

NUCLEAR SECURITY AS PART OF THE SECURITY OF MAJOR PUBLIC EVENT (MPE)

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Abstract

Nuclear and other radioactive material used with criminal or malicious intent during MPEs poses serious threat, leading to severe health, social, psychological, economic, political and environmental consequences. In March 2016, terrorist bombing in Brussels prompted new worries that they might be seeking to obtain radioactive materials to make a dirty bomb. The radioactive materials needed for Radiological Dispersal Device (RDD) or Radiological Exposure Device (RED) can be found in hospitals, medical centres, research labs and industries and many of these materials may not be secured properly. Nuclear security system and measures prevent adversaries from carrying out criminal or un-authorized acts and respond to Nuclear Security Events (NSEs). In Pakistan, nuclear security systems and measures are part of Nuclear Security Regime (NSR). One of the cardinal elements of Pakistan's nuclear security systems and measures is its Nuclear Security Detection Architecture (NSDA), which prevents, detects and responds to Material Out of Regulatory Control (MORC) and illicit trafficking of nuclear and other radioactive material. In the past, Pakistan has gained considerable experience in securing venues of MPEs against any radiological threat. To support MPE, it has developed necessary organizational structures, technical capabilities and operational plans / Standard Operating Procedures (SOPs). As per Nuclear Emergency Management System (NEMS) of Pakistan, requisite capabilities are in place and necessary procedures / interfaces have been developed for multi-agency coordination to support MPE and respond against NSE for Radiological Crime Scene Management (RCSM). Under NEMS, training regime is also in place to conduct exercises / drills for strengthening national capacities to prepare and respond against NSEs. National capacity to support MPE include carrying out nuclear security threat / vulnerability assessments, providing technical / scientific capabilities for RCSM, including radiological monitoring / protective measures, radiation exposure control, radiation emergency medical response, supporting Law Enforcement Agencies (LEAs), decontamination and recovery.

1. INTRODUCTION

Nuclear and other radioactive material used with criminal or malicious intent during Major Public Event (MPE) poses threat to public, property and the environment [1]. The threat can manifest in the form of Radiological Dispersal Device (RDD), Radiological Exposure Device (RED) and Improvised Nuclear Device (IND) or contamination of food / water supply. State's Nuclear Security Regime (NSR) provides an institutional framework for development of nuclear security systems and measures against such threats. A Nuclear Security Event (NSE) can take place during large gathering of public at a venue of national / international significance. The cases in point are Boston Marathon, Bataclan Theatre and Manchester Arena [2].

Nuclear security to Major Public Events (MPEs) is a challenging task, as it is relatively a new area for professionals working in the domain of safety and security. Securing MPEs against nuclear security threats requires development of appropriate nuclear security systems & measures, relevant organizational structures and operational plans. Success of MPE against NSEs depends on overcoming challenges related to threats / risks, geography / pathways, technology, intelligence sharing, crisis response and crime scene management. Another challenge is to ensure seamless interface among law enforcement agencies, public safety / emergency response organizations, technical / scientific experts and military in a cross-cutting manner. Overcoming these challenges is imperative to prevent, detect and respond to any criminal or unauthorized acts, which may lead to NSE.

In Pakistan, support to MPE against NSE is covered under its Nuclear Emergency Management System (NEMS). Our model is based on IAEA guidelines and international best practices. To support MPEs, necessary organizational structures, appropriate capabilities, interfaces and operational plans / SOPs have been developed, which have been tested during different events of national significance. In the last decade, Pakistan has gained substantial experience of supporting MPEs during Pakistan Day Parade on 23 Mar 2019, national ceremonies and visits of international dignitaries to Pakistan.

2. NUCLEAR SECURITY THREATs TO MPE

Criminal or un-authorized acts involving nuclear or other radioactive material at MPE could result in severe consequences, depending upon the nature and quantity of specific material used, the mode of its dispersal (violent or non-violent), the location and population impacted. Target locations, where MPEs take place are stadiums, parks and arenas. Other strategic locations are seaports, airports and critical infrastructure (power generation houses, water supply and transport infrastructure).

In the past, plots of criminal elements were un-earthed, which had the malicious intent to use radioactive material. The incidents include plotting of radioactive bomb in Belgium by Brussels Cell in Mar 2016 and foiling dirty bomb attack by Indonesian Police in Aug 2017 [2]. These events have reinforced threat to MPEs and high profile political or economic meetings and during major sporting contests.

In Pakistan, nuclear security vulnerability assessment to a MPE is carried out by Nuclear and Radiological Emergency Support Centre (NURESC). During planning phase, input of different intelligence agencies is sought and a mechanism for timely sharing of information alerts is established.

3. PRELIMINARY ARRANGEMENTS

3.1. Planning

Planning commences with the decision to host MPE and secure it against nuclear security threats. The process include, incorporation of nuclear security systems and measures into the overall security plan for the event, designation of authorities and specialized organizations, threat assessment, selection of capabilities and resources, development of protocols and procedures for assessment of alarms and information alerts and preparation of multi-agency security plan.

Fig. 1, shows graphic representation, exemplifying time periods needed to achieve an action and when to initiate that action, prior to the start of MPE.

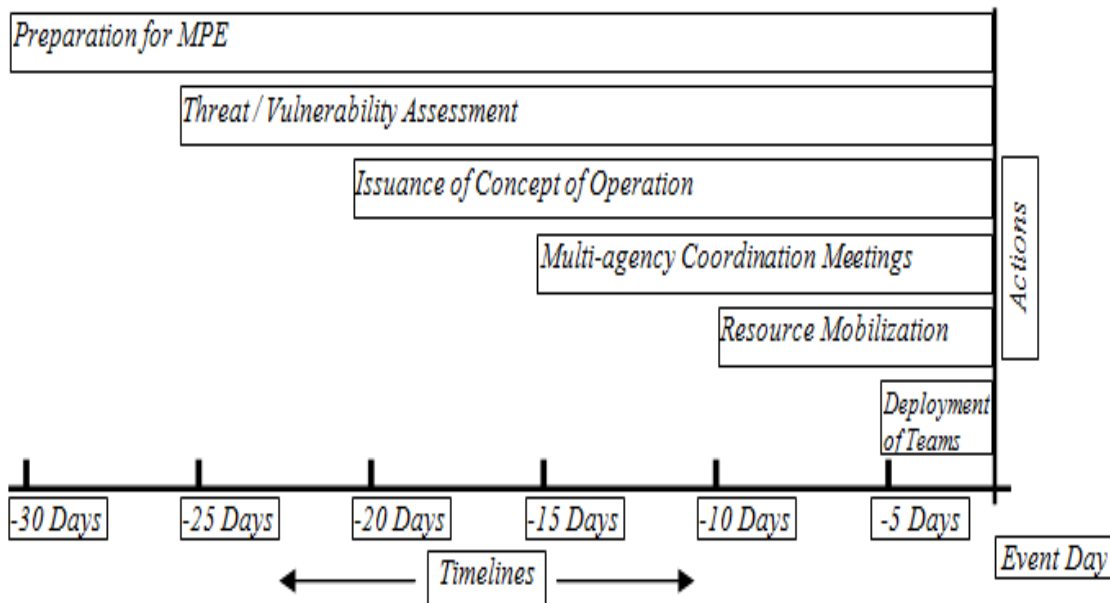


FIG. 1. Example of Pakistan Day Parade - 23 Mar 2019

3.2. Organizational Structures / National Capabilities

The organizational structures include intelligence gathering setups, security command centre, law enforcement bodies, radiation detection and assessment teams, emergency response services (bomb disposal, fire brigade and radiation emergency medical teams), crisis response centre, crime scene management experts for

criminal investigation and forensic evidence management and armed forces. Fig. 2, shows organizational structures and technical support capabilities of Pakistan.

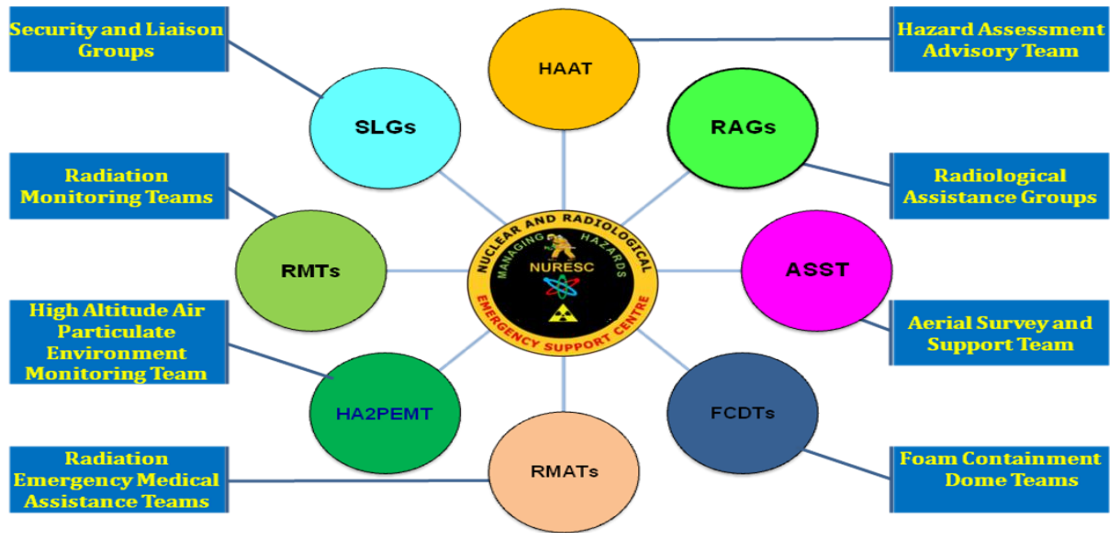


FIG. 2. NEMS Capabilities of Pakistan

- **Radiation Assistance Groups** comprising equipment specialists, data analysts, protection and safety experts equipped with Mobile Radiation Monitoring Lab, Personal Radiation Detectors (PRDs) and Radionuclide Identification Devices (RIDs);
- **Aerial Survey and Support Team** comprises aircraft and helicopters with aerial radiation detection equipment and spectra analysts;
- **Radiation Monitoring Teams** are equipped with detection equipment to monitor transport routes / pathways as part of outer perimeter security of MPE venue;
- **Radiation Emergency Medical Assistance Teams** for rescue, triage and radiation emergency medical response;
- **Nuclear and Radiological Emergency Support Centre** acts as a nerve centre for planning, coordination and management of technical capabilities for securing the venue against nuclear security threats;
- **Security Command Centre** comprises command, control and communication capabilities / resources for situational awareness and crisis response and its interface with Security and Liaison Groups (SLGs);
- **Public Information and Media Feeds** arrangements with pre-established protocols and procedures.

3.3. Threat Assessment

Conducting realistic threat assessment and timely sharing of information with all stakeholders is vital for operational success. Following is taken into consideration during threat assessment [3]:-

- Information on stolen, lost or orphan radioactive material;
- Burglaries, trespassing and espionage of facilities of radioactive sources and other strategic locations in the vicinity of MPE;
- Information on illicit trafficking of nuclear or other radioactive material into the State;
- Potential consequences if threat is materialized.

Pre-event threat assessment is conducted to determine the scale of resources and degree of preparedness required. The analysis includes consideration of the size, importance, duration, location (geography / pathways), attendance and media coverage as well as presence of dignitaries and / or political perception of the event.

Pakistan has well established organizational structures for intelligence sharing. Input and threat assessment from relevant intelligence organizations is sought and its integration is ensured till culmination of the event in a cross cutting manner.

4. PRE-EVENT MEASURES

4.1. Vulnerability / Risk Analysis

Vulnerability / risk analysis is carried out to take additional security measures such as:-

- Strengthening existing nuclear security arrangements at facilities against theft / loss of radioactive source(s);
- Enhance security measures during transport of nuclear or other radioactive material;
- Limit or prohibit transport of nuclear or other radioactive material in the vicinity of strategic locations during the period of MPE;
- Enhanced border protection against illicit trafficking of nuclear or other radioactive material;
- Surveillance of food and water supply near MPE venue.

4.2. Information Security

Policies and procedures for protection of sensitive information include classification of information, encryption methods, controlling and communicating sensitive information to organizations participating in the MPE.

4.3. Security Clearance Personnel

Reliability and trust worthiness of personnel involved to secure MPE against nuclear security threats is of paramount importance. In Pakistan, only security cleared personnel are deputed for MPE and clearance is periodically renewed. Additionally, special security clearance is also carried out prior to the MPE.

4.4. Command, Control, Communication and Coordination (C4) Arrangements

Roles and responsibilities with regard to C4 arrangements are identified and protocols are established with concerned organizations for smooth conduct of operations, crisis response and radiological crime scene management in case of a NSE. Overall responsibility for establishing an Incident Command Centre (ICC) during MPE rests with Pakistan Armed Forces.

4.5. Concept of Operation

Essential operational details are worked out to integrate various capabilities and efforts of different organizations, operational mechanism for screening and securing the venue against nuclear security threats, alarm assessment and crisis response measures. The concept of operation is prepared and shared by Nuclear and Radiological Emergency Support Centre (NURESC) with all stakeholders for smooth conduct of operation.

5. PRE-EVENT ACTIVITIES

5.1. Establishment of Incident Command Centre (ICC)

ICC established by Pakistan Armed Forces serves as focal point to coordinate and facilitate efforts of relevant organizations for completion of all pre-event formalities and activities as per NURESC Concept of Operation and its dovetailing with overall security architecture of MPE.

5.2. Selection and Deployment of Radiation Detection Equipment and Screening of Venue

Selection of radiation detection equipment is based on the threat assessment, size and type of the venue, expected no of audience / spectators, entry and exit points, time constraint and duration of the event. Work load is calculated and scanning teams are formed / deployed accordingly by NURESC in coordination with ICC. If required, mobile / aerial monitoring systems are also used / deployed. After completion of scanning operation, access control is ensured and nuclear security systems and measures are integrated with non-nuclear security

measures (metal detection, baggage scanning and physical search of personnel, vehicles, equipment and food supplies etc).

5.3. **Radiation Medical Emergency Response**

Radiation Emergency Medical Assistance Teams (REMATs) are earmarked and made available during MPE for triage / on-site treatment and transportation of casualties. Arrangements are also put in place at the nominated hospitals for advance preparation and planning to deal with any crisis situation in case of a NSE.

6. **RESPONSE MEASURES**

6.1. **Assessment of Alarms and Information Alerts**

On the day of actual event, quick alarm adjudication process is put in place to distinguish between false, innocent and actual alarms. Radiological Assistance Groups (RAGs) comprising of data analysts, equipment specialists, protective action (safety) experts and health physicists support the process.

6.2. **Crisis Response / Radiological Crime Scene Management**

In case of a NSE, an integrated system of crisis response involving Incident Command Centre, LEAs, Hazard Assessment Advisory Team (HAAT), protection and safety experts, radiation medical emergency response experts, Forensic Evidence Management Team (FEMT) and emergency response services work together to deal with the situation. Public is informed through available media and venue is locked down for safety measures, evidence collection, decontamination, recovery and rehabilitation.

7. **LESSONS LEARNT**

Having conducted a number of MPEs in the last decade and different challenges faced during operations, following lessons are shared:-

- **Threat / Vulnerability Assessment.** Timely sharing of intelligence and information alerts with the Incident Command Centre by different intelligence agencies during MPE is essential for success of operation. Integration of different intelligence agencies during vulnerability assessment of the venue is also critical;
- **Mobile Radiation Monitoring Teams.** Deployment of mobile radiation monitoring teams away from the venue on the main entry and exit points as part of outer perimeter security proves to be an important defense in depth practice for deterrence and vigilance [4];
- **Speedy Screening of Audience / Alarm Adjudication.** The major challenge is speedy screening of large number of people and vehicles under time constraint environment. This requires maximum use of automated resolution of alarm incidents. In this regard, IAEA assistance for a Coordinated Research Project is required;
- **Inter-agency Coordination and Cooperation.** Planning and coordination among multiple organizations and competent authorities with different roles / responsibilities is a challenging task e.g. integration of nuclear safety / security experts and LEAs, besides coordinating nuclear security measures with traditional security system in place for the protection of MPE. It requires agreed multi-agency response framework, concept of operations, protocols / memorandums for information sharing and coordination arrangements, besides implementation of response plans for seamless interface for effective functioning of different response organizations. In this regard, joint training exercises and drills have helped to overcome the challenges;
- **Technical Logistic Support During MPE.** It is important to depute and make available technicians for trouble shooting of detection equipment at the venue during MPE;
- **Radiological Crime Scene Management.** In case of a radiological crime scene, it is important to establish operational and hazard control areas [5]. During training exercises and drills, the importance of joint multi-agency effort for radiological crime scene management has come to the fore. IAEA assistance to the States in this area (safety - security interface) is required in the form of advisory service or Coordinated Research Project (CRP) to develop material for guideline / training;

- **Time Constraint Environment.** At times, decision to secure MPE against nuclear security threats is taken at belated stage, which impacts planning and pre-event measures / activities;
- **Awareness of National Authorities.** National authorities be sensitized regarding the importance of sanitizing the venue of MPE against nuclear security threats, alongside traditional protection and security measures;
- **Public Information and Media Feeds.** Nomination of competent authorities (Public Information Officers / Agency) and pre-arranged protocols for speedy dissemination of information goes a long way to reduce panic and anxiety among public in case of a NSE at MPE.

8. CONCLUSION AND FUTURE CHALLENGES

NSE during MPE can result into public panic, radioactive contamination of the environment and disruption of social and economic activities. In the past, criminal elements have shown desire to use radioactive material during major public gatherings and against critical infrastructure at strategic locations. Securing MPEs against nuclear security threats is, therefore, considered critical to avoid politico-economic and psycho-social consequences. The future challenges include, capacity building of States in terms of detection equipment, operational and technical guidance through updated IAEA Nuclear Security Series and regular holding of training exercises / drills by the States to integrate the response of all stakeholders (especially nuclear safety and security experts and LEAs) in case of a NSE. Another area which requires special attention is multiagency response framework during RCSM with focus on coordination and information sharing arrangements, besides integration of nuclear security plan with conventional security measures and regional cooperation.

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