



# Increasing Role of Nuclear Forensics to Support Nuclear Security Events Investigation in Indonesia

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## 1. Introduction

The writing purposes are to identify the existing nuclear forensic capabilities and its role in nuclear security events investigation in Indonesia. Compare them to IAEA recommendation Nuclear Security Series No.2: Technical Guide "Nuclear Forensics Support". Then analyze the gap for improvement.

This paper gives an overview of national recent capabilities, both traditional forensic and nuclear forensic, and also some recommendation on national action plan to improve the capability in nuclear forensic.

## 2. Method

- Identify national capability based on: existing plan and procedure, ISE (Integrated Safety Evaluation) reports to IAEA of 2013, and from the evaluation of national field exercise from 2006 – 2013;
- Literature study on requirements of nuclear forensic capability; and
- Gap analyzing in order to get some recommendation for improvement.

## 3. Results

### 3.1. Response Organization

Before conduct an investigation, the first important step is how to respond correctly to an event in order to manage the evidence to be used for law enforcement.

National Nuclear Emergency Response Organization has established in 2006 (Figure 1). At the end of 2007, this organization established their joint response guidance, developed from stakeholder's guidance, but adds some more attention to radiation risk and radiation protection.

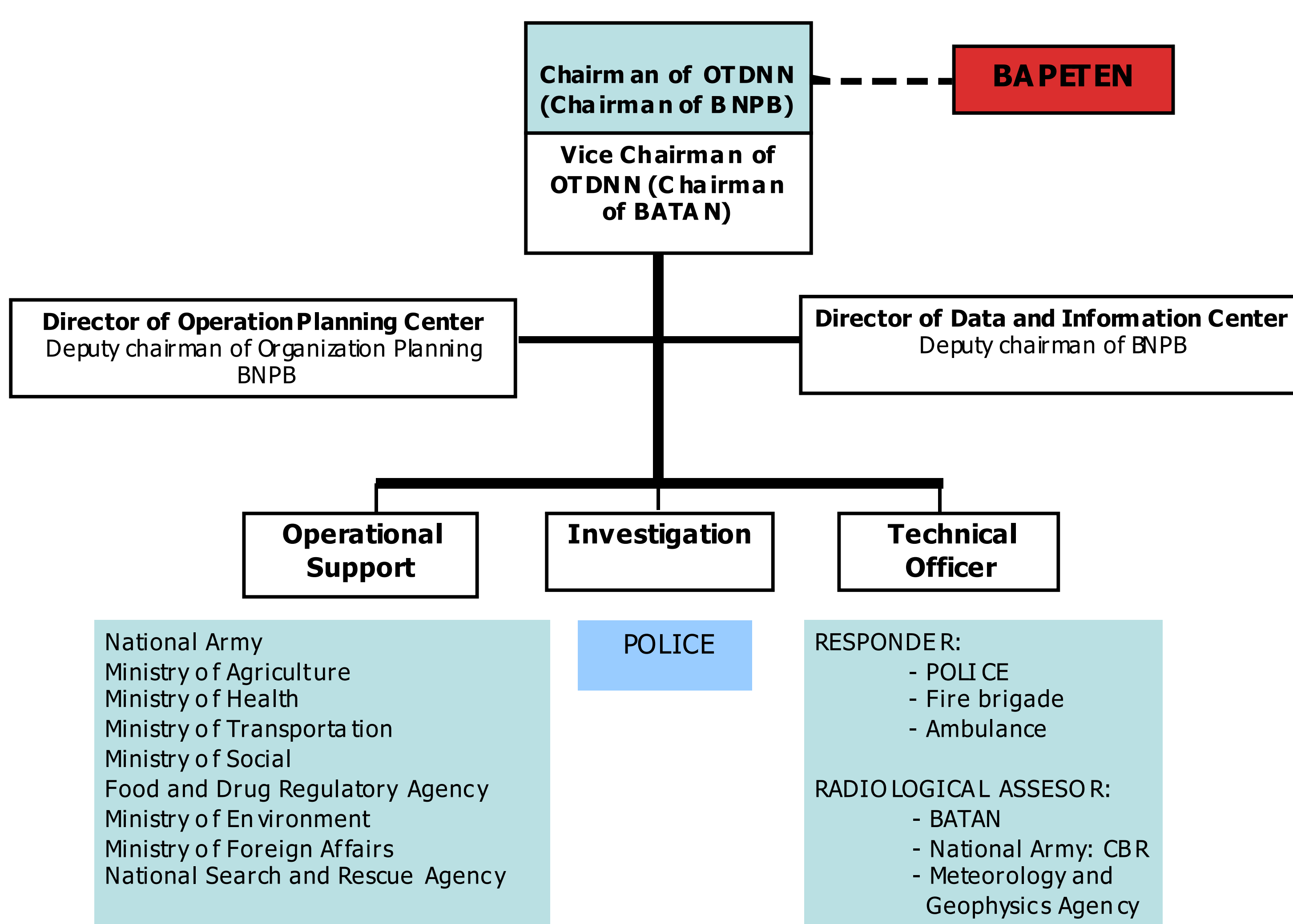


Figure 1. Structure of National Nuclear Emergency Response Organization

This is a response organization to an emergency. The response organization for a nuclear security events could also be derived from the existing organization, but need to develop by involving security agency in the operational support or technical officer, such as:

- Co-ordination Ministry of Politics, Law and Security;
- Directorate General of Customs and Excise;
- Port Operator;
- Ministry of Defence;
- Ministry of Research and Technology;
- National Counter Terrorism Agency; and
- State Intelligence Agency

The purposes of the scene response are to: minimize the radiological hazards, control nuclear/ radioactive materials, and preserve the evidence for traditional and nuclear forensics analysis.

### 3.2. Nuclear Forensic

BATAN as a national nuclear research agency has competent staff in handling radioactive contaminated evidence and also for current standard, but their instruments need to be reassessed according to the latest technology. BAPETEN as a regulatory body, as well as a national competent authority for nuclear security is on-going process to establish their laboratory of environment, security and safeguards.

### 3.3. Traditional Forensic

Police forensic laboratory has sufficient traditional forensic expertise and can be used to support nuclear forensic analysis, such as scene management by observation, analyzing and correlating the evidence. Caution should be applied when collecting the evidence in the radiological contaminated scene. Personnel involved in scene must be trained and qualified enough, also know the concept of operations and the basic concept of the radiological crime scene management and proper radiation protection.

## 3.4. Gap Analyzing and recommendation

Table 1. National capability in nuclear forensics

Recommendation	Current Status
<b>1. Incident respond</b>	
Incident investigation team;	Conducted by Police.
On-site analysis	Conducted by Police Forensic Laboratory, in coordination with BAPETEN (Mobile Expert Support Team/ Emergency Response Team) and/ or BATAN (Radiology Assessor) in the case of radiation events.
Collection of radioactive evidence	There is no arrangement yet, would be conducted by radiological expert accompany by forensic expert or vice versa.
Collection of traditional forensic evidence	Conducted by Police Forensic Laboratory.
Final survey and release of scene	Conducted by Police for bomb hazard; conduct by radiological expert (BAPETEN/ BATAN) for radiation hazard.
Evidence holding site	There is no arrangement yet.
Transportation of evidence	There is no arrangement yet.
<b>2. Nuclear forensic laboratory</b>	BATAN has competent researcher staff, but the instrument need to be reassessed based on current and updated technology.
<b>3. Nuclear forensic analysis</b>	
Characterization	BATAN already has laboratory for elemental analysis. Need to be reassessed based on current technology.
Nuclear forensic interpretation	Conducted by Police, BAPETEN, BATAN and related expert. We are lack of expert for nuclear forensic interpretation, if there is availability.
Attribution	Conducted by Police, BAPETEN, BATAN and related expert. We are lack of expert for attribution, if there is availability.
<b>4. Traditional forensic analysis</b>	Police forensic laboratory has sufficient expertise for traditional forensic analysis

1. Gap in incident response: investigation are conducted by Police, but for an events involving radiation, there is no interface procedure as a guide in coordination between forensic expert (Police) and radiology expert (BAPETEN/ BATAN) for conducting investigations and scene analysis; there is no arrangement yet in evidence holding site as well as for radioactive evidence transportation. Traditional evidence is stored in Police office but for radioactive evidence should be considered the radiation expose and contamination related to the availability of shielding in the Police office;
2. Gap in nuclear forensic laboratory: there is no arrangement yet which laboratory would be designated. Designation should consider the evidence chain of custody and the evidence security, but also consider easily access for further analysis. BATAN already has in place, but need to be reassessed according to recent technology in nuclear forensic; BAPETEN is on going process to establish their laboratory;
3. Gap in nuclear forensic analysis: Expert in this field is still lack, if indeed there, since we never investigate such this case;
4. Gap in traditional forensic analysis: Personnel in charge are still lack of radiation protection knowledge, concept of operations and the basic concept of the radiological crime scene management.

As we realized our weaknesses, we are now trying to improve and develop capability in nuclear forensic. We are on going process to establish Indonesia Centre of Excellent of Nuclear Security and Emergency Preparedness (I-CoNSEP). The main roles of ICoNSEP are to facilitate the development of human resources, providing legal, technical and scientific support services. For nuclear forensic, it include the effort to combine the capability of traditional forensic and nuclear forensic.

Based on those findings, we could make some recommendations, such as: strengthening coordination among response stakeholders as well as related expert; increasing staff competency through education as well as training programme and increasing nuclear forensic infrastructure, such as nuclear forensic library, nuclear forensic laboratory instruments, nuclear forensic standard method and etc. We also could make a timing action plan to support these recommendations, for example:

- Year 1 – 2 are development for incident response capabilities;
- Year 2 – 5 are development for national nuclear forensic library and nuclear forensic laboratory; and
- Year 5 – 10 are development for human resource on nuclear forensic analysis and interpretation.

## 4. Conclusion

Since the responsibility for nuclear security rests entirely on individual States, we need to develop a reliable nuclear security system from the nuclear facility to the State border. We already have in place an emergency response organization which could be derived to nuclear security response organization. The challenges of nuclear security events are now growing. Therefore, we need to develop our nuclear security system which cannot be separated from the nuclear forensic capability.