)* states “some tests and exercises may be required at least on an annual basis; more comprehensive exercises (such as force-on-force exercises) may be conducted less frequently but should be required at least every two to three years” [7]. The need for long-term planning of exercises is discussed in Section 2.7 of this publication. Over the implementation of the long-term exercise programme, all response objectives should address the objectives of the State’s physical protection regime (as identified in Section 2 of Ref. [3]), including interfaces with on-site and off-site organizations in the plan, and should be targeted by at least one exercise. Some objectives will potentially be tested more often than others. A contingency response exercise would not be an isolated event, but rather one that is part of an overall exercise programme that is normally implemented over a cycle of several years. Leading to any full-scale exercise (integrated force-on-force), there will be training, drills and smaller-scale exercises. In most cases, exercises are conducted once the plans and procedures have been implemented, the resources have been allocated and the training has been delivered.

Contingency response plans can be exercised in parts (partial exercise), or at full scale by exercising all aspects of the response at once. Partial exercises may be useful for testing and evaluating one or more components of the strategy whereas a full-scale exercise would test and evaluate all components of the strategy.

2.2. PURPOSE OF EXERCISES

Exercises are a way of testing, training, evaluating and demonstrating capabilities in contingency response. Participants and participating organizations should be knowledgeable of their roles and responsibilities as well as the established procedures for dealing with the topic of the exercise. Participants, taking on the roles of players, controllers or evaluators in the exercise, may consist of the following personnel: security force, operations, emergency planning, radiation protection, safety, off-site, competent authority and any other personnel necessary to conduct the exercise scenario.

The exercise provides an opportunity for those procedures and decision-making processes to be applied in a realistic manner. When multiple organizations are involved in the exercise, their ability to coordinate and collaborate is also demonstrated. The objectives of an exercise may include (but not be limited to):

- Validating site specific plans and procedures;
- Testing performance of participants and participating organizations;
- Providing realistic training opportunities for guards, response and adversary forces;
- Assessing and improving on-site and off-site organization interfaces and coordination;
- Exploring and testing new contingency response concepts, planning and ideas;
- Identifying, understanding and evaluating contingency response issues;
- Formalizing concepts, plans, procedures, arrangements and systems;
- Developing and evaluating operational and tactical concepts;
- Evaluating a current (baseline) or upgraded system;

- Performing vulnerability assessments;
- Evaluating the interface between the safety and security response plans.

The desired outcome of exercises includes reinforcing good practices, identifying gaps and overlaps or other areas as part of the organization's continuous improvement programme.

Weaknesses may be identified through exercises, mitigating underlying vulnerabilities that may otherwise appear during an actual nuclear security event. In that case, valuable time and resources may be wasted in trying to solve problems under the worst possible conditions (see Table 1 for the types and purposes of exercises considered in this publication).

2.2.1. Validation

Validation is by far the most common reason for holding an exercise and may be characterized by the question, 'Does the contingency plan work?' A successful exercise identifies where improvements are necessary in the contingency or other plans, tests the effectiveness of revised procedures introduced as a result of previous exercises or operations and enhances the development of an adequate response to a nuclear security event.

However, an exercise should not be seen as an opportunity to demonstrate the perfection of a contingency response. A good exercise is not necessarily one where everything goes well, but rather allows improvements to be identified.

When the contingency plan is implemented, an exercise allows for validation of the plan. Periodically, as changes or revisions are introduced to the plan and procedures, it may serve as a verification of the continued effectiveness of the physical protection system and an effective response to a nuclear security event. In general terms, as significant changes are made to the plan, a more complex exercise scenario may be needed to validate it.

Communication between organizations is one of the major challenges during real-world operations (both routine and emergency). An exercise can test the communication arrangements better than any other activity. In that context, communication is not limited to the technological means of communicating, but also includes the substance, the format and the manner in which the information is shared.

2.2.2. Performance evaluation

Performance evaluation may be characterized by the question, 'Do all participants know their part in the plan?' Exercises may be used to check individuals' and organizations' skills, knowledge and ability to implement the contingency plan or other related plans. Performance may be evaluated internally by the operator or externally by the competent authority. Receiving and acting upon feedback from exercise participants is essential in the evaluation process in order to identify and eliminate gaps and vulnerabilities.

2.2.3. Training

Although the main purpose of an exercise is to validate and test performance, every exercise has a significant training value. As part of an overall training programme, exercises provide opportunities for individual and collective training, feedback on the training received by guards and response forces, coordination between multiple organizations and interface between safety and security organizations.

Exercises may be one of the few opportunities for individuals and organizations to train together under the realistic conditions of a credible threat scenario. Exercises are not the only method used to expose individuals to the roles they could play since these individuals may be left with a misconception of their responsibilities. The overall training programme can also include seminars, classroom lectures, workshops, and vendor instruction.

2.2.4. Trials

In some cases, new or revised concepts, procedures, systems or arrangements should be developed, explored, and pre-tested so that they can be improved before they are implemented. This can also be accomplished in the context of exercises.

2.2.5. Coordination and interfaces

An effective response to a security event, as described in a contingency plan, may need the input of several organizations or the State. The level of familiarity with each other’s roles and responsibilities may differ. Exercises present an excellent opportunity for participants to learn how they will integrate with each other and understand each other’s part in the plan(s).

This may be the first time that participants from diverse organizations or from the State have had a chance to meet and establish an effective working relationship. A further benefit may be, as part of the validation process, confirming that boundaries of responsibility are clear, effective and understood by all participants in the plan(s). This may be the case for guards and response forces, national and local police forces, national and local emergency response organizations and the State.

2.3. TYPES OF EXERCISE

The term ‘exercise’ is usually loosely interpreted as meaning any practical implementation of response plans and procedures in a simulated situation. This includes simulations and exercises as presented in Table 1. The preparation and conduct of each varies in complexity, scope and objectives.

TABLE 1. EXERCISES AND ASSOCIATED PURPOSES

Type	Purposes	
Simulation takes place without field execution		
Tabletop exercise/battleboard	— Varies in scope and number of personnel involved	
	— Training	
	— Interagency coordination	
	— Performance testing	
Computer-based exercise	— Testing and evaluating command and control structures	
	— Training	
	— Decision making	
	— Validating vulnerability assessment	
Exercise takes place with field execution	— Testing new concepts, procedures, physical protection measures	
	Drills	— Limited number of personnel
		— Training
		— Performance testing
Partial exercise	— Limited scope	
	— May include force-on-force engagement	
	— Training	
	— Performance testing	
Full-scale exercise	— Testing and evaluating command and control structures	
	— Training:	
	▪ Training of all on-site and off-site agencies	
	▪ Training under real time and or prevailing conditions or simulated	
	— Coordinating with all on-site and off-site agencies	
	— Based on force-on-force engagement	
— Evaluating capabilities and proficiencies		
— Testing and evaluating command and control structures		

Scenarios, developed on the basis of the contingency response plan, can be utilized to conduct exercises (example scenarios are provided in Appendix V).

Exercises can vary in magnitude and scope. In the case of a radiological emergency resulting from a security event, the exercise can be designed to test a variety of capabilities including guard force response, safety and security interface, command and control and emergency communications.

Exercises are usually an obligation of the operator to the competent authority. While simulations may not be an obligation, they are desirable.

2.3.1. Simulations

2.3.1.1. Tabletop exercise/battleboard

A TTX is a discussion-type exercise conducted around a table and is typically driven by a script. A battleboard is a variation of a TTX that uses probabilistic outcomes of engagements to determine the progression of the exercise. All of the participants are in the same room or building (players, controllers and evaluators). There is no field component to either a TTX or battleboard exercise. However, TTXs and battleboards can use the same tools, such as maps or a physical model of the facility to facilitate realistic conditions of the exercise.

For both TTXs and battleboard exercises, the adversary and response forces are controlled to ensure they conduct realistic actions. For example, response forces are constrained by:

- Actual procedures and training;
- Equipment in inventory, unless an upgrade is being modelled.

Adversary forces are constrained by an agreed upon design basis threat (DBT), for example, with:

- Force numbers;
- Insiders numbers and level of aggression (passive/active);
- Equipment (tool kit);
- Realistic tactics and movements.

In addition to the commonalities listed above, additional details specific to TTXs and battleboard simulations are described below.

(a) TTXs

The main focus of a TTX could be on decision making, cooperation and coordination arrangements, assessment, public and media communication policy definition, implementation or another capability that needs to be exercised. TTXs are not usually conducted in real time (see Section 2.4.1).

Key points in the preparation of a TTX include, but are not limited to the following:

- Organizing the room so that it is clearly perceived by the players to be the setting of an exercise and NOT a meeting;
- Ensuring that all the players are introduced and that their roles and responsibilities are clearly understood by all;
- Explaining, clearly and briefly, that the goal of the TTX is to assess and to attempt to make decisions that will be used for improving the overall response to a nuclear security event;
- Explaining that players provide detailed information relevant to their role in the exercise;
- Explaining that players can only bring realistic resources to the problem;
- Explaining, if applicable, that the discussions may be recorded.

The key points above make TTXs very different from workshops. In a workshop, participants tend to be in a receiving mode with free-flowing discussion. In a TTX, which is scenario based, players need to be pro-active and concrete.

(b) Battleboards

Originally developed by the military as a battle planning tool, the concept of battleboards has since been modified and is used by numerous organizations. The rules are modified to meet the needs, objectives and purposes unique to a security event at a facility.

Battleboards are typically turn-based (adversary followed by response force), probability-assigned exercises designed to evaluate the system's capability in response to an adversary action. Using a scale model, map sheet or an enlarged aerial photograph gives participants the ability to make decisions based not only on their own procedures but also in reaction to many other variables (e.g. adversary actions, terrain, buildings).

The concept of a battleboard exercise is similar to combat-oriented board games whereby players are divided into two groups: adversary and response forces. The two groups are assigned missions and develop plans of attack (or defence) in order to achieve their assigned mission. Once the planning is complete, the two groups then meet around a battleboard and walk through their assigned missions using a turn-by-turn process. Engagements between the two forces are evaluated by the controllers and the use of probability tools (dice or computer applications) to determine the outcomes of separate engagements. The battle continues until one of the following conditions is met:

- Adversaries have met their objective;
- Adversaries are no longer capable of meeting their objective, either through attrition (they do not have necessary personnel to overcome the physical protection system) or the loss of essential capability such as explosives, vehicles or tools.

2.3.1.2. Computer-based simulation

Computer-based simulation has been used for decades in warfare and combat modelling and in nuclear plant safety analysis. In nuclear security, computer-based simulation is a relatively new concept. Computer-based simulation can be used for planning and preparation of nuclear security exercises. It allows a large number of scenarios to be tested prior to conducting a field drill or exercise, thereby making such simulations a cost-effective way to optimize parameters to be used in an exercise. The fidelity of a simulation depends upon how much detail the user puts into setting up a simulation. More detail provides more realism typically at the expense of greater computational resources needed. Computer simulations can range from fairly simple numerical output spreadsheet calculations to extremely complex synthetic environment simulations which may also include first person interaction.

2.3.2. Exercises

2.3.2.1. Drills

Drills normally involve small groups in a learning process designed to ensure that essential skills, knowledge and abilities are available for the accomplishment of non-routine tasks such as response force immediate actions or contact drills. A drill is conducted primarily as a training tool to develop and maintain skills in certain basic operations or tasks, to reinforce a skill or practice/review a procedure. A drill can also be used to assess the adequacy of personnel training and is usually supervised and evaluated by qualified instructors. It normally covers a particular component, or a group of related components, associated with the implementation of the contingency plan. It may also be an element of a partial or full-scale exercise (e.g. force-on-force). The type of drill to be used depends on the function being practised and the group being trained.

Drills can be used to test different elements of the physical protection system. The purpose of drills may include:

- Demonstrating the protective strategy using a model of the facility. This allows contingency response force members to demonstrate their understanding of the physical protection system and their individual response requirements.
- Demonstrating the response timelines established for the protective strategy and to test either the validity of the timelines established for the physical protection system or the ability of the contingency response force personnel to respond to their assigned response position within the established timeline.
- Evaluating the ability of one or more contingency response force members to effectively implement their physical protection system functions. These drills are conducted as needed for each individual, group, or shift to validate and test the protective strategy.

2.3.2.2. Partial exercises

In a partial-scale exercise, the emphasis is on team procedures and coordination between several teams with the common task of evaluating one or more capabilities or functions. The general focus of partial-scale exercises may be on coordination and cooperation between multiple organizations or to evaluate specific functional aspects, which will need only selected organizations and interfaces to be activated (where the remaining may be simulated). The purpose of partial exercises includes, for example:

- Security only exercises involving the contingency response force and an adversary force without a planned response effort across other on-site organizations (e.g. facility operations, emergency preparedness) with the focus primarily on contingency response force.

- Exercises focusing on the contingency response by using the minimum number of members of the response force and the adversary force sufficient to execute the scenario being tested. They would be a credible, realistic and thorough test of a portion of the site protective strategy and evaluate the key security programme performance elements bounded by the DBT. The exercise provides scenario controls and exercise controllers and includes a post-exercise critique and required exercise documentation.

2.3.2.3. Full-scale (force-on-force) exercises

The most demanding and exhaustive test of contingency response capability is an integrated full-scale exercise involving the full participation of all organizations involved in the physical protection of a facility, including applicable contingency response organizations. Its major objective is to verify that the overall coordination, control, interaction and performance of these response organizations are effective and that they make the best use of available resources. The full-scale exercises include those exercises involving a planned response effort across various on-site and off-site organizations (e.g. law enforcement agencies, security, plant operations, emergency preparedness) to minimize or mitigate the threat.

2.3.3. The progressive planning approach

Although each exercise type can be executed as a single activity, greater benefit can be achieved through a progressive planning approach that exposes exercise participants to gradually increasing complexity of exercise conduct. A multi-year plan employs a progressive planning approach in which training and exercise activities focus on specific capabilities in a cycle of escalating complexity (e.g. a series of exercises may begin with a seminar and progress towards a TTX exercise or an exercise series may begin with a TTX and progress to several drills and then to a full-scale exercise). This approach is depicted graphically in Fig. 1.

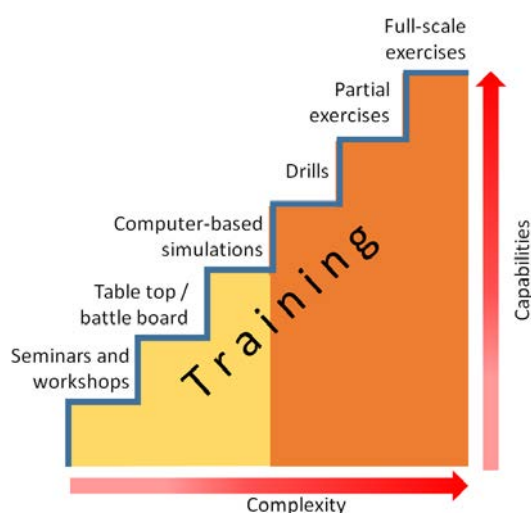


FIG. 1. The progressive planning approach for contingency exercises.

2.4. FACTORS TO CONSIDER WHEN CONDUCTING AN EXERCISE

Time (scenario injects versus free play) and the use of simulated activities are important factors that should be determined when preparing an exercise.

2.4.1. Time

An exercise is carried out in a real time mode when each activity is conducted over the same timescale as that of an actual nuclear security event. The timescale is compressed when otherwise necessary steps or time lapses are simulated or shortened during the exercise. An expanded timescale may provide additional time to that normally needed to complete a particular event or a prolonged time period within a sequence of events to enable the convenient management of the exercise.

Compression or expansion of the timescale for certain sequences in the scenario may be advisable in order to make efficient use of the time personnel invest in the exercise. This is often appropriate for TTXs and for drills, but not usually for larger exercises where coordination between the various groups makes it harder to synchronize the

exercise unless real time is used. However, there are exceptions; for example, in the early stages of a nuclear security event, response forces may take time in arriving at the event site and time compression may be advised. For the purpose of the exercise, the timescale for this stage may be compressed in order that their particular assessment and decision-making activities can be put into practice without prolonged delays.

There are cases where time compression is a disadvantage. For example, the compression of the time required for an adversary to defeat a series of barriers to gain access to equipment, systems, devices or nuclear material located in the vital area. These time delays are crucial to understanding the adversary task time delays that would be incurred in overcoming the physical protection system under real attack conditions.

Wherever possible, this procedure (time expansion in particular) should be avoided during the early stages of an integrated exercise since it is essential that players obtain a genuine appreciation of the actual time available for the completion of particular tasks, especially when these involve coordination with other groups. As a guiding rule, the time sequence of the associated series of events in an exercise may be compressed or expanded provided that this does not compromise exercise objectives.

In addition to the above, a suspension in exercise time (time out) may be required for addressing safety issues, relocating personnel or correcting scenario actions. Any person (e.g. player, controller) may call a time out for safety related issues.

2.4.2. Scenario injects and free play

Scenario injects refer to actions that controllers may take either to correct errors, to interrupt actions made by the players which might otherwise lead them to depart from the scenario and possibly jeopardize the overall objectives of the exercise, or to progress the exercise according to the scenario. In order for the exercise to remain 'on track', controllers should avoid correcting players' errors whilst the exercise is in progress unless a correction is absolutely necessary. Scenario injects can be either scripted (in advance) or unscripted (ad hoc), as required.

Free play allows players to use discretion in reacting to a simulated problem according to their perception of the most appropriate solution based upon the protective strategy as described in the contingency plan and associated procedures. Free play allows participants to perform reactively or pro-actively, depending on the situation. Freedom of action may be constrained by the scenario, which aims to achieve exercise objectives, and other factors such as the DBT or safety considerations. For example, a scenario that allows free play is the preferred method of training response force members to carry out their assigned functions under realistic conditions. Free play also allows the evaluators to determine more accurately the adequacy of response plans and procedures.

2.4.3. Simulated activities

The best exercises are those where the degree of realism is highest and the degree of simulation (i.e. pretending to do certain actions or obtaining certain information) is minimized.

However, in practice, it is difficult to incorporate extensive realism into such exercises. Malicious acts, especially terrorist acts, are often aimed at maximizing damage, injury and disruption, which is difficult to reproduce realistically in a safe manner or during an exercise. Furthermore, conducting a realistic exercise involving a malicious act may unduly alarm non-participants, especially if unannounced. Therefore, the exercise designers should compromise between the need for realism while maintaining safety.

Individual task simulation is used to replicate certain real-world aspects of an exercise that may not be feasible to use for practical reasons (e.g. safety or cost considerations). For events such as destruction of barriers or attempted sabotage of equipment, systems, devices or nuclear material located in the vital area, simulated tasks may be used to develop the scenario and run the exercise. During the exercise, simulation tools can add realism and may include:

- Weapons effect simulators (blanks, lasers and training munitions);
- Mock-ups (for explosives, packages, incident location);
- Other devices to add realism (e.g. smoke canisters).

2.5. EXERCISE FREQUENCY

Exercise frequency depends on the exercise type, an organization's operational procedures and regulatory requirements. For example, less demanding exercises with limited objectives that involve fewer staff may be held

more often than a full-scale exercise. As discussed in Ref. [7], some exercises may be required at least on an annual basis, while more comprehensive exercises may be conducted less frequently, not exceeding two to three years (such as force-on-force exercises). The frequency of a full-scale exercise will be determined by the competent authority. However, the operator may conduct more frequent exercises depending on the following factors:

- Change in the regulations;
- Change in the target assets;
- Change in the threat assessment or DBT;
- Need to change major portions of the contingency plan or other plans;
- Turnover rate of key personnel (e.g. operations, guards);
- Degree of normal contact between the major response organizations;
- Type and frequency of drills/partial exercises;
- Validation and performance evaluation, as part of a competent authority approval process for a change in protective strategy or implementation of new equipment or barriers;
- Need to maintain training;
- Degree of success observed in previous exercises.

For guidance, the full-scale exercise duration is unlikely to be less than 12 months or longer than 36 months.

2.6. FOLLOW-UP ACTIONS

Depending on the type of exercise conducted, the exercise objectives and scope will determine the extent of the evaluation process. In some exercises where a large number of resources have been dedicated, a formal evaluation process may be incorporated into the mechanisms of the conduct of the exercise. The physical protection system and actions of response organizations may be assessed by trained subject matter experts. The results should be provided in a formal evaluation report to be incorporated into an organization's corrective action programme in order to improve the effectiveness of the physical protection system. In other exercises, the participating organizations may conduct an after-action review (AAR) that would constitute a self-assessment. The AAR may then result in a lessons-learned report to support the internal improvement of an organization's tactics, policies, procedures, or other additional physical protection measures. The actions and physical protection system should be evaluated in order to gain value from the resources that have been dedicated, even if it is as simple as a participant debrief.

The evaluation of an exercise identifies areas of the security plan, contingency plan or response capabilities that may need to be improved or enhanced. As a result of an exercise evaluation, there may also be recommendations on ways to correct the identified deficiencies or weaknesses. However, it will be the responsibility of each organization, and possibly the competent authority, to review the evaluation report and to determine which corrective actions need to be adopted. These could include the following:

- Changing plans and procedures (e.g. modifications of tasks and responsibilities, more appropriate response goals and procedures, more or fewer details);
- Upgrading equipment, assessment tools and information material;
- Improving training, drills and exercise programmes in identified weak response areas.

Subsequently, corrective action plans could be developed. These plans identify:

- Corrective action tasks;
- Responsible persons;
- Implementation schedule.

The implementation schedule would depend on the types of issue, the associated procedure or the element of the security plan and operations. Table 2 provides an example of a follow-up action schedule based on the classification of deficiencies and weaknesses.

TABLE 2. EXAMPLE OF A FOLLOW-UP ACTION SCHEDULE BASED ON THE CLASSIFICATION OF DEFICIENCIES AND WEAKNESSES OF THE OVERALL EFFECTIVENESS OF THE PHYSICAL PROTECTION SYSTEM

Deficiency or weakness	Corrective action
Critical	<ul style="list-style-type: none"> — Compensatory measures to be enacted immediately; — Solution to be identified within one month; — Corrections to be implemented within three months or prior to next full-scale exercise.
Major	<ul style="list-style-type: none"> — Compensatory measures to be enacted immediately; — Solutions to be identified within one month; — Corrections to be implemented within six months or prior to next full-scale exercise.
Minor	<ul style="list-style-type: none"> — Compensatory measures to be enacted immediately; — Solution to be identified within three months; — Corrections to be implemented within one year or at the next revision of plans.

The implementation plan progress should be tracked; completed items should be recorded and reported to facility management and the competent authority.

As part of the formal review process, the exercise itself should be evaluated in order that subsequent exercises may be more effective in the future. At a minimum, answers to relevant questions should result from the formal review process, such as:

- Was the stated purpose of the exercise appropriate?
- Were the objectives clearly defined?
- Was the scenario effective in achieving the purpose and objectives?
- Was the exercise challenging enough?
- Were the correct organizations and individuals involved?

2.7. EXERCISE PROGRAMME

Exercises are an integral part of the process to develop, maintain and improve both the security plan and the contingency plan. The operator should consider the competent authority's requirements and expectations for having exercise programmes.

An exercise programme typically includes a detailed one-year plan and a more general long-term plan. The one-year plan describes:

- A statement about the purpose and objectives of the one-year plan;
- The types of exercises to be conducted;
- Any relevant changes in the threat assessment or the DBT;
- The nature and category of the target sets being protected;
- Identified critical or major deficiencies or weaknesses that need to be exercised more frequently;
- The tentative schedule for the exercises;
- The participating organizations.

The long-term plan identifies the exercises that should be carried out over the next several years (e.g. five) as set by the appropriate competent authority. This plan should be adequately detailed for partial and full-scale exercises, which require advanced planning. The long-term plan should also address the requirement for other exercises, but their detailed schedule and specifications would normally be part of the one-year plan.

Consideration should be given to the following factors in the development of the long-term plan:

- All response objectives identified for each organization should be covered over the period stipulated in the long-term plan;
- Adjustment of the exercise programme based on lessons learned from previous exercises;
- Identified minor deficiencies or weaknesses need to be exercised more frequently;
- The scenarios and event types to be considered should cover a broad range of postulated events;
- All designated personnel should participate as players on a regular basis;

- The exercise programme should take into account the schedule for the revision and improvement of plans, procedures, assessment tools and equipment.

A record of implemented activities and of the participation of individuals in exercises should be made by the operator to monitor the achievements of the exercise programme.

3. PREPARATION

3.1. PROCESS MANAGEMENT

3.1.1. Organization for the preparation of an exercise

A typical exercise preparation organization is shown in Fig. 2.

The exact structure and number of people involved depend on the scope of the exercise. The functions and associated roles presented are common to any exercise. The exercise director should ensure that responsibilities are clearly assigned.

In the interest of exercise integrity, the members of the exercise preparation team with any knowledge of the scenario should not become players during the exercise. Some, if not all of the members of this team, will most likely be part of the core group for the control and conduct of the exercise.

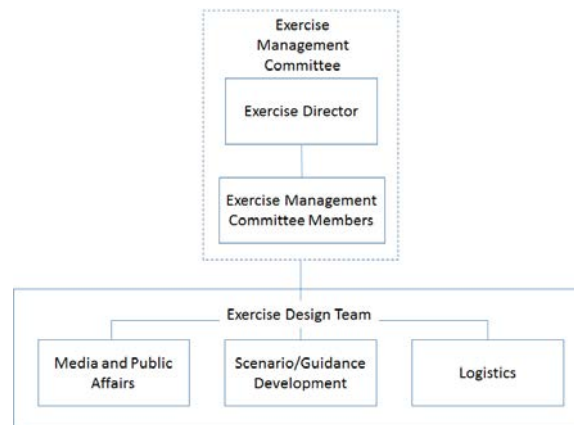


FIG. 2. Typical organization for the preparation of an exercise.

3.1.1.1. Exercise management committee

The exercise management committee may consist of:

- Exercise director;
- Lead controller(s), which may also include a separate adversary controller;
- Lead evaluator;
- Representatives from involved on-site and off-site organizations.

The exercise management committee should consist of senior decision makers and planners drawn from key participating organizations and possibly involved competent authorities. The chair of the exercise management committee is normally the exercise director.

This exercise management committee is responsible for, but not limited to, the following:

- Determining the exercise specifications (see Section 3.2);
- Approving the exercise evaluation criteria;

- Approving the guide for controllers and evaluators;
- Approving the guide for players;
- Selecting the scenario development team and assigning all major functional responsibilities within the exercise preparation organizations;
- Reviewing the exercise scenario periodically to ensure that it remains consistent with the exercise specifications;
- Approving the media and public information strategy;
- Selecting the exercise controllers and evaluators;
- Approving the presence of observers;
- Liaising with the organizations and individuals in charge of the other major exercise related items and tasks.

3.1.1.2. Exercise scenario/guidance development team

The scenario development team is responsible for the development and validation of the exercise scenario and exercise manual, guides and evaluation criteria in accordance with the exercise specifications. Those specifications are described in detail in Section 3.2. Scenario and exercise information development are addressed in Sections 3.3 and 3.4. The suggested outline of the exercise manual is presented in Section **Error! Reference source not found.**

The exercise scenario/guidance development team is comprised of:

- Security personnel with a thorough knowledge of the vulnerability assessment, DBT, physical protection system and the contingency plan;
- Technical specialists with a thorough knowledge of relevant plans as well as operational and security arrangements;
- Other representatives from the participating competent authorities, as appropriate;
- Persons knowledgeable in developing exercise evaluation criteria and guides for controllers, evaluators and players.

This team should involve people from all functional areas being exercised. Proper coordination of input and knowledge of plans and procedures are key in ensuring that the exercise remains realistic.

It is essential that one person be given overall responsibility for the preparation and organization of the exercise scenario. This person should have knowledge of the relevant vulnerability assessment, DBT, physical protection system and contingency plan, and be familiar with the area of the exercise and its surroundings. Other technical specialists may help by providing inputs for their respective parts of the scenario, but the responsible person should coordinate and consolidate all inputs to ensure that there are no conflicts and that the exercise objectives can be met.

3.1.1.3. Logistics

The logistics function (see Section 4.1.4) can be carried out by a team or assigned to an individual member of the exercise management committee or support staff, depending on the scope of the exercise. Logistical preparations include, but are not limited to, the following:

- Making hotel reservations or other accommodation;
- Reserving conference room workspace, which is required for the entire exercise control and evaluation team the day before the exercise, and for the evaluators following the exercise;
- Obtaining supplies (do not expect that controllers and evaluators will bring their own supplies);
- Arranging proper transportation;
- Food catering;
- Organizing communications for the controllers and evaluators;
- Obtaining safety equipment;
- Provisioning for medical support;
- Processing identification badges;
- Producing and distributing copies of the scenario, guides for controllers, evaluators and players.

It should be ensured that the use of exercise radio frequencies do not interfere with those used by on-duty security forces. Similarly, it should be ensured that radio frequencies used by exercise controllers and evaluators are different from those used by players or emergency services. The list of phone numbers and radio frequencies to be

used by controllers should be available and distributed in advance. All numbers and frequencies should be tested one day prior to the exercise.

Prior to the exercise, it is necessary to determine those who will need special protective equipment when safety requirements are in place.

All controllers and evaluators should wear distinctive identification. This could be a vest, armband, badge or a distinctive hat. The distinctive identification chosen should be identical for all controllers and evaluators.

It is important that spare copies of the exercise logistics instructions be brought to the briefing the day before the exercise.

3.1.1.4. Media and public affairs

The media and public affairs team (see Section 3.5) is responsible for:

- Formulating the strategy for managing the real media in the period leading to and during the exercise;
- Assisting the exercise director in his/her duties as official spokesperson;
- Leading the preparation of media simulation for the exercise, if it is required in accordance with the exercise objectives.

3.1.1.5. Participants

The exercise developers may consider the following positions of responsibility and the personnel when planning for exercises:

- **Lead controller:** The lead controller has overall knowledge of security operations and is responsible for the control and conduct of all aspects of the planned exercise activities. This individual may be selected from the security staff or from another organization, as appropriate.
- **Controllers:** Individuals assigned to specific participants or areas who have the necessary training to observe, evaluate and control the exercise activities of their assigned participant or control area.
- **Lead evaluator:** The lead evaluator is responsible for coordinating the evaluation of the exercise. Depending on the purpose and exercise objectives, they may evaluate aspects including the validity of the plan(s) being exercised, the performance of the participants, interagency coordination and interfaces.
- **Evaluators:** Individuals assigned to specific locations who have the necessary training to evaluate the exercise activities.
- **Adversaries:** Appropriately equipped and trained mock attackers with the required physical abilities to engage the exercise participants in an armed attack to test their ability to defend against the threat. Within the control and safety parameters established for the exercise, the adversary team will actually perform the normal physical and tactical activities (such as movement, communication and carrying of simulated explosives and equipment) required to accomplish their assigned mission. To execute such operations and tactics, it is essential that adversary team members are trained in small unit tactics and scenario planning. Typically, the adversary force is drawn from the operator's security force, from other facilities, or from law enforcement tactical response units.
- **Insider:** A knowledgeable individual(s) who provides active (assistance) or passive (information) help to the adversaries. This individual could be a member of the facility technical staff, operations staff, or the security force. Before an exercise, sufficient time should be allotted for the adversary team to gain intelligence information from the insider.
- **Central alarm station (CAS)/backup alarm station (BAS) participants:** Security force members stationed at the alarm stations who will perform CAS/BAS duties as participants during the exercises. They will be briefed on exercise conditions as required.
- **Security exercise players:** Security responders who respond to the mock security contingency event (e.g. guards, response team leaders, alarm station operators, armed responders and armed security officers designated as a component of the protective strategy).
- **Facility operations participant(s):** Individual(s) who are normally assigned to a command and control function. This participant is required only when significant simulated facility operations are expected from the scenario. Only facility operator actions listed in a target set should be used in determining whether an entire target set was compromised. If credit is taken for facility operator actions, an evaluation should be conducted to ensure that actions credited as part of the target set for mitigation or recovery are achievable under the postulated scenario conditions.

3.1.1.6. Key points and timeline

Key points in the preparation of an exercise should include, but are not limited to, the following:

- Defining the objectives of the exercise;
- Establishing the timeline;
- Preparing a clear scenario, including all associated data, that meets the objectives of the exercise;
- Identifying clearly and fulfilling all logistical requirements, such as data presentation, communications and tools required by the players;
- Implementing measures to ensure that the players' roles and responsibilities are clearly understood by all;
- Explaining that players need to be pro-active and resolute;
- Explaining, as required, that the exercise may be recorded.

A representative timeline for managing the preparation process is presented in Appendix I.

3.1.2. Process scope and overview

3.1.2.1. Process scope

All contingency response exercises, from TTXs to full scale, require preparation and management. Owing to the level of complexity, the processes outlined below are focused on the planning of partial and full-scale exercises. However, these processes are also beneficial in the development of drills and simulations such as TTXs and battleboards.

3.1.2.2. Process overview

The duration of the process is dependent on the complexity of the exercise and the targeted level of participation. Preparing a partial or full-scale exercise can take three to six months. Presented below are the general steps involved in the process, which are further examined in subsequent sections. The timeline provided is meant only as an example and can be adjusted, taking into account:

- Scope of the exercise;
- Diversity of participating organizations;
- Amount of exercise data that would be prepared;
- Availability of people and organizations;
- Level of priority of the exercise over other planned activities.

(a) Step 1 (several months prior)

- (i) Appoint an exercise management committee where the director also assumes the role of chairperson. A model for the committee's structure and its members' roles and responsibilities is described in Section 3.1 (all, TTXs, computer simulation, drill, partial/full scale exercises);
- (ii) Develop the exercise specifications (see Section 3.2);
- (iii) Obtain approval on the exercise specifications from major stakeholders;
- (iv) Distribute the exercise specifications to all participating organizations;
- (v) Define the policy to manage the real media in the context of the exercise (see Section 3.5).

(b) Step 2 (6 months prior)

- (i) Appoint a scenario design team. A model for the committee's structure and its members' roles and responsibilities is described in Section 3.1;
- (ii) Begin developing the scenario and exercise data (see Sections 3.3 and 3.4). The exercise management committee will periodically review the data to ensure that they remain consistent with the exercise specifications;
- (iii) Begin developing the exercise controller and evaluator guides, starting with the evaluation criteria;
- (iv) Develop the lead controller checklist (see Appendix IV);
- (v) Begin preparing a risk assessment, risk mitigation and exercise security plan for the exercise.

- (c) Step 3 (5 months prior)
 - (i) Validate the exercise scenario concept with specialists in the relevant fields. These specialists should not be players in the exercise;
 - (ii) Develop training, drills and exercises leading to the date of the major exercise, making full use of TTXs for managers and coordinators. If the exercise is partial scale, limited scope or intended to determine the current state of transport security without bias, this step may be omitted. However, since large-scale exercises often involve people who have had a limited amount of facility security response training, this step can be a useful part of the overall contingency response programme.
- (d) Step 4 (2–3 months prior)
 - (i) Conduct drills and TTXs;
 - (ii) Identify logistical requirements and begin making arrangements;
 - (iii) Develop a media briefing package (see Section 3.5);
 - (iv) Identify by name all controllers and evaluators;
 - (v) Make arrangements for observers;
 - (vi) Keep in mind that some participating organizations may need to develop their own internal exercise guide with the necessary information to ensure that staff members participate effectively;
 - (vii) In exercises involving a large number of organizations, this would be the deadline for the exercise scenario, evaluation guide, coordination mechanisms and communications protocols.
- (e) Step 5 (1 month prior)
 - (i) Complete preparation of the scenario and exercise data;
 - (ii) Complete the guide for exercise controllers and evaluators;
 - (iii) Distribute the guide for exercise controllers and evaluators to the exercise control and evaluation team members;
 - (iv) Develop the guide for exercise players.
- (f) Step 6 (2 weeks prior)
 - (i) Distribute the guide for exercise players to every participating organization and observer, as needed.
- (g) Step 7 (1 week prior)
 - (i) Hold a final meeting of the exercise management committee to review the exercise scenario and data, the guide for controllers and evaluators and the arrangements made in preparation for the exercise, and obtain needed concurrences;
 - (ii) Agree on the media releases for the real media (see Section 3.5);
 - (iii) Finalize logistical arrangements;
 - (iv) Complete and publish an exercise telephone/fax/email/radio communication list for the organizations and people being simulated. This list of simulated contact information is to be used by players during the exercise in lieu of real contact information. All numbers and frequencies should be tested.
- (h) Step 8 (At least 2 days prior)
 - (i) Train the exercise controllers and evaluators, including familiarization visits if needed;
 - (ii) Ensure exercise controllers and evaluators customize their guide so that they may readily obtain the information they need;
 - (iii) Make the final amendments to the scenario and exercise input and data lists, if needed. It is preferable not to make any significant changes, as even a single small change can have major repercussions on the overall scenario. Before a modification is made, the implication on all other aspects of the scenario would be carefully considered;
 - (iv) Occasionally, a full-dress rehearsal may be scheduled prior to the exercise. This is not absolutely necessary, but it allows for issues to be resolved (e.g. weapon issuing, timelines, changes in strategies, logistics) with respect to the players and exercise organizations. To protect the integrity of the actual exercise, different scenarios are exercised during the full-dress rehearsal.

Care should be taken to ensure that exercise players are not given access to information that would give them knowledge of the exercise scenario or allow them to anticipate upcoming actions. Additionally, certain tactics and responses associated with a nuclear security event may be sensitive and need to be treated accordingly.

3.1.3. Exercise planning process

Planning is the art and science of envisioning a desired future and laying out the effective ways of bringing it about. As with any other training event, there needs to be deliberate planning to ensure the success of the event. Exercises are no different. The size and complexity of the exercise determines the level of planning necessary to ensure success. Elements that dictate the complexity include the scope, type and duration of the exercise, as well as the number of participating agencies, the seniority of the stakeholders involved and the public perception of the exercise.

This guide addresses all necessary elements needed in planning an exercise. However, as the sponsoring agency works through the planning process, it is necessary to effectively communicate the elements in the planning process. This is typically done through the use of meetings or planning conferences. Typical meetings and conferences in support of exercise are:

- Concept and objectives meeting;
- Initial planning meeting;
- Scenario development meeting;
- Mid-planning meeting;
- Controller and adversary event logs meeting;
- Final planning meeting.

The need for, size and duration of the above-mentioned meetings depends upon the complexity of the exercise, the familiarity of all the participating agencies and the timeline.

3.1.3.1. Concept and objectives meeting

For information on concept and objectives meetings, please refer to Pages 3–4 of Ref. [8].

3.1.3.2. Initial planning meeting

The initial planning meeting is one of the most important meetings for an exercise. It is during this meeting that the foundation for exercise development is laid out. The purpose of this meeting is to determine the objectives, levels of participation and scenario variables from each participating agency, as well as to gain concurrence from the exercise planning team on scope, design requirements and conditions.

Points that should be covered during this meeting include:

- Ensuring objectives are clearly defined and measurable;
- Incorporating the following:
 - Contingency response and emergency operating plans and/or relevant agency standard operating procedures;
 - Identifying local issues, concerns, or sensitivities;
 - A ‘teamwork’ approach.
- Identifying the exercise design team members for:
 - Scenario/guidance development;
 - Logistics;
 - Media and public affairs.
- Developing a planning schedule.

In an effort to make this meeting as productive as possible, ensuring that all attendees are properly informed is critical. A common practice to help facilitate the necessary communication of information that will make this meeting more efficient is to send ‘read ahead’ documents, such as:

- Concept and objectives papers;
- Agenda;
- Briefings to present an overview of the exercise to the planning team:

- Purpose;
- Goals;
- Objectives;
- Narrative.

During the meeting, the topics to be discussed, agreed upon and actions to take are as follows:

- Clearly defined, obtainable and measurable objectives;
- Exercise narrative;
- Identifying major events;
- Identifying scenario variables (e.g. threat scenario, number of casualties, venue);
- Participating agencies and organizations;
- Identifying and recruiting subject matter experts and facilitators;
- Assigning responsibility for exercise document development and presentations/briefings;
- Acquiring all source documents (e.g. policies, plans, procedures) needed to draft exercise documents and presentations;
- Identifying and assigning responsibility for logistical issues (e.g. registration, badges, invitations);
- Establishing dates for completion of action items and tasks;
- Developing a planning schedule;
- Identifying critical tasks for the next meeting.

As with any effective meeting, it is important that there is follow-up in order to document and communicate to all stakeholders the next steps to be taken. The minutes from the initial planning committee should be prepared and disseminated among planning team members within four working days of the meeting's conclusion. Direct and continual contact should occur among all members of the exercise planning team regarding outstanding information and the logistics for conducting additional planning meetings and the exercise itself.

3.1.3.3. Scenario development meeting

The scenario development meeting is designed to bring together all necessary planners who would be involved in developing, validating and implementing the scenario of the exercise. The level of formality and participation is dependent upon the complexity of the exercise and the direction taken by the lead controller. It is during this meeting that the scenario is drafted and that concurrence that the scenario will support the exercise objectives and lies within the scope and abilities of the exercise participants is established.

A final scenario may take multiple meetings and extensive collaboration to complete. This meeting is the kick-off to the scenario development process, as noted in Section 3.3.

3.1.3.4 Mid-planning meeting

The mid-planning meeting is not obligatory and the need and purpose for convening it would be determined by the lead controller. Depending upon the complexity of issues facing the exercise design team, this meeting affords the lead controller the opportunity to check in officially with his/her staff and with other identified stakeholders to receive status reports on deliverables, action items, problems or other issues that may impact the conduct of the exercise.

3.1.3.5. Controller and adversary event logs meeting

The controller and adversary event logs meeting is dependent upon the complexity of the exercise. During this meeting, the controller and event logs are developed and agreed upon by the exercise planners in order to effectively coordinate and synchronize the events with the injects that will drive the play of the exercise. The controller and adversary event logs will link the simulations to the actions of the participants, with the intention of enhancing the participants' exercise experience.

3.1.3.6. Final planning meeting (FPM)

Information on the final planning conference may be found in Refs. [8] and [9].

3.2. DEVELOPING THE EXERCISE SPECIFICATIONS

This section describes what should be included in the ‘exercise specifications’ portion of the exercise manual.

Determining the exercise specifications is the first step of the exercise preparation process. The exercise specifications consist of the scope, objectives and constraints related to the exercise. No other work can proceed until the exercise management committee has agreed upon these specifications.

3.2.1. Exercise purpose

Since no single organization can independently address the issues associated with a nuclear security event at a facility, it is important that agencies exercise their ability to effectively respond and mitigate the impact of such events. The purposes of an exercise establish the reasons why an exercise will be conducted. Common purposes include:

- To satisfy competent authority requirements to conduct exercises;
- To address public concerns about the security of facilities;
- To provide greater consistency in response actions taken by agencies responsible for these events;
- To build stronger relationships among agencies and responding personnel;
- To implement the safety–security interface process;
- To identify vulnerabilities to be addressed after the exercise;
- To demonstrate the capabilities of responders and equipment;
- To evaluate new procedures or other operational requirements and/or competent authority requirements.

Once the type of exercise (see Table 1) that best facilitates the purpose is selected, then the scope of the exercise can be established.

3.2.2. Exercise scope

The exercise scope should be determined before any significant other work on the exercise scenario begins. The scope of the exercise includes:

- Selecting the organizations that will participate and the extent of their participation;
- Deciding on the time and duration of the exercise;
- Determining the extent of the actions that will be carried out during the exercise.

The extent of participation by organizations, teams or individual specialists depends on the purpose of the exercise. In the case of partial exercises, the presence of some organizations may not be essential and others need only be observers.

Each participating organization, especially large ones, should clearly identify which internal sections, departments or individuals will participate in the exercise, to what extent they will participate, and which restrictions they will be subject to. These should be consistent with the exercise objectives.

Decisions related to the selection of exercise planners, players and evaluators may include the following questions:

- What role would the individual best serve for the organization to benefit?
- Does the individual need to have a specific background and experience in the role they will serve or will training be needed?
- Since the planning cycle of an exercise can take several months/years, have alternates been selected to fulfil the roles?
- Will there be enough qualified non-players to serve as role players, safety personnel, etc.?

In planning an exercise, other considerations include:

- Time availability of each organization’s representative in planning the exercise;
- Selecting exercise dates that are not in conflict with major events or holidays;
- The total number of personnel that potentially could be involved and the logistical support needed for the duration of the exercise;

- Selecting exercise sites, with consideration given to operational needs of the exercise, site security and safety of both the exercise participants and the public.

When government organizations such as national departments or ministries are involved, a considerable amount of lead time to prepare may be needed.

3.2.3. Exercise objectives

Exercise objectives define specific expected outcomes from the exercise. They identify participants' roles according to an established standard. Well-defined objectives provide a framework for scenario development. The establishment of exercise objectives should consider the following:

- The exercise objectives have primary significance as they drive the entire exercise. All preparation and conduct efforts (e.g. defining the scenario, inviting participating organizations) are devoted to achieving the exercise objectives, and the evaluation is focused on assessing the extent to which the objectives are met;
- It is important to distinguish between response and exercise objectives. For the response, all the goals and objectives are well defined. Conversely, during an exercise, owing to its artificial nature and limitations in terms of time and space, the response objectives cannot be fully met (see Section 3.2.4). Therefore, exercise objectives are to be derived from the response objectives with due consideration given to the actual circumstances. The closer the exercise objectives are to the response objectives, the closer the exercise will be to representing a real response;
- Tangible success/evaluation criteria should be developed on the basis of exercise objectives during the preparation of a security exercise.

Objectives should be:

- Specific: the objectives should state clearly exactly what is to be accomplished and for whom, in terms of end results;
- Measurable: the objectives should state clearly the standard expected based on the objective to be achieved. An effective objective utilizes quantitative and qualitative measures;
- Agreed upon: the objectives should be the result of collaboration between agencies and, when needed, mutually agreed upon;
- Realistic: the objectives should be realistic, yet challenging. Objectives should be based on facts, analysis and knowledge;
- Time parameters: the end result specified should be accomplished within a certain time period, not merely 'in the future'.

In writing objectives for an exercise, a distinction should be drawn between organizational and individual tasks. The results of the exercise may identify the strengths or weaknesses of the organizations but not typically individual abilities or capabilities.

Although exercise objectives address the interactions between organizations, each organization may, in addition, develop specific objectives it wishes to evaluate. As an example, command and control may be an objective for the exercise, but an organizational specific objective may be the ability to use a new communication system to understand the restrictions associated with distance and terrain.

An exercise for a nuclear security event at a facility may include objectives such as:

- Demonstrate efficient and effective notification and alerting procedures and methods;
- Demonstrate the precise and clear transfer of responsibilities, if appropriate;
- Establish an effective command and control system at all levels in a multi-agency and multi-jurisdictional response environment;
- Develop an appropriate plan for precautionary protective actions in the case of a credible threat;
- Demonstrate the reliability and effective use of communications equipment, procedures and methods between relevant organizations, such as:
 - Between the CAS/BAS and the control room;
 - Between the CAS/BAS and any relevant off-site law enforcement authority.
- Demonstrate the ability of the CAS/BAS or the control room to integrate its activities with those of other relevant participating organizations;
- Demonstrate the CAS/BAS's or guards' ability to recognize and respond to a nuclear security event;

- Demonstrate the ability to communicate threat related information to the competent authority during the security event;
- Demonstrate all organizations' knowledge of, adherence to and ability to implement the contingency and other relevant plans;
- Demonstrate the ability to conduct a post-exercise review to determine areas requiring further capability improvements;
- Demonstrate the ability of on-shift security and operations personnel to coordinate with the incident commander regarding deployment of on-site and off-site first responders in a post-attack environment;
- Demonstrate the functional responsibilities or problem solving capabilities of the CAS/BAS, guards and other relevant organizations;
- Assess the scenario events in terms of credibility, capability and potential consequence;
- Communicate effectively the threat to relevant response and emergency organizations.

3.2.4. Exercise constraints

Exercise objectives are often subject to constraints imposed by practical considerations. For example, it may not always be possible to start the exercise in the middle of the night, even though this would allow a useful test of the functions at a time when people are least available. Financial resources may also be limited and therefore prevent the conduct of an exercise lasting more than one day. There may be other priorities and political or other considerations that restrict the time available for the exercise, or that limit the participation of important organizations. Constraints should be identified early in the process to avoid wasting efforts on designing an exercise that cannot be implemented.

3.2.5. Confidentiality

Prior knowledge of exercise scenarios is normally restricted to controllers and evaluators. However, for exercises testing response to situations resulting from malicious acts, there are special needs for confidentiality in order to protect sensitive information about physical protection systems and their possible vulnerabilities that could otherwise be used by potential perpetrators of such acts.

Care should also be taken to ensure that exercise players are not given access to the scenario or to any part of the exercise manual that would give them knowledge of the scenario that would allow them to anticipate upcoming actions. Also, certain tactics and responses associated with a nuclear security event may be sensitive and need to be treated accordingly.

Additionally, the need for confidentiality provides a challenge during conduct and evaluation, as well as preparation, which should be properly managed. Special attention should also be given to ensure confidentiality is maintained when observers are present during an exercise.

3.3. DEVELOPING THE EXERCISE SCENARIO

This section describes what should be in the 'scenario' portion of the exercise manual.

3.3.1. Introduction

Ref. [3] recommends that exercises be conducted to assess and validate physical protection measures and the physical protection system, including the timely response of the guards and response forces. In doing that, appropriate State response organizations, operators and other relevant entities should conduct exercises to assess and validate associated contingency plans, including testing interfaces with emergency plans.

Exercise scenarios should cover measures designed to prevent and respond to malicious acts, including sabotage of facilities and activities, in order to minimize or mitigate the radiological consequences of an act of sabotage.

3.3.1.1. Getting started

The first step is defining a broad scenario outline that reflects and supports the various objectives of the contingency response exercise.

Depending on the exercise scope, the scenario may need to be divided into several phases, each focused on a particular aspect of the security or contingency plans. For example, in the case of a contingency response exercise,

the scenario should at least include the actions of the guards or response forces and associated support agencies. Once the normal operations are exercised, a second phase of the exercise may include replicating malicious actions to test a particular contingency plan.

In this example, the normal scenario would contain all the actions needed by the guards or response forces to carry out their mission. It would be driven by the normal operating procedures and environment in which the guards or response forces would respond to an adversarial threat at a facility. The hostile phase of the scenario would then be driven by an adversary's actions based on the adversary's capabilities and goals.

To the extent possible, the scenario should exercise the judgement, knowledge and training of the security and response force personnel, emergency operations staff and other off-site personnel under simulated hostile conditions. The scenario development team can best accomplish its objectives by ensuring that the simulated hostile action provides the same type, form and sequence of information as would actually be available during an attack or unknown emergency.

The scenario development team should ensure that the scenario outline is reasonable and realistic and that it will allow all exercise objectives to be tested within the existing constraints, such as the DBT or threat assessment. Once a firm scenario outline has been agreed upon, the team is ready to fully develop and document the scenario.

3.3.1.2. Components of an exercise scenario

A general outline of the scenario should include, but not be limited to, the following:

- Exercise narrative;
- Tactical description;
- Key events and adversary timeline;
- Start state (initial conditions);
- Detailed sequence of events:
 - Controller event log;
 - Adversary event log.
- Exercise inputs and information.

These elements are discussed in more detail below, with the exception of exercise inputs and information, which are discussed in Section 3.4. Examples of sample controller and adversary event logs are given in Appendix VI.

3.3.1.3. Challenging the players

The simulated event description should also include non-essential inputs that challenge the players. For example, this could include one or more of the following:

- Large amounts of extraneous information that would compel the player to identify the most relevant aspects;
- Harsh working conditions;
- Inclement weather;
- Political pressures;
- Media pressure.

3.3.2. Scenario

3.3.2.1. Exercise narrative

The exercise narrative of the scenario is a brief overview that is often provided to describe the events involved in the scenario. It is a 'story' that contains all the main events that will drive the exercise. This description of the scenario is provided mainly for the exercise personnel and organizers who may lack the technical incentive, background or knowledge to understand the more technical scenario.

A scenario consists of three basic elements: (i) the general context or comprehensive story, (ii) the conditions that allow players to demonstrate proficiency and competency in meeting the exercise capabilities, tasks and objectives and (iii) the technical details necessary to depict scenario conditions and events accurately. The exercise planning team ensures that the design effort is not characterized by a fixation on scenario development, but rather, the scenario facilitates achievement of exercise capabilities, tasks and objectives, which are the foundation of exercise

design. Furthermore, scenarios should be constructed to avoid any sensitivity that may arise, such as the use of real names or sensitive venues.

3.3.2.2. *Tactical description*

The tactical description gives details as to the situation of adversarial actions and the events that set the scene for the exercise event. This includes, for example:

- Initiating event (e.g. explosive charges, diversion, hostile action);
- Security posture;
- External variables that contribute to or diminish guard or response force ability to accomplish tasks.

The tactical description also outlines operator actions, actions of off-site response organizations and changing plant conditions during the course of the security event.

3.3.3. Exercise events sequence

3.3.3.1. *Key events and adversary timeline*

Key events are those that take place in order for all exercise objectives to be met. The adversary timeline is the time it takes the adversary to accomplish its tasks and the key events that would occur in order to allow the participating organizations to take appropriate actions.

(a) Example 1

If the scenario is an attack postulating an attempted theft, there are typically pre-attack indicators or intelligence that supports the actions or capabilities of the adversaries. This ‘intelligence build’, depending on the exercise objectives, may be critical for the contingency response planning process.

(b) Example 2

An exercise is planned to test the response of the external security or law enforcement agencies during non-regular working hours. The simulated attack might occur after a diversionary action is initiated in the local area which causes the off-site agencies to respond to multiple events.

(c) Example 3

The simulated attack could lead to sabotage, although the desire is to test response actions to an active adversary. In this case, the attack is launched against the shipment to take the material outside of regulatory control and to be moved to a high population centre in order to inflict maximum casualties. The exercise controllers during the exercise should correct any deviation from critical timelines in order to test the parameters of moving the unauthorized removal to a higher consequence location.

3.3.3.2. *Start state (initial conditions)*

The start state describes the initial conditions as well as the context for the exercise and reflects realistic conditions. The amount of detail provided should be limited to that actually necessary for conducting the remainder of the scenario.

The start state should include, but is not limited to, the following topics:

- The characterization of the threat;
- The organizational assignments;
- The types and status of equipment;
- The weather conditions;
- The operating environment.

3.3.3.3. Detailed sequence of events

The detailed sequence of events can be described using various event logs. In emergency planning, the master event list is similar to the controller event log.

The lead controller position is ideally structured in such a manner that facilitates the control of all affected locations and the control and coordination of all events to be initiated leading up to and during the exercise. Two tools to aid in the successful planning of drills or exercises are the adversary event log and the controller event log.

(a) Adversary event log

The adversary event log describes in sequence the actions performed by the adversaries as outlined in the exercise scenario. They include, but are not limited to, the following:

- Number of adversaries and team make-up;
- Adversary movement (on-site entries and exits for all building and rooms);
- Use of cover and concealment;
- Location of planned breaches and the types of breaching tool employed;
- Use of simulated explosives, smoke grenades or remote charges;
- Deployment of equipment (e.g. ladders, rope, slings);
- Any tactics or deception used to aid the insider.

(b) Controller event log

The controller event log is a time ordered list of the major exercise events. It is a tool designed for the lead controller. The controller event log controls the pace of the exercise. A sample controller event log can be found in Appendix VI. A controller event log is often developed in table format and should contain the following information:

- Input sequence number;
- Time at which the input is to be provided;
- Scheduled time outs;
- Message, data or action that is to be delivered (identified by position);
- Any simulations that are to be utilized;
- Comments, if needed.

The controller event log provides the lead controller and the controller team with a sequence of events so that all controllers can monitor the actions of the adversary and the response force during the exercise.

The controller event log identifies the expected actions of all adversaries and response force members within the defined exercise areas and the interfaces with any required action needed, as identified in the exercise scenario or the adversary event log (e.g. determining whether a person can hear an explosion). Once these key actions and interfaces are identified, then controller actions/messages are developed. During this period, all of the needs for controller interfaces (e.g. alarm messages, simulation, and drill artificialities) are defined. During this process, any concerns (such as adversary transit though the protected area) can be addressed in the controller event log to minimize or eliminate the need for unscheduled time outs.

A well-developed controller event log is essential to the success of an exercise for:

- Ensuring the scenario starts as scheduled;
- Identifying the sequence of events based on the adversary event log;
- Keeping the scenario on schedule.

The controller event log can be used to assign controllers to monitor all exercise participant actions, to include but not be limited to the following:

- Adversary teams;
- Posts and patrols in protected areas (see Fig. 3);
- CAS/BAS operation;
- Security shift supervisor and response team leader;
- Facility operation, emergency plan and response plan during integrated exercises.

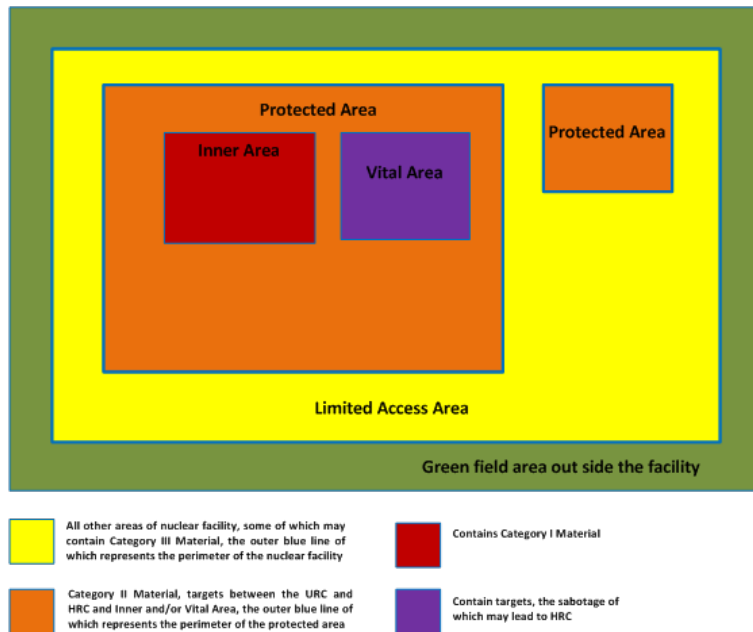


Fig. 3. Nuclear facility layout.

3.3.4. Validating the scenario and event sequences

Before a scenario is finalized, it should be validated. Scenario validation requires the help of specialists and experts in order to verify and approve the exercise scenario and event logs. Training staff are also extremely valuable in this respect. The nuclear facility engineering and safety analysis staff can be useful in both developing and validating scenarios as long as they understand the requirements and methodology of a contingency response exercise and recognize the need for conducting one.

When presenting the scenario for validation, the methodology is first explained, by starting with the exercise type and objectives. Discussions concerning personnel safety and plant conditions related to the scenario should involve specialists. Compromising elements are identified and removed. If at all possible, a scenario controller practice run should be executed (e.g. with the aid of a simulation or TTX when available).

The process of validation should include, at a minimum, that (i) adversary capabilities are within the threat assessment or DBT, (ii) there is appropriate contingency response force staffing and (iii) controller injects are realistic with respect to the scenario.

In validating the scenario and maintaining exercise integrity, information should not be shared with the players.

3.4. DEVELOPING THE EXERCISE INFORMATION

This section describes what should be included in the ‘exercise information’ section of the exercise manual.

3.4.1. General considerations

Data and injects for these exercises are similar to those for traditional nuclear/radiological emergency exercises. However, depending on the type of exercise and on the scenario, managing exercise data and injects can be a very demanding task. Potential challenges include the following:

- In the initial response to the scene of a malicious act, there may be several organizations and many emergency responders present. Radiological data and simulated injects should be provided to several people at the same time, by several controllers, in a coordinated manner. A lack of coordination on the controllers’ part could create exercise induced confusion for the players. One way to minimize this risk is by minimizing the number of injects, using stage set-up as much as possible to represent, realistically, the scene and using mock instruments to simulate field readings (e.g. radiation exposure levels, chemical agents).

- (b) One major element of nuclear security exercises is the ‘intelligence input’. This is very difficult to prepare for and to script. During a threat, hostage situation or similar event, there would be considerable intelligence resources engaged in supporting the front-line response, where the objectives will be to identify the perpetrators, their organization and their aims. There would also be actions undertaken such as psychological profiling, voice analysis and a whole range of other functions to assist in the management of the contingency. Special knowledge and expertise is needed to simulate this. Therefore, if appropriate, members of intelligence services could be included in the scenario development team.

Exercise information should be no different from real information except for the fact that it may be simulated. It provides information that is used to assess the security event and determine the response actions that should be followed in order to handle the situation. There are various ways of providing exercise information. A simple principle is to adopt a method that will most resemble reality.

The information may be presented in the form of:

- Briefings;
- Exercise injects;
- Messages;
- Tables;
- Graphs;
- Figures or pictures;
- Maps.

Several types of information are commonly used during the course of an exercise. These can be divided into three categories:

- (i) Adversary information;
- (ii) Meteorological information;
- (iii) Other information.

The information that is required to be part of the exercise manual includes all information that:

- Would normally be available to the exercise players during a real event;
- Is essential for achieving the exercise objectives;
- Is important for the exercise realism to be maintained;
- Would not be available during the exercise owing to the simulated nature of the event.

There are several types of delivery methods for the required information, one of which is through a pre-set message that is delivered by phone, fax, communiqués or other communication modes. The message should state:

- The originator;
- The person receiving the message;
- The delivery method;
- The time of delivery;
- The subject line;
- The event location;
- The message content.

3.4.2. Adversary information

Adversary information should be realistic and based on the national DBT or threat assessment. The detail level of the information is such that the confidentiality of the DBT and other arrangements is maintained.

Information includes, as appropriate:

- The type and characteristics of the adversaries (e.g. motivation, intent, number, training);
- The modus operandi (e.g. tactics);
- The firearms, explosives or other weapons used.

3.4.3. Meteorological information

The exercise scenario will normally include a specification of the meteorological conditions. In TTXs, it is easiest to use simulated or so-called ‘canned’ weather conditions. However, for force-on-force exercises, using real time meteorological information offers real advantages. One method is to state that actual meteorological conditions prevailing at the time will be used throughout the course of the exercise. This approach enables participants to consult weather forecasting organizations and to use this information to predict the likely development over time.

Meteorological information relevant to response actions and decision making may include:

- Precipitation status;
- Temperature;
- Humidity;
- Visibility;
- Lunar and solar conditions;
- Wind speed and direction;
- 12 hour forecast.

3.4.4. Other information

Other information may also be needed, for example:

- Interactions from the media and other simulated organizations;
- Response by the public;
- Radiological information.

This information may need to be highly flexible to account for the specific response during the exercise.

Depending on the scope of an exercise, radiological information may be needed (e.g. in a full-scale exercise including safety organizations). A decision should be made in terms of which information will be needed to exercise all functions associated with the exercise objectives. For an extended description and examples of radiological information see Ref. [2] (Sections 6.2 and 10.8).

3.5. PREPARATION FOR DEALING WITH THE REAL MEDIA IN THE CONTEXT OF AN EXERCISE

This section describes what should be included in the ‘media arrangement’ section of the exercise manual.

3.5.1. Liaison with the media

Any exercise, especially a large scale one, may attract media interest. Access to the exercise by the real media is strictly controlled. The presence of the real media presents several challenges, including the following:

- The real media can interfere with the conduct of the exercise;
- The real media may interfere with the simulated media;
- The presence of simulated and real media can confuse the players;
- The media may mistake the exercise for a real emergency;
- The results of the exercise can be misinterpreted by the real media and cause an unnecessary crisis after the exercise, especially if the exercise revealed areas for improvement in the plans and procedures.

Hence, it is important to develop an effective organization and strategy to interact with the real media. This strategy should be implemented several weeks or months prior to the exercise.

3.5.2. Media and public arrangements and guidelines

3.5.2.1. Strategy

There should be a clear strategy for dealing with media and public requests for information concerning an exercise. It is preferable that the strategy be consistent for all exercises rather than specific for each exercise. If outside organizations (e.g. federal, provincial or municipal authorities) are participating in the exercise, a joint or

coordinated, information strategy should be adopted. A strategy which considers the preceding points will reduce the opportunities for misinformation and confusion and a consequent loss of credibility for all concerned.

At any given time, the media may be viewed as any or all of the following: a possible asset, a potential resource or a time-consuming liability. It is preferable that the media strategy foster a positive relationship with the media so that they are an asset and a resource. In general, the exercise should be viewed as an opportunity to inform the real media that there are plans and procedures in place to deal with nuclear security events.

3.5.2.2. Media arrangements

If a decision is made to engage with the media, then the following arrangements should be considered:

- **Media announcement.** The purpose of the media announcement is twofold: to disseminate timely and accurate information to the public and to keep the media informed. The announcement should include a brief description of the exercise, including the approximate date, time and purpose. A phone number for public enquiries should also be included. The person(s) responsible for answering the phone should be properly briefed.
- **Media briefing.** For TTXs and field exercises, a media briefing prior to the exercise may be presented. This should be in addition to any media announcement. The purpose of the briefing is to keep the media informed and to integrate them into the overall exercise process.
- **Media photo opportunity.** A particular exercise, for example a field exercise, may lend itself to media coverage such as a photo opportunity. This does not obviate the need for a media announcement and possibly a media briefing.
- **Media participation.** TTXs and field exercises may lend themselves to actual media participation in the exercise. This does not obviate the need for a media announcement and a media briefing. Media participation could include any or all of the following: briefings, photo opportunities, interviews, media scrums and reporters providing spontaneous or scripted inputs.

In general, an effective real media strategy contains the following key points:

- The real media is informed of the exercise prior to its conduct;
- The media is informed of the purpose of exercises, emphasizing the fact that it is normal and desirable to find deficiencies, weaknesses and areas for improvements as a result of exercises;
- A separate section/department of the exercise organization manages the media during the exercise; the personnel in this group should not be players in the exercise. It should be communicated through the entire exercise organization that all communication regarding the media is to be made through the dedicated department.

For all of the above, a spokesperson should be appointed. This person should be an articulate representative and who is thoroughly familiar with the facility and with the particular exercise. This person should also have current media training (public affairs).

3.5.2.3. Public notification

Persons who may be concerned about or affected by exercise play should be notified of the exercise prior to its commencement or as soon as possible after the start of the exercise, commensurate with the exercise aim and objectives, taking into account information security considerations. For example, persons residing in the immediate vicinity of a facility exercise should be informed of the time, nature and scope of the exercise. By doing so, the potential for conjecture, unfounded rumour or possible panic is reduced or avoided. Therefore, the public information strategy is one of open dialogue geared to promoting public interest, awareness and goodwill. The normal method for informing the public is through a media announcement.

3.6. SPECIAL CONSIDERATIONS

3.6.1. Observers

Observers may be invited to attend and view an exercise. While observers may learn from their experience, they should not be allowed to disrupt the exercise, to prevent it from achieving its purpose and objectives or to interact with the players. Arrangements are made prior to the event in order to manage observers in a controlled manner. The groups should be split into smaller more manageable units and arrangements made for their transportation and

visits to particular locations. Observers should be escorted and not allowed to roam freely. Controllers or evaluators may ask observers to leave if they are disrupting the teams or delivery of the plan(s). Interest group representatives can make good observers. Observers should be briefed about their expected conduct before the visits to the exercise location.

3.6.2. On-duty security force

The on-duty security force comprises non-drill personnel who ensure that all requirements identified in the site-specific security plan and procedures are satisfied during the exercise. On-duty security force personnel are briefed on the exercise and how live weapons will be identified and controlled during the exercise.

3.6.3. Others

Depending upon the scenario and the level of the exercise, other persons or organizations (e.g. exercise site management, representatives of local/national authorities) may be involved in exercise planning and conduct and evaluation.

The sections suggested for inclusion in the exercise manual include the following:

- Exercise specifications (Section 3.2);
- Exercise scenario (Section 3.3), where confidentiality may preclude inclusion in the exercise manual;
- Exercise information (Section 3.4);
- Media arrangements (Section 3.5.2.2);
- Confidentiality (Sections 3.2.5 and 3.4.2);
- Logistics (Section 4.1.4);
- Safety and security (Section 4.1.6);
- Player guide (Section 4.2);
- Controller guide (Section 4.3);
- Evaluator guide (Section 4.4).

4. CONDUCT AND EVALUATION

4.1. GENERAL INFORMATION

4.1.1. Exercise control and evaluation organization

The exercise control and evaluation team is responsible for the conduct and evaluation of the exercise. It is important that controllers and evaluators are appropriately selected and that they are familiar with their role and the steps involved in conducting an exercise.

Ideally, controllers and evaluators are not the same individual. Both exercise control and exercise evaluation are full-time jobs. However, during operator evaluated exercises, owing to staff restrictions or physical constraints (e.g. space limited to one extra passenger in a survey vehicle), a controller may also be an evaluator.

Although controllers are not officially part of the evaluation team, they may have valuable input to contribute towards the evaluation process and should be debriefed by the evaluation team.

A typical exercise control and evaluation team is shown in Fig. 4.

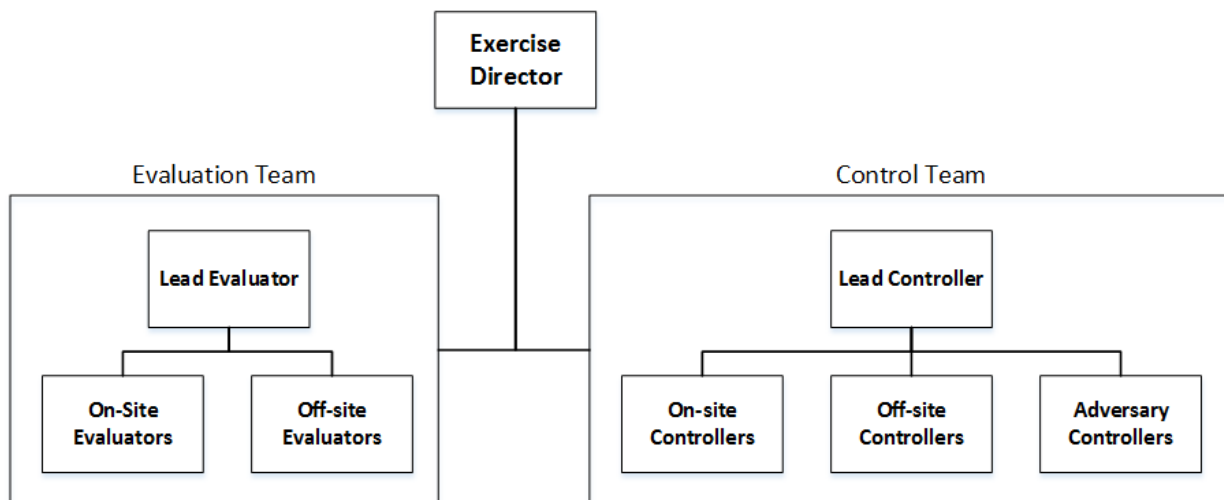


FIG.4. Typical exercise control and evaluation teams.

- **Exercise Director**—responsible for the overall exercise, its preparation, conduct and evaluation;
- **Deputy Director** (as needed)—assists the Exercise Director and assumes the role of Director in the Director’s absence;
- **Lead Controller**—responsible for the conduct of the exercise;
- **Control Team Chief/Assistant Lead Controller** (as needed)—for larger drills and exercises, at the discretion of the Lead Controller, Control Team Chiefs may be assigned and will be responsible for directing all functions of his/her respective on-site, off-site or adversary teams and subordinate elements;
- **On-site, Off-site and Adversary Controllers**— responsible for their respective team actions. This may include verifying that the controller and adversary sequence of event logs are adhered to and that free play/simulation injects are made such that the purpose and exercise objectives are achieved;
- **Lead Evaluator**—responsible for coordinating the evaluation of the exercise;
- **On-site and Off-site Evaluators**—responsible for their respective team actions. Depending on the purpose and exercise objectives, they may evaluate aspects of the exercise (e.g. validity of the plan(s) being exercised, the performance of the participants, interagency coordination and interfaces).

4.1.2. Schedule

The exercise instructions should include a schedule detailing the timings for:

- Startex (start of the exercise);
- Endex (end of the exercise);
- In-briefings (briefing before the exercise);
- Debriefings (briefing after the exercise);
- Any other essential timing.

4.1.3. Locations

The guide should give the specific locations where exercise activities are to be held. These can be provided on maps or in textual format.

4.1.4. Logistics

The following logistical arrangements should be included in the manual:

- Hotel reservations or other accommodation;
- Meeting locations and times;
- Office supplies;
- Transportation before and during the exercise;
- Communications for the controllers and evaluators;
- Safety equipment;
- Identification badges;

- Distribution of controlled exercise scenario;
- Distribution of guides for controllers, evaluators and players.

Any other special supplies that might be needed should be stated in the manual.

4.1.5. Communications

Communication methods and protocol that will be observed during the exercise should be included in the manual. This includes a contact list for the exercise staff and a list of contact numbers for simulated organizations. This section should also describe the communications rules, including the need to precede any discussion over communication networks with 'FOR EXERCISE' or an equivalent statement.

4.1.6. Safety

All safety legislation and procedures remain in effect during exercises. The stress of exercises can cause people to focus on their tasks to the extent that they may neglect to follow standard safety precautions.

As for any exercise, safety is paramount. This is particularly relevant for nuclear security event exercises that test response capabilities since the response can involve physical combat and the use of firearms or weapons. There is a potential that security and law enforcement agents may react to exercise events as if they are real, which could result in injury. Moreover, unless all exercise players are adequately briefed and clearly identifiable, security personnel may use firearms to confront exercise players. Some exercises may call for the use of real explosives and blank rounds to enhance realism. In order to avoid injury, there should be strict safety procedures in place and a safety officer or team should be designated with the responsibility for designing safety protocols and ensuring that they are followed.

The exercise manual should emphasize that evaluators and controllers are responsible for monitoring exercise play to ensure a safe environment. In the case of an unplanned event (such as a safety or real security event), procedures should be developed regarding who is responsible for suspending or terminating exercise play and how it will be accomplished. These details should be included in the exercise manual.

4.2. PLAYERS

This section describes the information that should be included in the development of the 'player guide' section of the exercise manual.

Players include adversaries and participants from facilities and external organizations that take part in the exercise.

The guide provides the exercise players with information needed to participate effectively in the exercise. This information is also discussed at the player briefings/orientations conducted prior to the start of exercise play. Its purpose is NOT to promote top performance, but to ensure that the exercise goes smoothly so that maximum value is achieved.

The guide identifies key elements to be communicated to players such as purpose, legal and regulatory requirements, scope, exercise rules and constraints, assumptions, artificialities and simulations. The guide also establishes the scenario narrative consisting of background information leading to the start of the exercise and other information to maintain exercise flow.

Players should be given a schedule indicating where they need to be and the expected time. Time is allocated for players to inspect equipment and prepare for any events requiring preparation. Exercise play may end before originally designated if the exercise director, lead controller and lead evaluator determine that all objectives and performance criteria (anticipated actions) have been sufficiently addressed to the extent that evaluators can complete their assessments.

4.2.1. The player's guide

As discussed in the following sections, suggested topics for the player's guide include, but are not limited to, the following:

- General statement of intent;
- Applicable laws, statutes and regulatory texts;
- Exercise scope and objectives;
- Participating organizations;
- Exercise rules and constraints;
- Exercise assumptions;
- Exercise artificialities;
- Exercise communications;
- Simulated activities (tasks and functions);
- Scenario narrative;
- Player procedures and responsibilities;
- Information security;
- Safety;
- Media and public information arrangements;
- Player feedback and reporting;
- Administrative support.

4.2.1.1. General statement of intent

The general statement of intent is generally a statement regarding the purpose of exercises that is consistent with the discussion contained in Section 2.2.

4.2.1.2. Applicable laws, statutes and regulatory texts

This section of the player's guide is a brief statement on the regulatory and legal requirements for the exercise. It can help establish the seriousness and importance of the exercise.

4.2.1.3. Exercise scope and objectives

This section of the player's guide is a summary of the exercise specifications determined in the first stage of the exercise preparation process contained in Section 3.2.

4.2.1.4. Participating organizations

This section of the player's guide is a list of the organizations that are participating, including the extent of their play. Players would ideally know this so that they understand which organizations can actually be relied upon or contacted (for real) during a nuclear security event. When omitted, this can lead to embarrassing situations.

4.2.1.5. Exercise rules and constraints

This section of the player's guide is a brief description of how the exercise will be conducted, how the inputs will be provided, when they will be provided and what the players would do to deserve the information. It also provides rules for the players on interacting with the exercise staff and for conducting themselves in the application of their procedures. Constraints, such as players only using existing real-world resources, would be fully explained.

4.2.1.6. Exercise assumptions

The following list of assumptions should be modified to meet specific exercise criteria:

- All participating agencies, departments and organizations have in-place established emergency management plans, annexes and procedures;
- These plans, annexes and procedures contain mitigation, response and recovery elements;
- Exercise players will respond in accordance with the existing plans, procedures and policies. In the absence of applicable plans, procedures or policies, players will be expected to apply individual or team initiative to satisfy response requirements;
- A multi-agency response to an emergency situation will be needed to protect the community;
- To ensure effective response, emergency centre coordination of response activities is necessary.

4.2.1.7. Exercise artificialities

It is recognized that certain artificialities and constraints detract from exercise realism. However, exercise players should be educated to accept artificialities as a means of facilitating the accomplishment of the exercise objectives and performance criteria. Additional artificialities can be added, depending on the exercise:

- The exercise will be played in real time, with the exception that the emergency centre is fully staffed and activated at the start of the exercise;
- Many of the alert, notification and initial activation actions may not be a part of the exercise;
- External organizations not participating may be simulated as ‘arrived-on-scene’ without their presence and without further play needed.

4.2.1.8. Exercise communications

This section of the player’s guide is an overview of communication and information systems, including instructions for all players and information system personnel concerning the preparation, transmission and handling of voice and recorded communications and traffic generated by the players.

A list of exercise phone numbers and contact information should be provided which is to be used during the exercise. For example, this list will contain the phone numbers of the organizations whose functions are simulated.

4.2.1.9. Simulated functions

Simulation during this exercise is needed to compensate for non-participating organizations, individuals and field units that may actually be deployed in a real-world response. Although simulations may detract from exercise realism, the simulated functions (messages from and to simulated entities) provide the means to facilitate exercise play and provide for the testing of exercise objectives and performance criteria.

A list of the organizations that will be simulated should be provided.

4.2.1.10. Scenario narrative

This section of the player’s guide includes meteorological information and all relevant background information that would be available to the exercise players at the start of the exercise. Scenario narratives are reviewed to ensure that criteria scenario information is not inadvertently disseminated which may affect the evaluation of the exercise.

4.2.1.11. Player procedures and responsibilities

This section of the player’s guide describes how the exercise is conducted, including player procedures for beginning the exercise and ensuring play continues. This should include the specific roles and responsibilities of the exercise players, their interaction with the control/simulation team and the evaluation team, and procedures for dealing with problems which may arise during the exercise.

4.3.1.12. Information security

This section of the player’s guide describes how sensitive information, both printed and electronic media, is handled, disseminated and disposed.

4.2.1.13. Safety

This section of the player’s guide makes a strong statement regarding the need to maintain safety during the course of the exercise, the responsibility of the players to follow standard safety procedures and the duty of the exercise staff to stop the exercise if the safety of the facility or personnel is jeopardized.

It describes the safety procedures, including safety concerns and point of contact on safety issues. This section provides an overview of security measures such as access control, site restrictions, badge procedures and incident reporting related to the exercise participants. It may also include the use of ‘THIS IS AN EXERCISE’ at the beginning and end of written messages and announced in voice communications over radios and telephones. The

procedure for calling an unscheduled time out to an exercise should be discussed in detail and include the process used to re-start an exercise once the situation that caused the time out has been mitigated.

4.2.1.14. Media and public information arrangements

There is a possibility that media and interest groups may have questions about the exercise. There should be common media and public information arrangements in place containing instructions regarding interaction with the media and the interest group(s) by the players.

4.2.1.15. Player feedback and reporting

This section of the player's guide describes the importance of obtaining player feedback and reporting at the end of the exercise and will provide instructions for the conduct of the post-exercise debriefing of the players.

This includes data produced by players (e.g. staff duty logs, staff officer action logs/reports, minutes from staff meetings, telephone conversation records) and also player responsibilities in the evaluation process (players are to provide commentary about the exercise, which may include completing exercise critiques to record their comments about any action, event, strength, or weakness that was observed during the exercise, or if they are asked to comment on selected areas of exercise planning, execution and training).

4.2.1.16. Administrative support

This section of the player's guide describes support provided to players such as copying, word processing, office supplies and chart paper. This section should also address the setting up of the room to conduct the functional exercise, including name tags, plans, chart paper, office supplies, audio-visual equipment and provision of refreshments for participants.

4.3. CONTROLLERS

The following instructions provide guidance for all controllers prior to, during and following the exercise and are included in the exercise instructions for controllers. Appendix VII has a checklist for the lead controller, which addresses the topics mentioned below.

It is the responsibility of the controllers to ensure that safety and security are maintained at working locations and during the exercise.

At a minimum, all personnel should receive an orientation briefing and handout materials that cover the exercise plan, including scenario, exercise objectives, procedures and exercise rules. Training may be provided by exercise design team members or by outside sources. For complex exercises, a tabletop activity could be conducted to help familiarize participants with their roles and responsibilities, as well as related plans, procedures and policies.

Training should emphasize the roles and responsibilities of both the control and evaluation teams, as well as functional interaction between the two.

4.3.1. The controller's guide

In general, controllers should be thoroughly familiar with, but not limited to, the following:

- Purpose of the exercise;
- Objectives of the exercise;
- Adversary and controller's sequence of event logs to include scenario timeline;
- Message forms and flow of information;
- Content of exercise messages and injects;
- Accuracy, timeliness and realism of expected responses;
- Requirements for coordination with evaluators and other personnel;
- Procedures and communications systems for injecting messages;
- Procedures for monitoring the sequence of events and message flow;
- Procedures for controlling spontaneous exercise inputs and for responding to unplanned or unexpected situations;
- Procedures for recording and reporting exercise information;

- Procedures for post-exercise debriefings and evaluation;
- Simulated activities (tasks and functions).

4.3.1.1. Roles and responsibilities

This section of the controller's guide identifies the responsibilities of the lead controller as well as those of the control team chiefs, individual controllers and individual controllers for simulated activities.

Prior to the exercise, all exercise control and simulation personnel should be familiar with the exercise control plan, the exercise plan and the exercise scenario. They should also be familiar with the adversary/controller sequence of events log, especially those to be injected into play from their assigned location.

This guidance addresses the general knowledge and skills necessary to be a controller. It includes an overview of controller key roles and responsibilities for lead controllers and assistant lead controllers (if needed), control team chiefs and individual controllers.

The role of the controller is to:

- Direct the exercise by providing exercise inputs to the players;
- Keep the scenario on track by ensuring that the actions of the players do not jeopardize the rest of the scenario.

Controllers should ensure that they are thoroughly familiar with the overall exercise scenario, purpose and evaluation objectives, and their particular roles and responsibilities. Prior to or during the exercise, controllers are not to hesitate to discuss matters of concern with the lead controller to obtain guidance or clarification. Controllers' freedom in providing exercise inputs needs to be clearly defined, so that an unrealistic scenario, or one which does not achieve its purpose or objectives, does not develop.

4.3.1.2. Controller knowledge

All controllers should be aware of the entire exercise scenario, including the expected actions of the participants they are monitoring. Actions that deviate from the expected scenario are to be evaluated by the controller to ensure that the intent of the exercise scenario is being followed.

On the basis of the scenario, each controller should have the knowledge and experience to evaluate effectively the following, based on the applicable controller training plan, which may include, but not be limited to, the following exercise elements:

- The principles of cover and concealment to include natural and fabricated defensive positions;
- The range and ballistic capabilities of exercise weapons;
- Target identification, acquisition and engagement;
- Explosive devices and their effective displacement when detonated;
- Realistic damage estimates caused by explosives, including hand grenades;
- The limits of protection offered by the body armour being used;
- The use and understanding of dispersal and the effects of chemical agents and smoke generating devices;
- Personnel protective equipment being used and its limitations;
- Site specific delay barriers and movement timelines;
- 'Use of deadly force' policy.

4.3.1.3. Controller positions

(a) Lead controller/assistants

The lead controller will have similar but greater responsibilities than individual controllers. These responsibilities are detailed in Ref. [10].

(b) Control team chief

The person in charge of controllers and simulators at each primary location will be referred to as control team chief and will be responsible for directing all functions of his/her respective team and subordinate elements. Control team chiefs are responsible for managing the control functions at a specific site. During exercises in which all

controllers and simulators are located at a single facility/location, the lead controller usually fills this role. For complex exercises, multiple control team chiefs may be necessary. Therefore, in some situations, these duties may be separate and distinct or fulfilled by one person.

(c) Individual controller responsibilities

Each controller is responsible to the lead controller or control team chief (as needed) at his/her assigned location to assist in monitoring and facilitating exercise play. Specifically, individual controller responsibilities include:

- Reviewing control plan materials and attending controller training;
- Performing duties under the management of the control team chief at the assigned location;
- Monitoring player actions and assisting the control team chief and other exercise control team members in tracking exercise events;
- Reporting to the control team chief any problems or issues that may arise concerning control, including deviations from the scenario or exercise artificialities that may interfere with exercise realism or exercise progress, and recording these problems in a controller log sheet;
- Monitoring the scenario to ensure the exercise is progressing as planned and injecting event implementer messages into exercise play at the scheduled times;
- Preparing ad hoc messages needed by the control team chief to adjust or enhance exercise play in order to achieve an exercise objective;
- Recording responses of players and maintaining logs and forms;
- Recording any ad hoc implementation messages that are created on a controller log sheet to be used for exercise reconstruction and evaluation;
- Providing observations using a player observation and comment form for input to the exercise evaluation;
- Acting as simulators for unanticipated actions for resource requests, if necessary;
- Coordinating spontaneous messages from other simulators and ‘free play’, as necessary;
- Attending the simulator/controller debriefing as instructed by the control team chief.

(d) Adversary controllers

The adversary controllers are responsible for the validity of adversary actions and to communicate effectively the adversary’s operations and perspectives to other exercise control elements and the lead controller. The adversary controller communicates safety, controller calls, or pre-determined injects to the adversaries.

(e) Individual simulator responsibilities

Each simulator is responsible for providing the interface between non-participating individuals or organizations and exercise players. Specifically, individual simulator responsibilities include:

- Reviewing simulator materials and attending training;
- Performing duties under the management of the lead controller/control team chief at the assigned location;
- Representing the ‘outside world’ comprising other organizations, agency, field units, victims, citizens or the media by responding to players’ enquiries and requests;
- Answering enquiries from players directed to non-participating organizations and individuals for general information or information concerning control sequence of events already injected into play and recording each of these enquiries;
- Receiving and acting on player produced exercise materials, such as messages or memorandums to non-participating agencies and individuals;
- Recording actions and decisions on tactical maps, situation status boards, resources status boards and logs;
- Assisting controllers in monitoring the flow of the exercise and completing scenario events;
- Informing the control team chief of possible deviations from the scenario and expected actions;
- Providing observations using an observation/comment form for input to the exercise evaluation report;
- Attending the simulator/controller debriefing as instructed by the lead controller or control team chief.

4.3.1.4. Simulated functions

Some organizations may not be participating but may need to be contacted by the players for the purpose of obtaining information. Therefore, these organizations should be simulated. The most effective way of accomplishing this is to provide one or several simulated functions (e.g. control room, emergency planning, radiation protection, media, government, public simulated functions) equipped with phones, faxes and email, as needed. There may be a need for several simulation locations if the exercise extends over several geographic areas.

Simulated function staff will have to be thoroughly familiar with the organizations they are simulating, the sorts of questions those organizations would ask and the responses they would give.

It will be necessary to provide the players with special phone numbers or with contact information for all simulated organizations. This information will most likely be different from that included in the normal procedures. The fewer the number of organizations simulated, the more realistic the scenario.

Where simulated functions are established, their telephone numbers and contact information should be listed and provided to the players before the exercise commences.

(a) Simulated media

Provided below is an example of the factors requiring consideration when establishing simulated media.

Simulated media input can add realism to an exercise. Interacting effectively with the media is a major challenge for most nuclear security events. The coordination of information provided to the media by the various response organizations and the need to monitor the media to detect false information or rumours and to correct them are key elements of the response system that are ideally exercised often.

It is not simple to simulate the media in a realistic manner. There are challenges in terms of logistics, personnel selection and distribution of the simulated media information in real time. The following measures may help achieve a realistic media simulation:

- The simulated media personnel should have some experience of dealing with the real media, such as an organization's communications department;
- The simulated media personnel should not be technical or operational staff who have intimate knowledge of the contingency response plans and who have no media experience;
- A separate location should be established for the simulated media personnel. In some cases, several locations may need to be established and these should be linked through proper communications systems;
- The simulated media should be given as much freedom as possible in carrying out their functions. Their script should be limited to key events and inputs;
- The simulated media should not know the scenario in detail.
- Information distribution (e.g. simulated media reports) can be broadcast through closed circuit television or radio;
- Written media products can be distributed by fax;
- The simulated media would be instructed not to 'overplay', which is when the controllers put undue and unrealistic pressure on the players because it is 'just an exercise'.

4.3.1.5. Controller instructions

The actions of the controllers are absolutely critical to the success of the exercise. Controller instructions provide guidance to controllers prior to, during and following the exercise and should be included in the exercise instructions for controllers. The following list includes, but is not limited to, items to be considered for controller instructions:

- Controllers should maintain a sufficient level of observation over their player and should position themselves, as applicable, where they can make the needed observations without identifying or giving away a player's position while stationary or moving tactically;
- Controllers are expected to control the flow of an exercise in a safe and effective manner, without interfering with the individual participant's performance;
- Controllers should ensure that they do not become separated from their assigned player during the exercise;
- Controllers do not interfere with the exercise but be prepared to provide an accurate input to the participants, as needed;
- Controllers have the authority to make specific calls during the exercise as described in the adversary or controller's sequence of event logs;
- Controllers should be positioned to observe both the responder's and the adversary's actions, in order to make the appropriate judgement. The controller should be in a position to witness the engagement scene from the participant's viewpoint without obstructing the participants;
- Controllers are to be vocal, immediate and decisive on any neutralization of a participant;
- Controllers should wear predesignated identifiers to identify themselves as a controller;

- Deficient actions by the participants should be recognized and documented and provided through the exercise critique process.

4.3.1.6. How to start the exercise

There are several ways of starting an exercise (Startex). The simplest of these is for the lead controller to ‘phone in’, send or announce the initial message that will trigger the start of the exercise. There is no need for an elaborate ceremony. If the situation and scenario allow, it is advisable to let the players do their normal work for a while before starting. It is preferable not to start as soon as the players are in place, but rather to allow them some time to adjust to their surroundings, if different from those of their normal work environment.

It is important to ensure that all controllers and evaluators are in place before the exercise commences.

4.3.1.7. How to deliver the exercise inputs

Supplying data during an exercise is an ‘art’. It is good to minimize the interaction between controllers and players. Data should be supplied as subtly as possible. If a message would normally be transmitted by phone, then an actual phone could be used during the exercise. There should be no engagement in a long discussion with players to explain the inputs. Clarification should be provided only if needed.

The key to a successful exercise is skilful coordination between the controllers. The lead controller is responsible for achieving this.

4.3.1.8. What to do when the exercise goes off-track

Occasionally, exercises will go off-track. An example would be players ‘outsmarting’ the controllers and scenario development team by finding an unexpected solution to a problem. This will have the potential to disrupt all events downstream and may need controller intervention. If this becomes the case, controllers should recognize the players’ achievements and explain to them why, for exercise purposes, they will be assumed to have failed. Another way of tackling this is to have the controller inject an additional event in order to get the scenario back on track (although this is not the most desirable solution). In any event, the lead controller is the only one who has the authority to permit deviations from the script.

If the exercise appears to be off-track, a controller should immediately inform the lead controller. The lead controller will then adjust the timeline or event, as needed, and inform all affected controllers, all the while keeping exercise purpose and objectives in sharp focus.

4.3.1.9. How to end the exercise

The exercise ends (endex) upon instruction from the exercise director. This should be clearly communicated to all those involved in the exercise, as well as all participating and interested organizations, both on- and off-site. Normally, this occurs at the end of the security scenario or when all exercise objectives have been met. However, different groups (e.g. facility operations, emergency planning, radiation protection) participating in the exercise may not necessarily end their part of the exercise at the same time when meeting the objectives of an integrated exercise. For example, in a nuclear power plant security exercise, it is possible to end the response force component of the exercise and let plant operations and off-site emergency agencies continue to deal with safety related equipment that was simulated to be damaged and associated radiological emergency issues.

4.4. EVALUATORS

The exercise evaluators should be knowledgeable of contingency response actions. Knowledge of the security plan and the facility specific response actions would also be an advantage. This knowledge is required to understand ongoing exercise activities and to be able to track them with events in the scenario.

Most organizations understand that evaluation of exercises is an essential part of preparedness for nuclear security events as it may provide feedback on the gaps and weaknesses of the performance. However, evaluations are not always well understood or conducted. Without a proper understanding of evaluations, it is impossible to determine gaps or weaknesses in response capability. A poorly conducted evaluation could result in instilling a false sense of security as to the organization’s state of preparedness, or it could unfairly single out an individual as being responsible for the failure of a plan.

4.4.1. The evaluator's guide

The following topics, detailed in the following sections, should be included in the evaluator's guide:

- Training of evaluators;
- Selection of evaluators;
- Roles and responsibilities;
- Evaluation techniques to be used during the exercise;
- Debriefing and critiques;
- Comprehensive exercise evaluation;
- Assessment of deficiencies;
- Exercise evaluation report.

4.4.1.1. Training of evaluators

Evaluators need to know what is important to note during the exercise. Experience, competence and training would be sufficient to allow this.

At a minimum, all evaluators should receive an orientation briefing and handout materials on the security plan, the procedures and the distribution of responsibilities within the participating organizations. Additional training could also be provided, which may include emergency centre operations, the incident command and all exercise control plan elements. Training should emphasize the roles and responsibilities of both the control and evaluation teams, as well as functional interaction between the two. Training may be provided by exercise design team members or by outside sources.

In general, evaluators should be thoroughly familiar with the following:

- Facility specific security management measures and contingency response actions (e.g. security plan, contingency plan, procedures);
- Purpose and objectives of the exercise;
- Scenario events and scenario timeline;
- Evaluator roles and responsibilities;
- Evaluation techniques;
- Procedures for monitoring and tracking player actions;
- Procedures for recording observation of player actions and feedback;
- Procedures for reacting to player enquiries;
- Procedures for notifying the lead evaluator or lead controller of problems and exercise deviations;
- Support for the entire evaluation team.

4.4.1.2. Selection of evaluators

The evaluation team comprises a representative sample of personnel who possess the requisite knowledge and expertise in the area(s) to be evaluated. It is important to choose the correct evaluators for each function. For example, a media team would be evaluated by someone with media experience; guard and response force teams would also be evaluated by people with relevant experience. Finding the correct evaluator for a given team is sometimes difficult owing to lack of resources. However, efforts should be made early in the exercise planning process to find suitable and credible candidates.

4.4.1.3. Roles and responsibilities

Evaluators are tasked with taking notes during the exercise and participating in the production of the final evaluation reports, as instructed by the lead evaluator. During the exercise, the role of the evaluator is to observe and record facts on the organizations' response. The record of actions is the key to a good evaluation. Good chronological notes ideally are taken concentrating on aspects that are critical to the response.

Evaluators other than the lead evaluator can lead a small team. For example, the lead evaluator may assign an evaluator to evaluate the response force. The response force evaluator may then lead a team of evaluators who assess tactical, post-incident recovery and other response force functions.

(a) Lead evaluator

The lead evaluator is responsible for managing and directing all evaluation functions during the conduct of the exercise. Specifically, his/her responsibilities may include, but not be limited to, the following:

- Participating in the exercise design team;
- Analysing and assessing the exercise plan to determine an appropriate evaluation strategy (e.g. locations of evaluation, number of evaluators needed, roles and responsibilities);
- Designing and developing the evaluation organization and chain of command;
- Determining the qualifications and experience level of evaluators needed and identifying avenues for recruiting them;
- Designing and developing training for the exercise evaluators;
- Developing and disseminating the exercise evaluators' guide and evaluation worksheets;
- Establishing evaluator communication systems and information support mechanisms;
- Coordinating and communicating with controllers and other evaluators;
- Developing procedures for debriefing of players and the exercise evaluation team;
- Managing and coordinating the activities of the evaluators during the exercise;
- Monitoring exercise progress and making decisions regarding any deviations or significant changes to the scenario caused by unexpected developments in the course of play;
- Coordinating any needed modifications to the scenario and supporting event implementers with the appropriate exercise evaluators;
- Conducting debriefing of the exercise evaluation team;
- Providing observations for input to the exercise evaluation;
- Completing routine reports to log exercise events and any special reports, as necessary;
- Chairing the post-exercise critique session;
- Attending evaluation team debriefings.

(b) Individual evaluators

Each evaluator is responsible to the evaluation team chief at his/her assigned location to assist in monitoring and facilitating exercise play. Specifically, individual evaluator responsibilities may include, but not be limited to, the following:

- Reviewing the evaluators' guide and the controllers' guide and attending evaluator training;
- Performing duties under the management of the lead evaluator at the assigned location;
- Observing assigned objectives;
- Monitoring player actions and assisting the evaluation team chief and other exercise control team members in tracking exercise events;
- Reporting to the lead evaluator any problems or issues that may arise concerning control, including deviations to the scenario or exercise artificialities that may interfere with exercise realism or exercise progress, and recording these problems in the evaluator worksheet;
- Providing observations using the evaluation worksheet form for input to the exercise evaluation;
- Attending the end-of-exercise participant debriefings/critiques and any evaluator debriefings as instructed by the lead evaluator;
- Reviewing simulator materials and attending training;
- Answering (if allowed) enquiries from players and individuals for general information or information concerning scenario events already injected into play and recording each of these enquiries on the evaluation worksheet;
- Recording observations, actions and/or decisions on tactical maps, situation status boards, resources status boards and logs;
- Assisting controllers in monitoring the flow of the exercise and completion of scenario events;
- Informing the lead evaluator of possible deviations from the scenario and expected actions.

4.4.1.4. Evaluation techniques to be used during the exercises

In general, exercise evaluation is a measure of whether the objectives of the exercise were achieved. The exercise objectives are measured using specific evaluation criteria and individual and collective performance standards which are observed and reported.

A comprehensive evaluation is normally made after the exercise, when all the observations from all evaluators are combined to form the complete picture. Therefore, during the exercise, it is important to observe response actions

objectively and make detailed notes on the sequence of events that can later be analysed to identify any problems and their cause.

The evaluators' guide should include evaluation techniques, which may need to be supplemented by evaluator training. These techniques should include, for example, the need to:

- Record the time of arrival of players and observe their actions;
- Identify players by name and function;
- Record the actual time of major scenario events;
- Listen and record commands, instructions, information and announcements given by one player to another and observe the actions that follow;
- Listen to input delivered by controllers;
- Evaluate the effectiveness of coordination and interfaces between organizations.

The way an exercise is conducted by the controllers can affect the response by the players, either in a positive or a negative way. Evaluators should record observations of controllers' performance and players' interactions regarding the effectiveness of the exercise play:

- Noting how controllers intervene when players depart significantly from the scenario;
- Looking for problems with exercise realism. (Does it look as if the scenario was compromised or was executed in a previous drill? Are reports neatly written, even though they could have been prepared in a rush? Is anyone anticipating events? Is there unusual equipment already in place, turned-on and ready to be used? Is anyone reading a script? Is anyone pre-positioned in a place which unrealistically reduces response times?)

Evaluation worksheets (forms) with check boxes can make the evaluator's work much easier. However, they are not encouraged in isolation for the following reasons:

- They can bias the evaluation by directing the focus away from performance or outcome and onto procedures or process;
- They are not appropriate for evaluating decision making, judgement and common sense in a complex environment with multiple locations;
- In most cases, they are very long and need the evaluator to 'shuffle' through paper during the exercise, which can distract attention away from the action.

The preparation of an evaluation worksheet is guided by an example evaluation worksheet which is provided in Appendix VIII.

It may be useful for the evaluator to have a list of the critical timings and functional requirements that could be met by the team being evaluated.

There are other evaluation techniques available, such as video recording or voice recording of the response teams. The exercise director should choose the method that is best suited to the group being evaluated. In some cases, for example, video recording may not be allowed by an organization for security reasons, or it may be too cumbersome because of the restricted space available at the emergency location, or there may be insufficient staff to operate the necessary equipment at all locations.

After the exercise, the evaluators should collect and review all material that was produced by the players during the exercise, including log files, status boards and maps.

4.4.1.5. Debriefing and critiques

Evaluators should encourage players to participate in a debriefing. The purpose of this debriefing is to ascertain the players' impression of what went well and what did not. It also serves as a stress reliever. The evaluators should attend these debriefing sessions as observers only; this is a chance for them to see how consistent their evaluation is with that of the players. They should not discuss the evaluation. If asked, evaluators can say that 'this has been a useful exercise and the evaluators will be meeting shortly to discuss the evaluation'. However, evaluators can elicit comments or suggestions from participants related to lessons identified or on the conduct of the exercise.

Another way to obtain critiques from the players regarding every aspect of the exercise is to prepare questionnaires structured along the list of exercise objectives. In some cases, it may also be useful to conduct post-exercise interviews with key players. For some types of exercises, such feedback can be useful for the evaluation.

4.4.1.6. *Comprehensive exercise evaluation*

It is only once the exercise has ended that evaluators actually begin to evaluate. This evaluation is based on the evaluators' consolidated notes. Performance should not be evaluated until all of the information is assembled.

The overriding principle for evaluating an exercise is that the performance of the entire organization and the contingency plan be measured as opposed to that of individuals. However, evaluation of individual players is a necessary function to ensure that players who perform their roles incorrectly are identified and re-trained in those duties. This individual evaluation may also identify a systemic failure in organization training or process. It is important to assess whether or not the organization, or a combination of organizations as appropriate, is able to achieve the response objectives.

A performance-based evaluation focuses on results, not process. In this type of evaluation, performance is measured against exercise objectives. Whether an objective is achieved or not is based on criteria such as:

- Key actions that could be completed;
- Time within which an action would be completed;
- Whether the participants know their part in the plan (if not, is an organizational deficiency to blame?);
- Whether the coordination between participants or organizations was effective;
- Whether the guards or response forces defeat the malicious act.

Performance requirements address the ability of people and organizations to perform actions. Performance requirements are generally satisfied when the actions taken are the right ones, are performed adequately, are performed within the required time and lead to the desired results. Hence, in theory, whether or not procedures were followed does not matter, as long as the desired results are achieved. However, in practice, a proper evaluation should consider both the process and the results achieved because the result is not always easy to measure.

For example, unless weapons effects simulation is used, it is difficult to determine whether response force actions have defeated the adversaries. In this case, evaluators and controllers will have to decide on whether processes were followed and agreed tactics, techniques and procedures were used.

Focusing on performance is a departure from other traditional approaches, which often focus on the ability to follow procedures. This can be misleading because procedures cannot account for all situations and may prove to be inadequate during an exercise or a real event. Although experienced evaluators can usually differentiate between the ability of exercise players to follow procedures and their ability to perform the needed function adequately, observing that procedures which are followed during an exercise may not be a sufficient nor consistent way of measuring performance.

The main advantage of a performance-based evaluation is that it concentrates on priorities: the significance of the observations is determined by their impact on specific goals that could be achieved. As a result, the evaluation is more credible, more thorough, more defensible and more useful. However, during an exercise, it is not always possible to measure the true result of actions because many of the malicious conditions are actually simulated. Therefore, it is necessary to: (i) make a judgement on the likelihood that the action taken would meet the desired goal and (ii) ensure that the process followed is appropriate. Therefore, in practice, evaluations should focus on:

- The results, when they can be measured;
- The process (i.e. the actions taken which led to the result).

It is important to record as many of the relevant facts and observations as possible during the exercise.

The problem of evaluating performance then becomes one of determining the criteria by which performance can be judged. Evaluation criteria are indicators — but only indicators — that the correct actions are being taken and that the response is achieving the correct exercise objective. In a generic sense, in order to complete an action successfully, it is necessary to:

- Be able to gather the relevant information that could affect what action would be taken and how it would be implemented. It could be, for example, knowledge regarding the location of malicious forces or a malicious device;
- Be able to analyse the information available. This analysis may be simple or complex. For example, it is necessary to know whether to attempt to remove a suspicious device or to call on specialist support and evacuate the area;
- Be able to make decisions promptly based on the available information;
- Be able to make a decision that leads to the desired action. In other words, the objective will probably not be met if the action taken is not in agreement with the analysis performed. There are many ways by which this could happen. An extreme example may be the response force opening fire on a group of protestors because the available information was misinterpreted or because of a miscommunication between the decision makers and the response forces.

Implicit in each of the above items is the ability to be able to communicate effectively.

In a performance-based evaluation, it is not necessary to meet all criteria in order to meet an exercise objective. The actual success of the response depends on the conditions at the time and may call for creative solutions on the part of the players, including prioritizing some actions over others. It is not always possible to guess which actions, and hence criteria, will be the most important. Therefore, the evaluation should consider the relative importance of each evaluation criterion, based on the situation.

Whether or not objectives are met, lessons can be drawn from the exercise. For example, if an objective was met but the procedures were not used, this may indicate that the procedures should be revised. If the objective was not met, it may have been because of the scenario and may not be a reflection of the plan or ability of the players.

If the performance objective was met, questions that could be asked include: Was the procedure followed? Was the result achieved in good faith or by accident? If the performance objective was not met, then why not? Was the procedure followed? Was training lacking? Was the procedure effective?

4.4.1.7. Assessment of deficiencies

Deficiencies or weaknesses that are identified by the evaluation can be classified in terms of their impact on response performance. The following is an example of deficiency classification:

- **Critical**—The deficiency or weakness significantly impairs the ability of the organization to perform its role and responsibilities or jeopardizes the security of the facility;
- **Major**—The deficiency significantly reduces the response effectiveness of the organization but does not prevent it from performing its role and does not, in isolation, jeopardize the security of the facility;
- **Minor**—The deficiency reduces the response effectiveness of the organization but does not prevent it from performing its role and does not jeopardize the security of the facility.

The purpose of this classification scheme is to help prioritize follow-up actions and establish a target schedule for improvements.

The evaluation of the exercise performance will facilitate identifying lessons to be learned in order to increase efficiency of contingency response capabilities.

4.4.1.8. Exercise evaluation report

An evaluation report is typically prepared and submitted to the management of the facility in a timely fashion.

It is critical that the evaluation report be submitted within a reasonable period. What constitutes a reasonable period depends on the scale of the exercise and the number of organizations involved. The longer the delay, the less impact the report will have on the overall improvement of preparedness for, and response to, a nuclear security event. For small scale exercises, this delay should not exceed a few days. For major exercises, do not exceed a few weeks. It is important to note, however, that critical deficiencies should be communicated prior to the report being submitted.

The report is a compilation of the assessed observations of the evaluators, which may include observations, grades, deficiency classifications, good practices and recommendations. The report should contain sufficient details to permit the evaluated organization to use the report to commence rectification of problems.

After receipt of the evaluation report, participating organizations may seek clarification. Although the entire approach described above aims at ensuring that the evaluation is impartial, defensible and based on facts, it does happen that some aspects of the evaluation may be inaccurate or subject to a different interpretation. The lead evaluator should try to avoid this situation; however, if it occurs, he/she needs to be receptive to criticism by the players. However, the evaluation should not necessarily be changed on the basis of player feedback and comments on the evaluation report. The players should be reminded that the purpose of the evaluation is to improve preparedness and response by identifying potential weaknesses and not to blame individuals or organizations. It is normally the participating organizations themselves that determine the actions to take in response to the evaluation report.

In some cases, inter-organizational approaches may be needed to address deficiencies identified by the exercise which cross-cut multiple organizations. The solutions may need agreement on the best approach to be used.

An internal review of the organization, security, contingency and other plans and procedures used during the exercise and the personnel training programmes should commence as soon as possible after acceptance of the report. Plans, procedures and checklists should be amended, reviewed and approved as soon as possible after identifying and addressing the deficiencies.

Normally, the exercise director is responsible and accountable for the evaluation report. However, in some cases, the responsibility can be delegated to the lead evaluator or lead controller.

APPENDIX I: TEMPLATES FOR PLANNING CONSIDERATIONS FOR EXERCISE SUPPORT

Examples of some input fields for different types of exercises are given in Appendices II–IV. Depending upon the sensitivity of the information provided in this form once filled out, a classification determination and marking would be applied.

I.1. DESIGN

See Section 2.3 (Types of exercise)

Type of exercise:

- Table top exercise/battleboard
- Computer-based exercise
- Field exercise (Drill / Partial scale / Full scale)

Topic of exercise: _____

Date of exercise conduct: _____

Name of exercise: _____

Location of the exercise: _____

I.2. TIMELINES AND MILESTONES

See Section 3 (Preparation)

The timeline presented is an example and will vary depending upon the scale of the exercise.

Initial Planning Meeting:

Suggest 3 months prior to exercise conduct date for discussion-based exercises. Suggest 6 months prior to exercise conduct date for operations-based exercises.

Mid-term Planning Meeting:

Not needed for discussion-based exercises. Suggest 3 months prior to exercise conduct date for operations-based exercises.

Final Planning Meeting:

Suggest 1 month prior to exercise conduct date for both discussion-based and operations-based exercises.

After Action Meeting:

Suggest 45–60 days past exercise conduct date for both discussion-based and operations based exercises.

I.3. PURPOSES

See Section 2.2 (Purposes of exercises)

Goals of the exercise:

Purpose statement: ('The purpose of the exercise is to...')

I.4. SCOPE

See Section 3.1.2 (Process scope and overview)

Scope of the exercise includes:

Type of event/threat/emergency:

Core capabilities to be tested:

I.5. OBJECTIVES

See Section 3.2.3 (Exercise objectives)

I.6. MAJOR PARTICIPATING AGENCIES

Types/levels of personnel that may be needed:

- Policy making (elected officials, chief operation officers, department heads)
- Coordination (managers, emergency centre(s) representatives, department deputies)
- Operations (field personnel, headquarters staff level)
- Public representatives (media, public information officers, general public)
- _____

Observers: _____

Supporting Agencies/Departments:

- Competent Authority (all agencies comprising the competent authority)
- National Crisis Coordination/Management Group
- Emergency Management
- National Security Services
- Intelligence Services
- Department/Ministry of the Interior
- Department/Ministry of Defence
- Department/Ministry of Justice
- Department/Ministry of Health
- Environment and/or Energy Department
- State Homeland Security Advisor
- _____
- _____

Law Enforcement and Response Forces:

- National Police
- Provincial/Regional Police
- Local Police
- Explosive Ordnance Disposal Squad
- _____
- _____

Fire/Emergency Medical Services:

- Emergency Services (fire, medical, etc.)
- Hazardous Materials Response Team
- _____
- _____

Industry:

- Operator
 - Security Manager
 - Emergency Manager
 - Operations/Safety Manager
 - Health Physics
 - _____

Others:

- Facility Manager of the Site of Exercise
- _____
- _____
- _____
- _____

I.7. SCENARIO DEVELOPMENT WORKSHEET

See Section 3.3 (Developing the exercise scenario)

- | | | |
|-------------------------------|---|--|
| Scenario will be... | <input type="checkbox"/> presented all at once. | <input type="checkbox"/> given to the players incrementally. |
| Scenario presentation will... | <input type="checkbox"/> involve multi-media. | <input type="checkbox"/> need computer access. |

Event information:

Where is it? _____

What time/date? _____

Weather/environmental factors: _____

What is the event? _____

What is the threat (insider, DBT, etc.)? _____

What has happened so far? _____

What has been done about it so far? _____

Any prior intelligence? _____

Other factors that would affect procedures (political, media, etc.): _____

How do players find out about it? _____

Expected actions: _____

Facility information:

Type of facility design: _____

Age of facility: _____

Nature and category of nuclear/radiological material at risk: _____

Site characteristics (type of strategy (i.e., internal denial, external engagement, etc.), guards, physical protection measures):

I.8. EXERCISE DOCUMENTATION CHECKLIST

See Section 3.4 (Developing the exercise information).

- | | |
|---|---|
| <input type="checkbox"/> Exercise Invitation
<input type="checkbox"/> Exercise Plan
<input type="checkbox"/> Situation Manual
<input type="checkbox"/> Intelligence Documents
<input type="checkbox"/> Additional Reference Materials
(such as plans, policies, material information
sheets, etc., and make a few copies available)
<input type="checkbox"/> _____
<input type="checkbox"/> _____ | <input type="checkbox"/> Presentation
<input type="checkbox"/> Facilitator Guide
<input type="checkbox"/> Controller/Evaluator Handbook
<input type="checkbox"/> Exercise Evaluation Guides
<input type="checkbox"/> After Action Report
<input type="checkbox"/> Improvement Plan
<input type="checkbox"/> _____
<input type="checkbox"/> _____
<input type="checkbox"/> _____ |
|---|---|

I.9. LOGISTICS CHECKLIST

This checklist is given for reference only. It is based on experience and is not necessarily complete.

Exercise Room (simulations:

tabletop/battleboard/computer-based exercises):

- Suitable room(s)
(e.g. to allow for approximately 4 or 5 tables with each table sitting 8–10 participants or a large U-shape configuration seating 40. This will also allow for 40–60 observers.)
- _____

Exercise Site (field exercises):

- Suitable location(s) for conducting the exercise considering the layout of the facility and deployment of response forces
- _____

Equipment:

- Projector and projection screen for presentations/videos or other types of media
- Sound amplification system
(possibly including wireless microphones for a moderator/facilitator and participants)
- Computers and/or network access
- Tables and comfortable chairs
- _____
- _____
- _____

Field Exercise Considerations:

- Safety and security personnel for the exercise location
- Communications and exercise support control (radios, telephones, etc.)
- Simulators (blanks, explosives, etc.)
- _____
- _____
- _____

Additional Considerations:

- Name tags and/or table tents
- Writing utensils, notepads, easels
- Food/refreshments
- Registration table and staff
- Restrooms available
- Security of facility
- Ample parking adjacent to facility
- Access to public transportation
- _____
- _____

APPENDIX II: EXAMPLE DATA FOR TABLETOP EXERCISE ON THE COMMAND-LEVEL RESPONSE

These example data are given for reference only.

II.1. DESIGN OF EXERCISE

Type of exercise: Table top exercise.
Topic of exercise: Command-level response.

II.2. PURPOSE

Goals of the exercise: To evaluate the command-level response to a nuclear security event.
Purpose statement: To test command-level response elements.
To test command and coordination elements of a response.

II.3. SCOPE

Scope: Multiple-agency response at the command level.
Type of event/threat/emergency: Nuclear security event of attempted sabotage of equipment, systems, devices or nuclear material located in the vital area.
Core capabilities to be tested: Roles and responsibilities of involved organizations and agencies.

II.4. OBJECTIVES

- To receive, analyse and disseminate information to relevant stakeholders;
- To demonstrate the national command level response to a facility security event;
- To evaluate interagency coordination and cooperation on the command level.

APPENDIX III: EXAMPLE DATA FOR A TABLETOP EXERCISE ON THE CONTINGENCY RESPONSE PLAN

These example data are given for reference only.

III.1. DESIGN OF EXERCISE

Type of exercise: Tabletop exercise.
Topic of exercise: Contingency response.

III.2. PURPOSE

Goals of the exercise: To validate that the physical protection measures contained in [insert contingency plan section] provide the intended level of protection against attempted sabotage of equipment, systems, devices or nuclear material located in the vital area.
Purpose statement: To validate the [insert contingency plan section] and an associated response to an attempted act of sabotage of the vital equipment.

III.3. SCOPE

Scope: Evaluate the provisions of the contingency response plan.
Type of event/threat/emergency: Nuclear security event arising from attempted sabotage.
Core capabilities to be tested: Roles and responsibilities of involved organizations (e.g. operator, government agencies, key personnel centre, response agencies) and other key personnel.

III.4. OBJECTIVES

- To validate the contingency response plan and the response to attempted sabotage of equipment, systems, devices or nuclear material located in the vital area;
- To receive, analyse and disseminate information to relevant stakeholders;
- To demonstrate the national response to a facility security event;
- To evaluate interagency coordination and cooperation in support of a facility security event;
- To demonstrate the relationships and interactions among the competent authority, other national organizations and the operator.

APPENDIX IV: EXAMPLE DATA FOR A FIELD EXERCISE OF RESPONSE TO ATTEMPTED THEFT OF NUCLEAR MATERIAL

These example data are given for reference only.

IV.1. DESIGN OF EXERCISE

Type of exercise: Field exercise (partial scale).
Topic of exercise: Response to attempted theft of nuclear material.

IV.2. PURPOSE

Goals of the exercise: To evaluate the State's response to a nuclear security event involving attempted theft of nuclear material.
Purpose statement: To test response elements and their capabilities in the event of attempted theft of nuclear material.
To test communication, command and coordination elements of response.

IV.3. SCOPE

Scope: Multiple agency response.
Inter- and intra-agency communication, command and coordination capabilities.
Type of event/threat/emergency: Nuclear security event of attempted theft of nuclear material.
Core capabilities to be tested: Roles, responsibilities and capabilities of involved organizations (e.g. competent authority, operator, response agencies) and other key personnel.

IV.4. OBJECTIVES

- To demonstrate the response to attempted theft of nuclear material at a facility;
- To evaluate interagency coordination and cooperation in support of a response to a security event at a facility;
- To demonstrate the deployment of response resources in support of a security event at a facility;
- To receive, analyse and disseminate information to relevant stakeholders;
- To demonstrate the relationships and interactions between the competent authority, operators and other national organizations.

APPENDIX V: EXAMPLES OF EXERCISE SCENARIOS

The following non-exhaustive list provides examples of scenarios that may be used for exercise development, both for simulation and for field exercises:

- Protestors;
- Active insider;
- Loss of communications;
- Intrusion detection system malfunction;
- Medical emergency involving security officer;
- False alarms;
- External adversary contact, such as sniper, vehicle/water borne improvised explosive device;
- Sabotage event.

Some sample scenarios are provided as follows.

V.1. COORDINATED ATTACK SCENARIO

It is Wednesday evening, 17:00. You are the security shift supervisor. You hear the emergency diesel generators start as you receive a call from the control room senior reactor operator that the plant has experienced a complete loss of off-site power (event 1). Additionally, your CAS operator has just initiated a Code xxx after detecting and assessing xx (number) heavily armed adversaries running towards the northern protected area (PA) barrier (event 2). Simultaneously, a security post announced an explosion on the western PA barrier and that xx (number) heavily armed adversaries carrying backpacks are running through the breach and heading towards the control room and safety related equipment (event 2a). External security positions and cameras are being engaged with rifle fire (event 3).

Actions to consider:

- Deployment of security;
- Scene security;
- Appropriate notifications;
- Any additional information you would want to obtain if there are subsequent calls (from anyone) on this incident;
- What resources you will need to address any of the listed actions.

V.2. HOSTAGE BARRICADE SCENARIO

It is Saturday morning, 02:00. You are the security shift supervisor. Your CAS operator has just informed you that xx (number) disgruntled plant employees have commandeered the control room. They have barricaded the doors and are holding three reactor operators, including the senior reactor operator, hostage. The group is threatening to shut down the reactor(s) and cause a radiological release unless their demands for better pay and working conditions are met. They claim to have placed tamper resistant detonation devices on all sources of power that will detonate in two hours. They have already called local news agencies and informed them of their actions and demands.

Actions to consider:

- Deployment of security;
- Scene security;
- Appropriate notifications;
- Any additional information you would want to obtain if there are subsequent calls (from anyone) on this incident;
- What resources you will need to address any of the listed actions.

V.3. INSIDER SCENARIO

It is Friday evening, 20:00. You are the security shift supervisor. Your CAS operator has just informed you that the control room has been commandeered by insiders sympathetic to a national terrorist group. The insiders have communicated to you that they have sabotaged safety related equipment and that a loss of power will occur in 10 minutes which will leave the site on four (4) hour battery backup power. The insiders have overpowered a security officer and obtained his weapon(s). They have also stated they will kill all hostages if anyone tries to enter and recapture the control room.

Actions to consider:

- Deployment of security;
- Scene security;
- Appropriate notifications;
- Any additional information you would want to obtain if there are subsequent calls (from anyone) on this incident;
- What resources you will need to address any of the listed actions.

V.4. VEHICLE-BORNE IMPROVISED EXPLOSIVE DEVICE SCENARIO

It is Sunday morning, 05:00. You are the security shift supervisor. The control room senior reactor operator has notified you of a complete loss of off-site power. Additionally, your CAS operator has just informed you that a DBT-sized vehicle has parked adjacent to the eastern PA fence vehicle boundary and that xx (number) heavily armed adversaries have dismounted from the vehicle and have run to protective positions and begun engaging external security positions with weapons fire. After approximately two minutes, the vehicle explodes destroying all security related equipment and barriers within xx metres. xx (number) adversaries begin entering the PA breach and head toward the turbine building.

Actions to consider:

- Deployment of security;
- Scene security;
- Appropriate notifications;
- Any additional information you would want to obtain if there are subsequent calls (from anyone) on this incident;
- What resources you will need to address any of the listed actions?

V.5. WATER-BORNE IMPROVISED EXPLOSIVE DEVICE SCENARIO

It is Tuesday morning, 07:00. You are the security shift supervisor. The CAS operator has informed you of an unidentified boat that has crossed the site demarcation boundary and is heading at speed towards the intake structure. The individual in the boat appears to have secured a device to the steering wheel and is preparing to jump into the water. Additionally, as safety related equipment has actuated, the control room operator has called the CAS and notified you of a complete loss of off-site power. Additionally, your CAS operator has just informed you that a vehicle has parked adjacent to the southern PA fence vehicle boundary and that xx (number) heavily armed adversaries have dismounted from the vehicle and have run to protective positions and begun engaging external security positions with weapons fire.

Actions to consider:

- Deployment of security;
- Scene security;
- Appropriate notifications;
- Any additional information you would want to obtain if there are subsequent calls (from anyone) on this incident;
- What resources you will need to address any of the listed actions.

APPENDIX VI: EXAMPLE OF CONTROLLER AND ADVERSARY SEQUENCE OF EVENTS LOGS

Tables 3 – 13 represent an example of the controller sequence of events log.

TABLE 3. CONTROLLER SEQUENCE OF EVENTS LOG: GENERAL INFORMATION

PRE-DRILL ACTIVITY	BRIEFING	COMMUNICATIONS	DRILL ANNOUNCEMENTS CAS/BAS:	DRILL PHONE NUMBERS	EXERCISE OBJECTIVES
Perform communications radio test (Controllers/Players /Adversaries)	Ensure Operations/Shift Manager is briefed on evening activities	<u>Radio Channels:</u> On-shift security SEC-1 Players SEC-2 Controllers	Security drills in progress Lead Controller Drill window is open	Lead Controller xXXXX Shift Manager xXXXX CAS xXXXX BAS xXXXX	<ul style="list-style-type: none"> • Land-based vehicle bomb • Radio jamming (bandwidth) • Suppressed weapons • Insider assistance • Sniper
All Players/Controllers/Adversaries obtain the proper dosimetry prior to start of drill	Ensure on-duty Security Force is appropriately briefed	SEC-3 Adversaries SEC-4			

TABLE 4. CONTROLLER SEQUENCE OF EVENTS LOG: INITIAL CONDITIONS

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
IC Initial Conditions Drill window open	<p>No equipment out of service</p> <p>Vehicle bomb is pre-staged in South Parking lot</p> <p>Plant units at 100% power</p> <p>Earlier in the day an adversary with a fake ID badge (provided by the insider), drops off a vehicle laden with explosives and adversary equipment in the contractor parking lot</p> <p>The vehicle driver hitched a ride with an unsuspecting driver of another vehicle and left the site</p>	<p>Prior to opening the drill window:</p> <p>Pre-stage as follows:</p> <ul style="list-style-type: none"> • LAA Adversary Team staged on the east side of the LAA • PA Adversary Team, Inside PA near the (Waste Water Building) • Vehicle bomb in contractor parking lot 	<p>LAA Controllers:</p> <p>Will pre-stage the LAA patrols at pre-designated locations</p> <p>Controllers will drive vehicle to location with LAA patrol being blindfolded</p> <ul style="list-style-type: none"> • The blindfold may be removed upon opening of drill window <p>LAA Starting Points:</p> <ul style="list-style-type: none"> • LAA 1: Site access road • LAA 2: Equipment lay down area 	
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
				<p>Controller message:</p> <p>Provide initial locations of personnel to the shift manager</p> <p>Normal shift complement</p>

TABLE 5. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 1

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
EVENT 1 Placement of vehicle bomb	EVENT DESCRIPTION: The main adversary team moves to a hidden position on the southeast corner of the PA One adversary will drive the vehicle bomb to the west side of the plant close to the water storage tanks The adversary will then exit the vehicle and move to a sniper position	Adversaries: <ul style="list-style-type: none"> • Avoid LAA patrols • Engage LAA patrols only if detected • Relocate the vehicle bomb to the west side of the PA near the water storage tanks. Controllers: <ul style="list-style-type: none"> • The Lead LAA Controller declares Event 1 as adversaries start movement • Monitor for engagement 	Normal patrol activities Engage adversaries if sighted	Monitor & report
Internal PA Normal rounds	VA Patrol Normal rounds	External PA Normal rounds	SSS/RTL Normal rounds	Ops/EP

TABLE 6. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 2

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
EVENT 2 Detonation of vehicle	EVENT DESCRIPTION: The adversary waits to take advantage of LAA response and command detonates the vehicle bomb	Adversaries: <ul style="list-style-type: none"> • Avoid LAA patrols • Engage LAA patrols only if detected • Command detonate vehicle bomb and communicate with team. Controllers: <ul style="list-style-type: none"> • LAA adversary controller notifies the Lead Controller of Event 2 upon detonation • Monitor for engagement • Monitor and ensure that adversaries properly place explosives and employ proper standoff distances 	Area Controller Upon Event 2 sound a long blast of air to simulate vehicle bomb All LAA 1 & 2 and Checkpoint Controllers Message: Explosion heard on west side of plant LAA Controllers: If your player is within 90' of the explosion the player will be eliminated from play	Ingress Monitor Controller: <ul style="list-style-type: none"> • You hear an explosion on the west side of the plant CAS/ BAS Controller Message: <ul style="list-style-type: none"> • You see white out conditions on cameras 5, 6 & 7 Cameras are out of service for 60 seconds • You receive IDS Alarms on Zone 5, 6 & 7
Internal PA DELTA Controller: You hear an explosion to the west	VA Patrol BRAVO Controller: You see an explosion to the west ECHO Controller: You hear an explosion to the west	External PA	SSS/RTL	Ops/EP Controller Message: You receive a seismic alarm

TABLE 7. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 3

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
EVENT 3 Radio jamming	EVENT DESCRIPTION: (Timed event) Four (4) minutes after the vehicle bomb explodes, the radio frequency jamming will be initiated by the adversary team	Adversaries: <ul style="list-style-type: none"> • Avoid LAA patrols • Engage LAA patrols only if detected • Initiate radio jamming Controllers: <ul style="list-style-type: none"> • LAA adversary controller notifies the Lead Controller of Event 3 • Monitor for engagement 	Controller Message: You are hearing white noise on your radio. If player attempts to use radio replay that they receive no response TURN OFF RADIO All Controllers: If the player demonstrates going to secondary communication is complete, instruct player to turn-on primary radio	CAS/BAS – Monitor and report. On report of white noise, CAS must simulate communications A/B switch transfer CAS/BAS Controller Message: <ul style="list-style-type: none"> • You are hearing white noise on your radio • If player attempts to use radio replay that they receive no response TURN OFF RADIO • [CAS]Announce that SUCCESS when transfer is complete to backup Radio System All Controllers: <ul style="list-style-type: none"> • If the player demonstrates going to secondary communication is complete have player turn-on primary radio
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
Controller Message:	Controller Message:	Controller Message:	Controller Message:	Controller Message:
You are hearing white noise on your radio	You are hearing white noise on your radio	You are hearing white noise on your radio	You are hearing white noise on your radio	You are hearing white noise on your radio
If player attempts to use radio replay that they receive no response. TURN OFF RADIO	If player attempts to use radio replay that they receive no response. TURN OFF RADIO	If player attempts to use radio replay that they receive no response. TURN OFF RADIO	If player attempts to use radio replay that they receive no response. TURN OFF RADIO	If player attempts to use radio replay that they receive no response. TURN OFF RADIO
All Controllers:	All Controllers:	All Controllers:	All Controllers:	All Controllers:
If the player demonstrates going to secondary communication is complete have player turn-on primary radio	If the player demonstrates going to secondary communication is complete have player turn-on primary radio	If the player demonstrates going to secondary communication is complete have player turn-on primary radio	If the player demonstrates going to secondary communication is complete have player turn-on primary radio	If the player demonstrates going to secondary communication is complete have player turn-on primary radio

TABLE 8. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 4

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
EVENT 4 PA Entry	<p>EVENT DESCRIPTION: (The main adversary team will approach southeast side of the plant near the maintenance garage</p> <p>The main adversary team will enter near the Southeast corner of the PA</p> <p>Two adversaries will establish security with suppressed weapon</p> <p>The remaining adversaries will move up to the vehicle barrier</p> <ul style="list-style-type: none"> • one adversary will deploy a satchel charge on the outer PA fence • One will throw a satchel charge through the isolation zone to the inner PA fence <p>The adversaries will retreat to the vehicle barrier and detonate</p> <p>The security element will advance through the breach followed by the adversaries at the vehicle barrier</p>	<p>Adversaries:</p> <ul style="list-style-type: none"> • LAA Adversaries will move toward the Protected Area Fence using cover and concealment • Avoid LAA patrols, engage LAA if detected • Establish security, move to the outer PA fence, deploy charges on the outer and inner PA fences, retreat to the VBS and detonate • Return to the breach, simulate deployment of a satchel at the inner PA, retreat and detonate • Move through the breach in the PA <p>LAA Adversary Controller: Once the adversaries are in position:</p> <ul style="list-style-type: none"> • Announce to LC event 4 in progress on the inner fence satchel throw • Ensure adversaries deploy satchel charge on the outer fence, simulate deployment of a satchel charge on the inner fence, retreat to the VBS, detonate. Sound air horn for satchel detonation • Report any kills to the P/A adversary controllers and State Final Count so CAS/BAS Controller can deliver picture (Sit down if killed – Lay Down if out of play) <p>P/A Adversary Controller:</p> <ul style="list-style-type: none"> • Move the P/A adversaries on second air horn to the PA Breach • Reset players until they touch the inter PA fence • Once the player touches the fence they are in play • Ensure any LAA adversary kills are removed from the P/A adversary team 	Engage adversaries if sighted.	<p>MAF – As directed</p> <p>CAS/BAS – Monitor and report Should report Code Yellow {Drill Code} to control room on PA Breach</p> <p>CAS/BAS Controller: On Event 4 IDS Zone 19 alarm</p> <p>Based on info from LAA Lead Adv. Controller - Deliver adversary count picture based on final number through PA breach</p>
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
Engage adversaries as directed.	Responders assume initial positions or deploy as directed	Responders assume initial positions or deploy as directed	Responders assume initial positions or deploy as directed	<p>Based on Code Yellow {Drill Code} from CAS the following actions are expected:</p> <p>Enter ____ Security-1 for security event.</p> <p>Will declare ____ on hostile force in Protected Area.</p> <p>PA announcement for personnel to remain on station.</p> <p>Will augment the ERO per Site Procedures.</p>
Delta and Alpha may have engagements				

TABLE 9. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 5

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
EVENT 5 Movement to Unit 2 service bay	<p>EVENT DESCRIPTION: The main adversary team will move west, deploy smoke, breach the delay fence running north/south, and move to the Unit 2 service bay</p> <p>The adversary team will then enter the Unit 2 track way via the roll-up door, if open, or use the insider provided key to open the personnel door</p> <p>Once inside the adversary team will engage expected responder located inside the service bay</p> <p>The adversaries will suppress the responder located in the service bay</p>	<p>Adversaries:</p> <ul style="list-style-type: none"> • Move west, deploy smoke • Breach the delay fence • Enter the Unit 2 service bay <p>Controllers:</p> <ul style="list-style-type: none"> • Monitor and ensure that adversaries properly place explosives and employ proper standoff distances • Hold the adversaries at the delay gate for 10 seconds to simulate breach • Sound one long blast on air horn to simulate explosion on the delay fence if satchel charge fails to land within 18” of fence explosion not effective • Deploy chem./light sticks to simulate smoke 	Remain in protective positions	<p>CAS/BAS – Monitor and report</p> <p>Observe using PTZ devices</p> <p>Should report to the control room breach of last PA fence. {Code Brown-Drill Code}</p>
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
Engage adversaries as directed	Movement as directed	Movement as directed	Provide direction	On declaration of Code Brown take actions required by _____ Security-1
Delta and Alpha may have engagements		Victor may have engagements		
Delta and Alpha Controller: See and hear Satchel charge on PA fences		Victor Controller: See and hear Satchel charge on Pa fences		

TABLE 10. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 6

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
EVENT 6 Adversary team splits	<p>EVENT DESCRIPTION: Adversary Team 1 will advance up the stairs in the turbine building to the 451’ elevation.</p> <p>They will proceed North to the shift office and move to Door 505</p> <p>Team 2 will proceed from the trackway north to Door 205 and engage expected responders</p> <p>The adversaries will suppress the responder located in the service bay.</p>	<p>Adversaries:</p> <ul style="list-style-type: none"> • Ascend stairs to 451 elevation • Move north and enter the shift office • Move to Door 505 <p>Controllers: Monitor for engagement</p>	Remain in protective positions	<p>CAS/BAS – Monitor and report.</p> <p>Ingress Movement as directed</p> <p>Ingress may have engagement during movement.</p>
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
Engage Adversaries as directed	Movement as directed – engage adversaries	Movement as directed – engage adversaries	Provide direction	Continue monitoring

TABLE 11. CONTROLLER SEQUENCE OF EVENTS LOG: EVENT 7

Time	Comments	Adversaries	Limited Access Areas (LAA) Patrols	CAS/BAS
<p>EVENT 7</p> <p>Attack against control room</p>	<p>EVENT DESCRIPTION: Adversary Team 1 will breach Door 505, enter the main control room (MCR) and terminate all personnel, manipulate and disable equipment and controls</p> <p>One adversary member will stay and maintain control of the MCR</p> <p>The remaining adversaries will exit the MCR, descend to elevation 401, move north and enter the Aux. Building through Door 205 to re-join Team 2</p>	<p>Adversaries:</p> <ul style="list-style-type: none"> • Breach Door 505 and enter the main control room • Disable equipment and controls <p>Controllers:</p> <ul style="list-style-type: none"> • Monitor and ensure that adversaries properly place explosives and employ proper standoff distances. • Utilize door alarm drill card on Door 505 • Sound one short blast on air horn to simulate explosion on Door 505 • <u>DO NOT ENTER MCR</u> • Hold all adversaries in the shift office for XX minutes to simulate equipment and control manipulation and destruction • Ensure one adversary remains to maintain control of the MCR <p>SAFETY NOTE: DO NOT ENTER THE MAIN CONTROL ROOM</p>	<p>Remain in protective positions</p>	<p>MAF – As directed</p> <p>CAS/BAS – Monitor and report</p> <p>CAS Controller: Breach of Door 505</p>
<p>Internal PA</p> <p>Engage adversaries as directed</p> <p>Controller in vicinity of Door 505: Localized Explosion</p> <p>SAFETY ISSUE: Due to close proximity ensure that all engagements are monitored by controllers</p> <p>Dry fire only</p>	<p>VA Patrol</p> <p>Movement as directed</p>	<p>External PA</p> <p>Movement as directed</p>	<p>SSS/RTL</p> <p>Movement as directed</p>	<p>Ops/EP</p> <p>Should Declare HG1</p>

TABLE 12. CONTROLLER SEQUENCE EVENTS LOG: EVENT 8

Time	Comments	Adversaries	Limited Access Areas (LAA) patrols	CAS/BAS
EVENT 8 Team 2 moves to Auxiliary Building	EVENT DESCRIPTION: Adversary Team 2 will move north to Door 205, breach door 205, enter the Aux building and descend the stairway to elevation 383' May use fragmentation grenades as necessary	Adversaries: <ul style="list-style-type: none"> • Breach Door 205, enter the Aux Building • If scissor gate deployed use satchel charge to breach • Descend to elevation 383 and move to the either Unit 1 or Unit 2 remote shutdown panel room doors Controllers: <ul style="list-style-type: none"> • Monitor and ensure that adversaries properly place explosives and employ proper standoff distances. • Sound one short blast on air horn to simulate explosions on Door 205 • Drill card is used to simulate alarm on door 	Remain in protective positions	CAS/BAS – Monitor and report Announce to the Control room breach of vital door Ingress Movement as directed
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
Engage adversaries as directed	Movement as directed-engage adversaries	Movement as directed – engage adversaries	Provide direction	Continue monitoring

TABLE 13. CONTROLLER SEQUENCE EVENTS LOG: EVENT 9

Time	Comments	Adversaries	Limited Access Areas (LAA) patrols	CAS/BAS
EVENT 9 Attack remote shutdown in Panel Area	EVENT DESCRIPTION: Adversary Team 2 will breach the doors to the U-1 or U-2 remote shut down panels Set explosives, and disable the equipment Adversary Team 2 will communicate with Team 1 to verify Team 1 targets are taken If not, Adversary Team 2 will move up exit the Aux building through door 205, ascend to elevation 451 and attack the MCR in a suicide attack	Adversaries: <ul style="list-style-type: none"> • Breach the Unit 1 or 2 remote shutdown panel room doors • Enter the Unit 1 or 2 remote shutdown panel rooms and disable controls using explosives Controllers: <ul style="list-style-type: none"> • Monitor and ensure that adversaries properly place explosives and employ proper standoff distances • Sound one short blast on air horn to simulate explosions on the remote shut down panel doors and one long blast for the explosives on the remote shut down panel • Drill card is used to simulate alarm on door ***NO ENTRY INTO REMOTE SD PANEL ROOMS OR RADWASTE CONTROL ROOM***	Remain in protective positions	CAS/BAS – Monitor and report <ul style="list-style-type: none"> • Tamper/Alarm on Door 205 • Should report breach of vital door to control room Ingress Movement as directed
Internal PA	VA Patrol	External PA	SSS/RTL	Ops/EP
Engage adversaries as directed	Movement as directed-engage adversaries	Movement as directed – engage adversaries	Provide direction	Continue monitoring

Tables 14–16 represents an example of the adversary sequence of events log.

TABLE 14. ADVERSARY SEQUENCE OF EVENTS LOG: INITIAL CONDITIONS

Time	Comments	Adversaries
IC Initial Conditions	<p>Weather Condition: Clear or inclement</p> <p>Equipment Status: No equipment is out of service</p> <p>Plant Status: Units 1 & 2 - 100% power</p> <p>Perform Communications Test: (Controllers/Players/Adversaries)</p> <p>On-Duty security force instructed to switch to the alternate security radio frequency</p> <p>Drill Announcements: CAS/BAS: Security drills in progress Lead Controller: Drill window is open</p>	<p>Adversaries will be pre-staged in the (LAA & PA</p> <p>LAA Team on west side of LAA near main office building west side of the lake.</p> <p>PA Team will stage near PA fence near Gate 1 in the diesel building enclosure</p> <p>Safety Note: Adversary teams must be issued MILES equipment or dry fire weapons</p>

TABLE 15. ADVERSARY SEQUENCE OF EVENTS LOG: EVENTS 1 – 3

Time	Comments	Adversaries
T ₀ * Event 1 Adversary intrusion into LAA	<p>EVENT DESCRIPTION:</p> <p>Adversaries cross the lake using a raft and enter the LAA from the west side near the Main Office Building and move through the LAA using cover and concealment to Gate 1</p> <p>The Adversaries will avoid the LAA patrols unless they are detected</p>	<p>LAA Adversaries will move from West Side of the lake to the Protected Area Fence at Gate 1 using available cover and concealment</p> <p>Avoid LAA patrols unless detected</p> <p>Engage LAA only if detected</p>
Event 2 PA entry	<p>EVENT DESCRIPTION:</p> <p>Adversaries will mechanically breach PA fence in the area of Gate 1</p> <p>Adversaries to implement radio jamming</p>	<p>Adversaries will breach fence and enter the PA</p> <p>Implement radio jamming</p> <p>Adversaries will establish security position: Using a gas-powered saw will cut through the outer fence fabric and concertina wire</p> <p>Then they will move through the exclusion zone</p> <p>They will then cut through the inner fence and enter the PA.</p>
Event 3 Breaching Door xxxx	<p>EVENT DESCRIPTION:</p> <p>The adversaries will move to the diesel building breaching Door XXXX with explosives</p> <p>The adversaries will enter and move through the diesel building and enter the main diesel room</p>	<p>Adversaries Team:</p> <p>Proceed to Door XXXX, set explosives and breach door XXXX</p> <p>Enter the Building and proceed to the main diesel room</p>

TABLE 16. ADVERSARY SEQUENCE OF EVENTS LOG: EVENTS 4 – 7

Time	Comments	Adversaries
Event 4 Adversary teams split up	EVENT DESCRIPTION: Adversaries will divide into two teams: Alpha Team - moving through the diesel room to the fire door on the west side, enter the Unit 2 aux building stairwell and ascend the stairwell to the 200' elevation and enter Unit 2 spent fuel pool through Door AAA. Bravo Team – standby to enter Unit 1	Alpha Team: Move through diesel room to the fire door on west side and enter Unit 2 Aux. Building stairwell. Ascend stairwell to 200' and enter Unit 2 Spent Fuel Pool through Door AAA. Set position to provide cover fire for Bravo Team. Bravo Team: Prepare to enter Unit 1.
Event 5 Bravo Team adversaries enter Unit 1 service bay	EVENT DESCRIPTION: Bravo team adversaries will move through the model room breach Door EE, deploy smoke and enter the service bay through door EE	Alpha Team: Maintain position to provide cover fire for Bravo Team if required Bravo Team: Move through diesel room and Breach Door EE with silhouette charges Deploy smoke and enter service bay through breached door One member will provide rear security and place charge on roll-up door to provide path to atmosphere
Event 6 Bravo Team: breach caged stairwell	EVENT DESCRIPTION: The adversaries will move through the service bay and breach/enter the caged stairwell in the northeast corner The adversaries will place a remote charge on the roll-up door to provide a pathway to atmosphere	Alpha Team: Maintain position to provide cover fire for Bravo Team, unless redirected by Bravo Team Leader. <ul style="list-style-type: none"> Should Bravo Team be eliminated Alpha Team will move in to complete objective Bravo Team: Proceed through service bay and breach caged stairwell in northeast corner Place Timed charge on service bay roll-up door Ascend to 200' Unit 1 Spent Fuel Pool One member will provide rear security
Event 7 Entry into spent fuel pool	EVENT DESCRIPTION: The adversaries will ascend to the 200' Unit 1 spent fuel pool level If available, one adversary will provide rear security in the stairwell Bravo Team Enters the Unit 1 spent fuel pool If available, one adversary will provide rear security in the stairwell	Alpha Team: If Bravo Team is successful in penetrating the Unit 1 Spent Fuel Pool Area <ul style="list-style-type: none"> Provide cover fire from Unit 2 Spent Fuel Pool Area. <i>Or</i> <ul style="list-style-type: none"> Move to the Unit 1 spent fuel pool and attempt to achieve the primary objective using the same route Bravo Team: Ascend to the 200' Unit 1 spent fuel pool level via stairwell <ul style="list-style-type: none"> If available, one adversary will provide rear security in the stairwell Enter Unit 1 Spent Fuel Pool Area Provide rear security, if available Assemble charge – need to have __ pounds of explosives Simulate setting charge and detonate in a suicide attack.

APPENDIX VII: LEAD CONTROLLER EXERCISE CHECKLIST

VII.1 LEAD CONTROLLER CHECKLIST

The following checklist provides an example of tasks to be accomplished during the exercise planning process and prior to exercise initiation.

1. Assess the exercise plan to determine if the following information is provided:
 - (a) Needs assessment;
 - (b) Type of exercise;
 - (c) Exercise objectives;
 - (d) Scenario narrative (storyline);
 - (e) Adversary and controller sequence of event logs;
 - (f) Scenario events and messages/simulations inputs needed;
 - (g) Extent of plays/any actions performed out of sequence;
 - (h) Participating/non-participating organizations;
 - (i) Duration of exercise.
2. Determine the number of controllers needed:
 - (a) Consider the type of exercise, whether TTX, partial or full scale. (This will generally convey an idea of scope).
 - (b) Determine if exercise activities are being conducted at the same time:
 - Some exercise activities may be operating on different days, or perhaps in the evening;
 - Exercise activities may include full activation of a facility or a key action by one or more individuals. (For example, full emergency centre activation or dispatcher at another location making key notifications.)
 - (c) For each individual exercise activity, answer the following:
 - Do the exercise activities cover a large area (such as a large one room facility, multiple room facility, indoor and outdoor activities)?
 - Do the key activities occur during the same time frame?
 - How many players are performing key actions?
 - Does the facility or area have space limitations that may affect the number of controllers assigned? (Remember, besides players and controllers, evaluators and observers may be present.)
 - (d) Examine the adversary and controller's sequence of event logs and develop planned messages for each action event as needed:
 - Determine the number of messages issued per key activity/exercise player/location at action site;
 - Determine the appropriate number of messages reasonable for a controller to inject and be able to perform other controller actions (e.g. monitoring timeline, observing expected actions).
 - (e) If the exercise duration exceeds 8–12 hours, a shift change may be needed:
 - Evaluate each exercise activity. Depending on when some exercise activities are activated and operating, a shift change may not apply;
 - If the exercise proceeds into the night, or a period of time when activity lessens, a shift change may not be needed.
 - (f) Consider the following when making final determinations of controllers:
 - Use the same controllers in more than one location if time frames for activities are different;
 - Assign a control team chief or individual controller of the task to inject some event messages if needed;
 - Some controllers, simulators and evaluators may have dual assignments, such as responsibility for both evaluation and control functions. (Ideally, these functions would be performed by different personnel. However, this may not be practical for table-tops or at locations that do not have much activity);
 - If crowded conditions are anticipated at an exercise activity location, consider using innovative techniques to accomplish some functions (such as monitoring the players via a video camera to reduce the number of control/evaluation staff needed at the location).
3. Determine the need for control team chiefs and the number needed:
 - (a) Identify locations or events that may need more than one controller;
 - (b) Designate team chiefs.

4. Identify the chain of command/organizational control structure:
 - (a) Examine the command/organizational control structure at each exercise location. (For example, limited access area, protected area, control room);
 - (b) Designate the reporting structure of controllers and team chiefs to the lead controller or assistant lead controller.

5. Determine the qualifications and experience level needed for controllers, team chiefs and assistant lead controllers (if needed):
 - (a) Examine controller, team chief and assistant lead controller positions for level of activity, any anticipated problem areas, type of position (limited access area, protected area, control room, etc.) and procedure familiarity;
 - (b) Identify the experience level needed for each controller, team chief and assistant lead controller position;
 - (c) Identify the preparation time needed for these positions.

6. Assess ways of staffing controllers, team chiefs and assistant lead controller:
 - (a) Identify individuals from participating organizations, departments and agencies who know organizations and procedures;
 - (b) Identify individuals from neighbouring local jurisdictions and State, federal and private sector organizations;
 - (c) Examine the budget and estimate expenditures for accessing controllers, team chiefs and assistant lead controllers.

7. Begin contacting controllers, team chiefs and assistant lead controller to assess availability for dates for activities such as controller training, exercise and exercise critique. Obtain written confirmation 30–50 days prior to the exercise.

8. Determine training needed for controllers, team chiefs and assistant lead controllers. Training should cover the following areas:
 - (a) Purpose and objectives of the exercise/extent of plays;
 - (b) Scenario events and timeline;
 - (c) Message forms and flow of information;
 - (d) Content of exercise messages;
 - (e) Accuracy, timeliness and realism of expected responses;
 - (f) Requirements for coordination with evaluators and other personnel;
 - (g) Procedures and communications systems for injecting messages;
 - (h) Procedures for monitoring the sequence of events and message flow;
 - (i) Procedures for controlling ad hoc exercise inputs and for responding to unplanned or unexpected situations;
 - (j) Procedures for recording and reporting exercise information;
 - (k) Procedures for post-exercise debriefings and evaluation.

9. Determine the number of simulators needed. Note that simulators play organizations or individuals not participating in the exercise.
 - (a) Determine the number of simulations and methods per exercise activity:
 - Face-to-face;
 - Written;
 - Telephone;
 - Video;
 - Fax;
 - Computer generated;
 - Radio;
 - Advanced simulation techniques.
 - (b) Identify the number of simulations needed per exercise activity and the time frame for those activities;
 - (c) Identify the number of simulations needed according to communication method.

10. Identify the preparations needed for advanced simulation techniques:
 - (a) Makeup, theatrical property ('props') for victims/patients;
 - (b) Explosives, irritants, smoke, barrier penetration, etc.;
 - (c) Media;
 - (d) Pre-staging scenes or players.

11. Identify training need for simulators:
 - (a) On plans, procedures and organizational practices;
 - (b) On where to obtain additional information for questions and responses;
 - (c) On realism required;
 - (d) On scenario, objectives and extent of play for their particular simulation.
12. Assess ways for staffing simulators:
 - (a) Identify individuals from participating organizations, departments and agencies who know organizations and procedures, but are not exercise players;
 - (b) Identify individuals from neighbouring local jurisdictions and State, federal and private sector organizations;
 - (c) Examine the budget and estimate expenditures for obtaining simulators and making preparations for advanced simulation techniques.
13. Begin contacting simulators to assess availability for dates such as simulator training, exercise, and exercise critique. Obtain written confirmation 30–50 days prior to the exercise.
14. Finalize process for recruitment of controllers/simulators.
15. Identify communications required to support controller/simulator organization for exercise play and for reporting:
 - (a) Telephone;
 - (b) Radio;
 - (c) Computer (email);
 - (d) Fax.
16. Establish process for communications equipment installation and directories for phone, fax and radio frequencies to be used for simulations and controller injects.
17. Develop the following procedures for exercise control and simulation:
 - (a) Reporting systems through chain of command;
 - (b) Purpose and description of how to read the list of scenario events and implementers;
 - (c) Problem resolution procedures to include the following:
 - Addition of ad hoc implementers;
 - Objective will not be met;
 - Exercise activity not on track with scenario;
 - Mechanism to track messages to completion;
 - Players' use of computers and electronic equipment — how to monitor and obtain this information;
 - Key event does not occur.
 - (d) Guidelines to allow participants to leave to respond to a real emergency;
 - (e) Assumptions/artificialities;
 - (f) Rules governing free play (when, how, why);
 - (g) Interaction procedures between the following groups:
 - Controllers;
 - Simulators;
 - Evaluators;
 - Players.
 - (h) Post-exercise debriefing procedures.
18. Develop forms needed to report status of exercise organization:
 - (a) Controller log sheet;
 - (b) Simulator log sheet;
 - (c) Ad hoc implementer form;
 - (d) Scenario events implementer form;
 - (e) Participation/observation comment forms;
 - (f) Key participation comment forms;
 - (g) Other forms, as necessary.

19. Develop control and simulation roles and responsibilities:
 - (a) Lead controller;
 - (b) Assistant lead controllers;
 - (c) Control team chiefs;
 - (d) Controllers;
 - (e) Simulators.

20. Develop overall management concepts for control and simulation:
 - (a) Describe overall management structure of the exercise;
 - (b) Describe overall control and simulation structure using organizational chart and chain of command developed previously.

21. Verify that participating organizations have been provided formal notification describing specific objectives and extent of plays relating to them and the equipment, preparations and resources that would be available for the exercise.

22. Exercise safety:
 - (a) Develop exercise control and simulation safety procedures;
 - (b) Safety briefings prepared (e.g. simulators, weapons, radiation safety, facility safety briefing);
 - (c) Ensure that necessary safety equipment is issued to all exercise players, controllers, evaluators and observers;
 - (d) Conduct walk-downs of exercise area if necessary;
 - (e) Identify safety concerns or conditions that may affect the exercise;
 - (f) Review facility's safety procedures (e.g. prohibited area entry).

APPENDIX VIII: EXAMPLES OF EVALUATION WORKSHEET

VIII.1 EVALUATOR'S WORKSHEET

The evaluator's worksheet is consistent between all organizations involved in the exercise. The following is an example of a worksheet; modifications may be made to accommodate additional information needed by exercise designers.

EXERCISE _____	
Organization evaluated: _____	Date: _____
Evaluator: _____	Location: _____

EXERCISE EVENT SEQUENCE		
<i>Complete the table with the actions observed during the exercise</i>		
Time	Action observed	Remarks

Evaluate the fulfilment of exercise objectives through the evaluation of defined evaluation criteria with: Yes, No, Partly, Not Applicable or Not Observed. If appropriate, clarify the evaluation with text below the evaluation criteria.

1. Threat classification

Objective: The threat is correctly assessed and communicated.

Evaluation criteria

EC-1.1: The threat is assessed based on available information

Yes		No		Partly		Not applicable		Not observed	
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EC-1.2: The threat is classified according to the methodology in effect

Yes		No		Partly		Not applicable		Not observed	
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2. Threat response

Objective: Appropriate actions are taken to respond to the threat and mitigate the risk.

Evaluation criteria

EC-2.1: Appropriate immediate actions are taken by guards

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

EC-2.2: Physical protection measures are initiated

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

3. Command and control

Objective: The command and control system is effective.

Evaluation criteria

EC-3.1: Command relationships are clear and adhered to

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

EC-3.2: Timely activation of command levels

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

4. Security

Objective: Security is maintained for the nuclear material and security procedures are followed.

Evaluation criteria

EC-4.1: A security perimeter is established and maintained

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

EC-4.2: Security procedures are followed

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

5. Media communications

Objective: Communication with the media is effectively coordinated in a multi-agency environment.

Evaluation criteria

A joint media centre is established at the scene

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

A single spokesperson is designated at the scene

Yes		No		Partly		Not applicable		Not observed	
-----	--	----	--	--------	--	----------------	--	--------------	--

.....

PLAYER FEEDBACK

Complete the table using the feedback provided by players during debriefing

Player role	Feedback	Remarks

APPENDIX IX: INTERFACE BETWEEN SECURITY AND SAFETY

This appendix aims at identifying the interface between safety and security response actions, plans and procedures, and between contingency and emergency response.

For the purpose of illustration, the severity of security incidents and safety events are grouped in three levels based on their consequences and the capabilities needed for responding to them (see Table 17).

TABLE 17. SEVERITY LEVELS

Severity level	Documents used for security acting/responding	Security events	Documents used for safety acting/responding	Safety events
LOW	Regular security procedures	Anticipated security incidents	Regular safety procedures	Anticipated operational occurrences
MEDIUM	Contingency response plan	Security incidents postulated in the threat assessment or DBT without unacceptable radiological consequences	Emergency operating procedures Severe accident management guidelines	Design basis events Beyond design basis events Severe accidents without unacceptable environmental consequences
HIGH	Contingency response plan	Successful sabotage which entail unacceptable consequences or which could lead to a high potential of radiological consequences	Emergency response plan	Severe accidents which entail unacceptable consequences or which could lead to a high potential of radiological consequences

The LOW severity level includes those security incidents, which are anticipated to occur during normal operation of the nuclear facility under normal operation of the physical protection system. Such events are, for example:

- Keys left in a pocket when passing through a metal detector;
- Attempt to steal facility property;
- Forgotten identification badge.

The response actions to LOW severity level security incidents typically include warning, re-checking and taking complementary actions.

The MEDIUM severity level includes those security incidents that are postulated in the threat assessment or DBT and thus provide a basis for the measures described in the contingency plan. The MEDIUM severity level security incidents do not entail the release of radioactive material exceeding the level established as representing an unacceptable radiological consequence. Such events are, for example:

- Unauthorized access to the site through the fence;
- Suspicious object left unattended;
- Emergency conditions, such as evacuations due to fire or criticalities;
- Unsuccessful attempt to steal nuclear or other radioactive material;
- Unsuccessful attempt to sabotage the facility.

The response actions to MEDIUM severity level security incidents typically include the implementation of security measures described in the contingency plan.

HIGH severity level includes those security incidents, which entail unacceptable consequences or which could lead to high potential of radiological consequences. Such events are, for example:

- Accident which results in a radiological release;
- Successful theft of nuclear or other radioactive material;
- Successful sabotage to vital area equipment;
- Successful sabotage to spent fuel or other nuclear material.

The response actions to HIGH severity level security incidents typically include the implementation of security measures described in the contingency plan to handle the situation from a security point of view and the implementation of protective actions described in the emergency response plan to protect the workers, the public and the environment.

As it can be concluded from the above grouping of security incidents, the response to LOW severity level security incidents involves mainly security organizations. Therefore, in the case of such events, the interface with safety is very narrow. However, in certain cases, information should be provided to the safety organization, in order to allow its preparation for safety measures, were the security incident to evolve further to a MEDIUM or HIGH severity level safety event. Conversely, information should also be provided to the security organization in order to allow its preparation for security measures, were the incident to evolve further to a MEDIUM or HIGH severity level event.

It can be concluded that planning for acting and responding should consider both security and safety at MEDIUM and HIGH severity levels. The response to a security incident having environmental consequences needs the closest cooperation between the security and safety staffs in the frame of an integrated response.

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DEFINITIONS

Definitions are obtained from the IAEA Nuclear Security Series Glossary, Ref. [11].

access delay

The element of a physical protection system designed to increase adversary penetration time for entry into and/or exit from the nuclear facility or transport.

competent authority

A governmental organization or institution that has been designated by a State to carry out one or more nuclear security functions.

contingency plan

Predefined sets of actions for response to unauthorized acts indicative of attempted unauthorized removal or sabotage, including threats thereof, designed to effectively counter such acts.

design basis threat

The attributes and characteristics of potential insider and/or external adversaries who might attempt unauthorized removal or sabotage, against which a physical protection system is designed and evaluated.

detection

A process in a physical protection system that begins with sensing a potentially malicious or otherwise unauthorized act and that is completed with the assessment of the cause of the alarm.

force-on-force exercise

A performance test of the physical protection system that uses designated trained personnel in the role of an adversary force to simulate an attack consistent with the threat or the design basis threat.

graded approach

The application of physical protection measures proportional to the potential consequences of a malicious act.

guard

A person who is entrusted with responsibility for patrolling, monitoring, assessing, escorting individuals or transport, controlling access and/or providing initial response.

insider

An individual with authorized access to associated facilities or associated activities or to sensitive information or sensitive information assets, who could commit, or facilitate the commission of criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities or associated activities or other acts determined by the State to have an adverse impact on nuclear security.

malicious act

An act or attempt of unauthorized removal of radioactive material or sabotage.

nuclear facility

A facility (including associated buildings and equipment) in which nuclear material is produced, processed, used, handled, stored or disposed of and for which a specific licence is required.

nuclear material

Material listed in the table on the categorization of nuclear material, including the material listed in its footnotes, in Section 4 of IAEA Nuclear Security Series No. 13, Nuclear Security Recommendations on Physical Protection of Nuclear material and Nuclear Facilities (INFCIRC/225/Revision 5).

nuclear security event

An event that has potential or actual implications for nuclear security that should be addressed.

operator

Any person, organization, or government entity licensed or authorized to undertake the operation of an associated facility or to perform an associated activity.

performance testing

Testing of the physical protection measures and the physical protection system to determine whether or not they are implemented as designed; adequate for the proposed natural, industrial and threat environments; and in compliance with established performance requirements.

physical protection measures

The personnel, procedures and equipment that constitute a physical protection system.

physical protection regime

A State's regime including:

- The legislative and regulatory framework governing the physical protection of nuclear material and nuclear facilities;
- The institutions and organizations within the State responsible for ensuring implementation of the legislative and regulatory framework;
- Facility and transport physical protection systems.

physical protection system

An integrated set of physical protection measures intended to prevent the completion of a malicious act.

protected area

Area inside a limited access area containing Category I or II nuclear material and/or sabotage targets surrounded by a physical barrier with additional physical protection measures.

response forces

Persons, on-site or off-site, who are armed and appropriately equipped and trained to counter an attempted unauthorized removal or an act of sabotage.

sabotage

Any deliberate act directed against a nuclear facility or nuclear material in use, storage or transport, which could directly or indirectly endanger the health and safety of personnel, the public or the environment by exposure to radiation or release of radioactive substances.

threat

A person or group of persons with motivation, intention and capability to commit a malicious act.

threat assessment

An evaluation of the threats — based on available intelligence, law enforcement and open source information — that describes the motivations, intentions and capabilities of these threats.

unacceptable radiological consequences

A level of radiological consequences, established by the State, above which the implementation of physical protection measures is warranted.

unauthorized removal

The theft or other unlawful taking of nuclear material.

ABBREVIATIONS

BAS	backup alarm station
CAS	central alarm station
CPPNM	Convention on the Physical Protection of Nuclear Material
DBT	design basis threat
Endex	end of exercise
Startex	start of exercise
TTX	tabletop exercise



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