EMERGENCY PREPAREDNESS IN BANDUNG NUCLEAR RESEARCH AREA

Satrio Aris Setiawan
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Follow-Up Training Course (FTC) on Nuclear / Radiological Emergency Preparedness (NREP)
19 – 22 Agustus 2025
DPFK BRIN - JAEA

INTRODUCTION

Satrio Aris Setiawan

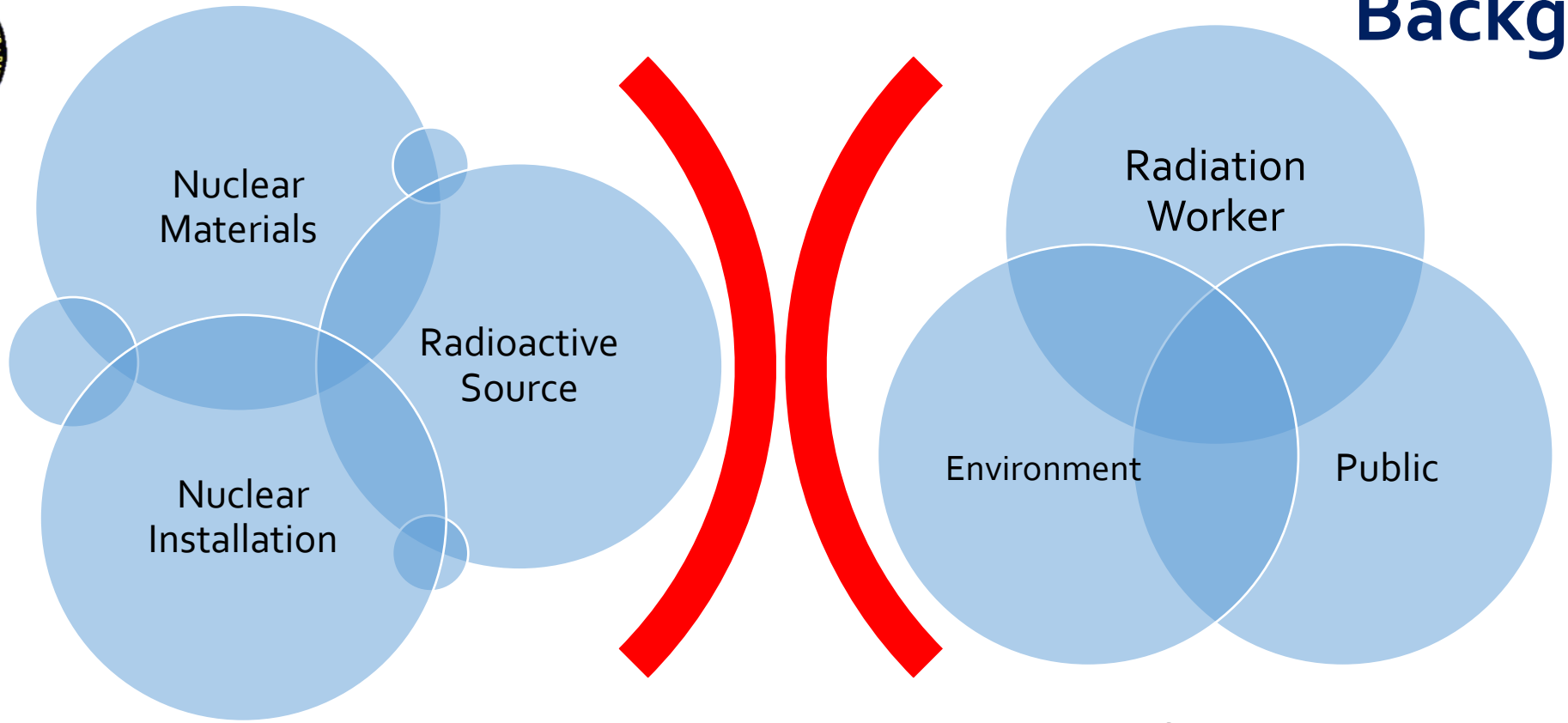
Physics

I'm working in National Research and Innovation Agency (BRIN) - Directorate of Nuclear Facility Management (DPFK).
In Radiation & Environmental Safety Section as Radiation Protection Officer (RPO).

RADIATION SAFETY

INTRODUCTION

Background



Nuclear Utilization

Potential for Nuclear and Radiological Accidents

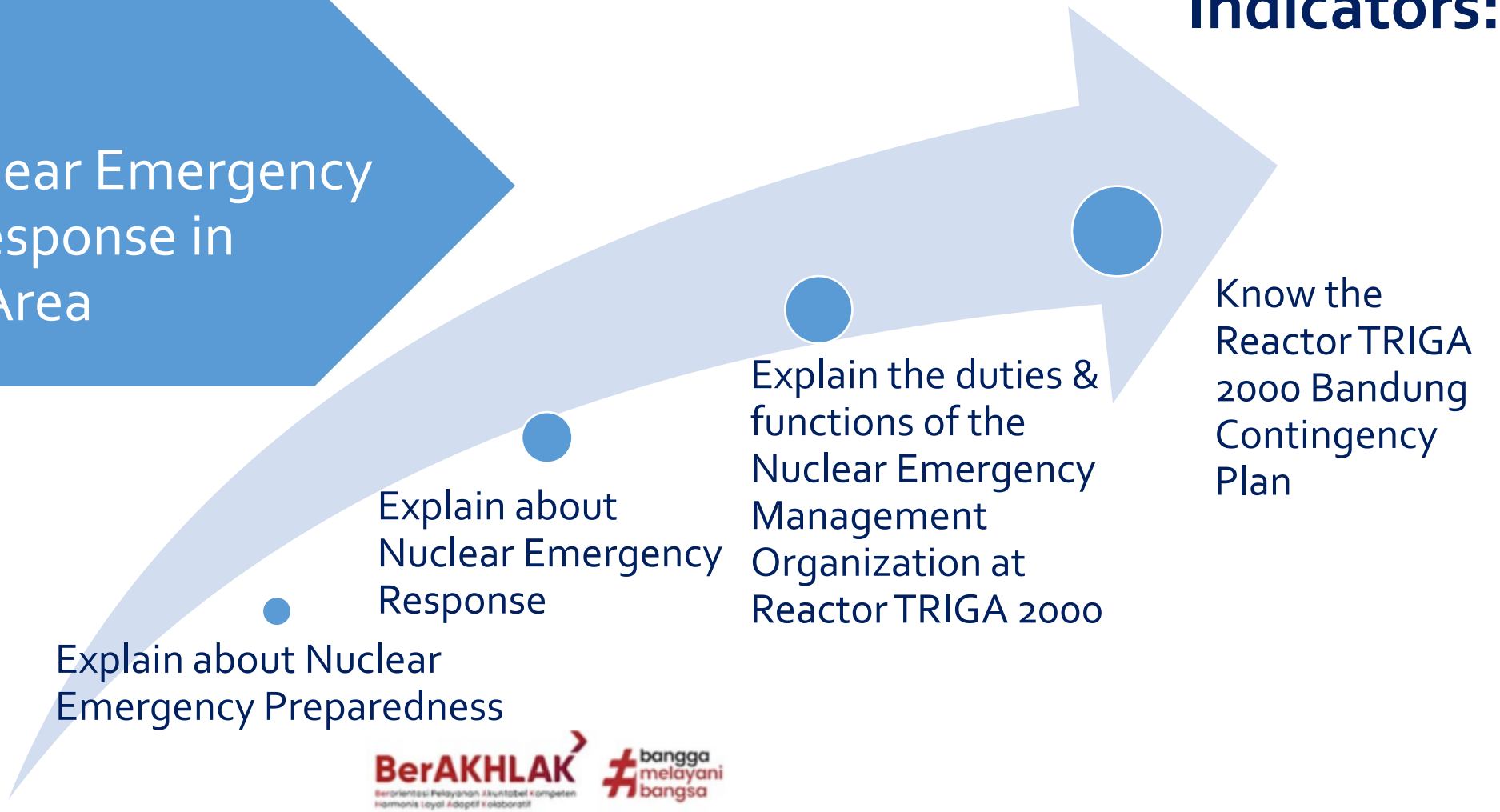
INTRODUCTION

Learning Objectives

Purpose:

Explain about Nuclear Emergency Preparedness & Response in Bandung Nuclear Area

Indicators:



REGULATION

Indonesia's legislative acts for nuclear and radiological response:

- Law of the Republic of Indonesia No. 10 of 1997 concerning Nuclear Forces;
- Law of the Republic of Indonesia No. 24 of 2007 concerning Disaster Management;
- Government Regulation no. 45 of 2023 concerning Safety and Security of Nuclear Installations
- Government Regulation no. 54 of 2012 concerning Ionizing Radiation Safety and Radioactive Materials Security;
- Regulation of the Head of Nuclear Energy Regulatory Agency (BAPETEN) No. 01 of 2010 concerning Nuclear Emergency Preparedness and Management;
- Guidelines for Nuclear Reactor Emergency Preparedness and Management, BAPETEN, 2017

OUTLINE

- Hazard Assessment
- Roles & Responsibility
- Emergency Preparedness & Response (EPR) Programme in Bandung Nuclear Area
  - Infrastucture
    - Organization
    - Coordination
    - Facilities and equipment
    - Procedures
    - Training and/or drill
  - Response function
    - Identification, report, activation
    - Mitigation
    - Urgent protection action
    - Emergency worker protection and public
    - Information to public
- Contingency Planning

IAEA GSR Part 7 (2015)
↓
The Goverment Regulation No. 54 Year 2012
↓
Nuclear Energy Regulatory Agency (BAPETEN) Chairman's Regulation Number 1 Year 2010
↓
Guidelines for Nuclear Reactor Emergency Preparedness and Management, BAPETEN, 2017

HAZARD ASSESSMENT (1)

G. A. Siwabessy RR, Serpong

- Operated in 1987
- Power 30 MW

TRIGA 2000 RR, Bandung

- Operated in 1965 (power 250 kW)
- Power 1000 kW (1971)
- Power 2000 kW (2000)

Kartini RR, Yogyakarta

- Operated in 1979
- Power 100 kW

HAZARD ASSESSMENT (2)

hazard categorization system for installations / facilities / activities that utilize nuclear energy using a graded approach according to the level of hazard and potential impact of the installation / facility / activity

Category I

Category II

Category III

Category IV

Category V

HAZARD ASSESSMENT(3)

Category II

Facilities, such as some types of research reactor and nuclear reactors used to provide power for the propulsion of vessels (e.g. ships and submarines), for which on-site events are postulated that could give rise to doses to people off the site that would warrant urgent protective actions or early protective actions and other response actions to achieve the goals of emergency response in accordance with international standards, or for which such events have occurred in similar facilities.

Severe deterministic effects on-site, urgent protective action off-site, e.g. reactors 2 – 100 MW(th)

HAZARD ASSESSMENT (4)

Category III

Facilities, such as industrial irradiation facilities or some hospitals, for which on-site events are postulated that could warrant protective actions and other response actions on the site to achieve the goals of emergency response in accordance with international standards, or for which such events have occurred in similar facilities.

No off-site hazard – severe effects on-site, protective actions on site, e.g. reactors < 2 MW(th), radiotherapy facility.

HAZARD ASSESSMENT (5)

Source:

Spent fuel / fresh fuel, radioactive material / source, radioactive waste

Emergency preparedness categories in Indonesia:

- category II (GSR part 7)
- threat category II facility (GS-G-2.1, PP 54/2012)

TABLE 8. SUGGESTED EMERGENCY ZONES AND AREA SIZES[a]

Facilities	Precautionary action zone (PAZ) radius[b,c]	Urgent protective action planning zone (UPZ) radius[d]
Threat category I facilities		
Reactors >1000 MW(th)	3–5 km	5–30 km[e]
Reactors 100–1000 MW(th)	0.5–3 km	5–30 km[e]
A/D_2 from Appendix III is $\geq 10^5$ [f]	3–5 km	5–30 km[e]
A/D_2 from Appendix III is $\geq 10^4$–10^5 [f]	0.5–3 km	5–30 km[e]
Threat category II facilities		
Reactors 10–100 MW(th)	None	0.5–5 km
Reactors 2–10 MW(th)	None	0.5 km
A/D_2 from Appendix III is $\geq 10^3$–10^4 [f]	None	0.5–5 km
A/D_2 from Appendix III is $\geq 10^2$–10^3 [f]	None	0.5 km
Fissionable mass is possible within 500 m of	None	0.5–1 km

ROLES & RESPONSIBILITIES

GSR Part 7	In Indonesia (PP No. 54 tahun 2012)
Alert	Instalation emergency
Facility emergency	
Site area emergency	
General emergency	Province emergency National emergency

Responsibility

- Instalation : Facility's license holder – Operating Organization
- Province: Local / provincial government – Regional Disaster Mangement Agency (BPBD)
- Nasional : Central Government – National Board for Dissaster Mangement (BNPB)

EPR PROGRAMME IN BANDUNG NUCLEAR AREA (1)

INFRASTRUCTURE

1. Organization
2. Coordination
3. Facility & Equipment
4. Procedures
5. Training and/or Drill

RESPONSE FUNCTION

1. Identification, Report & Activation
2. Mitigation
3. Urgent Protection Action
4. Emergency Worker Protection & Public
5. Information & Instruction to Public

EPR PROGRAMME IN BANDUNG NUCLEAR AREA (2)

Response Function

BAPETEN Regulation No 1 Year 2010

1. Identification, Report & Activation
2. Mitigation
3. Urgent Protection Action
4. Emergency Worker Protection & Public
5. Information & Instruction to Public

Government Regulation No 45 Year 2023

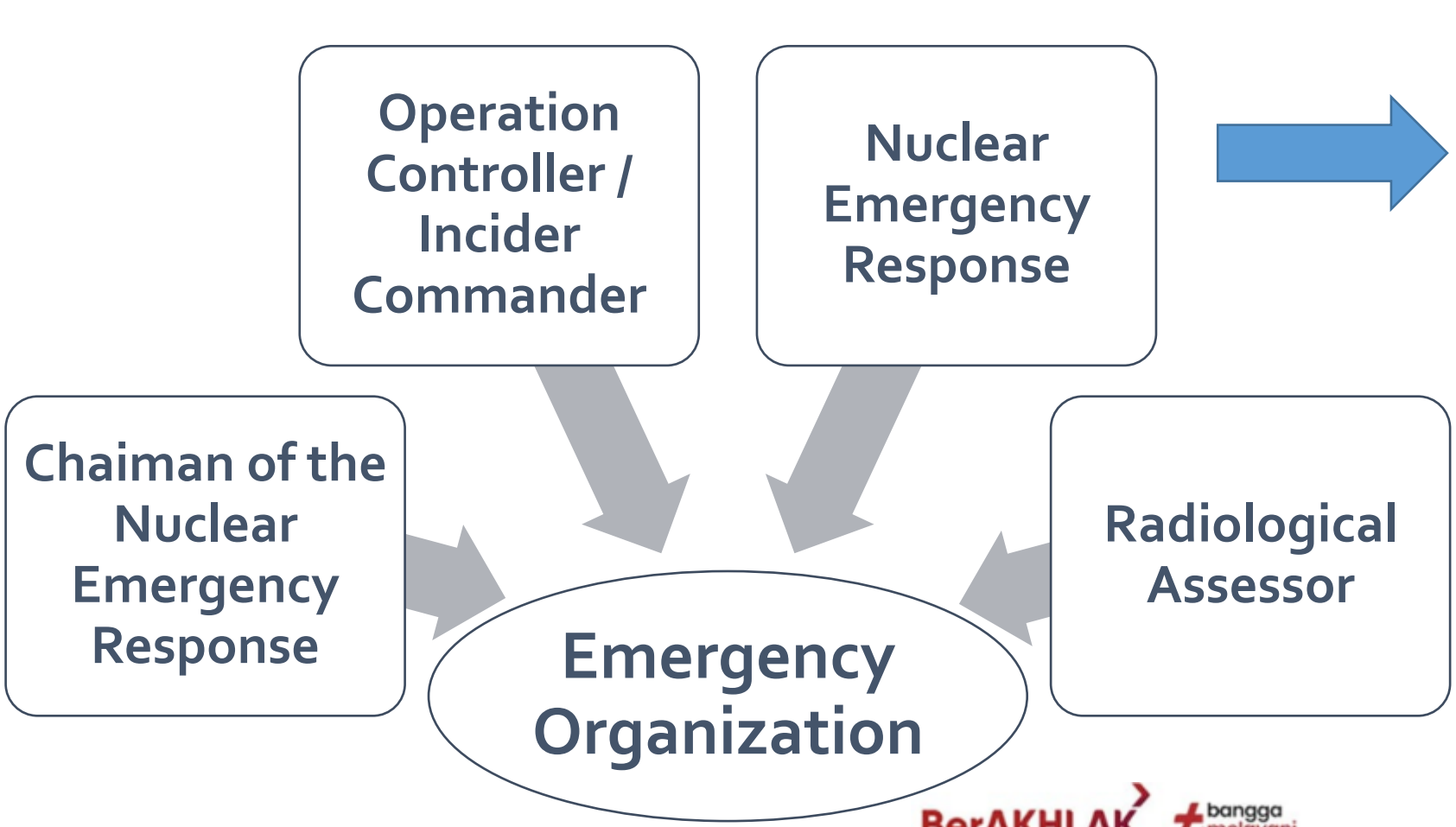
1. Emergency preparedness operation management
2. Identification, report & activation
3. Mitigation
4. Urgent protection action
5. Information & instruction to public
6. Emergency worker protection
7. Medical treatment
8. Public commmunication
9. Radioactive waste management
10. Nonradiologic consenquence mitigation
11. Nuclear emergency termination
12. Emergency preparedness & response analysis

INFRASTRUCTURE (1)

PURPOSE:
to ensure availability for **adequate** capacity to **respond** effectively in the event of a **nuclear** or **radiological emergency**, both at the installation, local, regional and national levels and at the international level.

INFRASTRUCTURE (2)

1. Organization, consists of (at least):



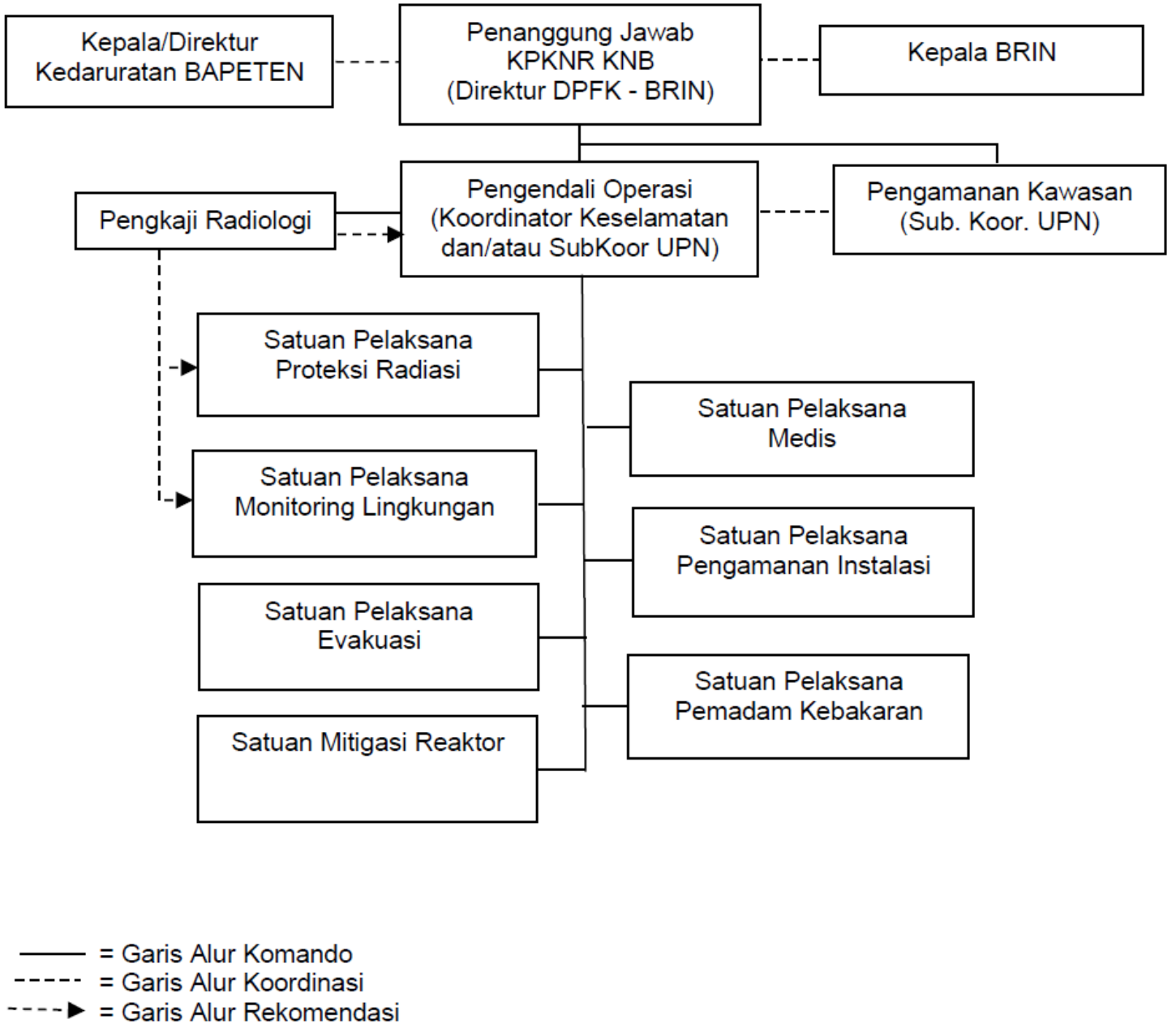
Consists of (at least):

1. Mitigation Team
2. Radiation Protection Team
3. Medic Team
4. Firefighter Team
5. Security Unit

INFRASTRUCTURE (3)

1. Organization &
2. Coordination

- Chairman of the nuclear emergency response
- Operation controller / Incider Commander
- Radiological Assessor
- Nuclear Emergency Response Organization (mitigation, radiation protection, medic, firefighter, instalation / security, etc)



INFRASTRUCTURE (4)

1. Organization &
2. Coordination

KEPUTUSAN

DEPUTI BIDANG INSFRASTRUKTUR RISET DAN INOVASI
BADAN RISET DAN INOVASI NASIONAL
REPUBLIK INDONESIA
NOMOR : B-685/II.6/HK.01/1/2024

TENTANG

PELAKSANA KESIAPSIAGAAN DAN PENANGGULANGAN KEDARURATAN NUKLIR / RADIOLOGIK KAWASAN NUKLIR BANDUNG
TAHUN 2024

DEPUTI BIDANG INSFRASTRUKTUR RISET DAN INOVASI

Menimbang :

a. bahwa aspek keselamatan radiasi adalah hal yang mutlak harus dilaksanakan guna mencegah atau mengurangi kecelakaan radiasi, guna menjamin keselamatan pekerja, masyarakat, instalasi dan lingkungan;

b. bahwa untuk mencegah dan menanggulangi kecelakaan nuklir dan/atau radiologik secara dini dan untuk memperkecil akibat yang ditimbulkan perlu dibuat suatu ketentuan mengenai Kesiapsiagaan dan Penanggulangan Kedaruratan Nuklir / Radiologik;

c. bahwa nama-nama pegawai pada daftar lampiran keputusan ini dipandang mampu dan memenuhi syarat sebagai Pelaksana Kesiapsiagaan dan Penanggulangan Kedaruratan Nuklir / Radiologik di Kawasan Nuklir Bandung.

Mengingat :

1. Undang-undang Nomor 10 tahun 1997 tentang Ketenaganukliran;
2. Peraturan Pemerintah No. 45 tahun 2023 tentang Keselamatan Radiasi Pengion dan Keamanan Zat Radioaktif;
3. Peraturan Pemerintah No. 54 tahun 2012 tentang Keselamatan dan Keamanan Instalasi Nuklir;
4. Peraturan Presiden Nomor 78 tahun 2021 tentang Badan Riset dan Inovasi Nasional;
5. Peraturan Kepala Bapeten Nomor 1 tahun 2010 tentang Kesiapsiagaan dan Penanggulangan Kedaruratan Radiologik;
6. Peraturan Kepala Badan Riset dan Inovasi Nasional Nomor 1 tahun 2021 tentang Organisasi dan Tata Kerja Badan Riset dan Inovasi Nasional.

1

MEMUTUSKAN

Menetapkan : KEPUTUSAN DEPUTI INFRASTRUKTUR RISET DAN INOVASI TENTANG PELAKSANA KESIAPSIAGAAN DAN PENANGGULANGAN KEDARURATAN NUKLIR / RADIOLOGIK KAWASAN NUKLIR BANDUNG TAHUN 2024

KESATU : Membentuk Pelaksana Tanggap Darurat Kawasan Nuklir Bandung dan mengangkat pegawai yang nama-namanya tersebut dan tugasnya pada Lampiran II dan III yang merupakan bagian tidak terpisahkan dari Keputusan ini.

KEDUA : Seluruh personel harus melaksanakan tugas dan fungsinya seperti yang telah ditetapkan.

KETIGA : Pelaksana bertanggung jawab dan melaporkan pelaksanaan tugasnya kepada Kepala Badan Riset dan Inovasi Nasional.

KEEMPAT : Biaya untuk melaksanakan Keputusan ini bersumber dari anggaran pendapatan dan belanja negara yang dialokasikan pada bagian anggaran Badan Riset dan Inovasi Nasional dan/atau sumber lain yang sah dan tidak mengikat.

KELIMA : Keputusan ini mulai berlaku sejak tanggal ditetapkan sampai dengan SK berikutnya dengan ketentuan apabila di kemudian hari terdapat kekeliruan dalam keputusan ini akan diadakan perbaikan sebagaimana mestinya.

Ditetapkan di Jakarta
pada tanggal 26 Januari 2024

Plt. Deputi Infrastruktur Riset dan Inovasi
Badan Riset dan Inovasi Nasional

TT ELEKTRONIK

Dr. Yan Rianto, M.Eng

Dokumen ini ditandatangani secara elektronik menggunakan sertifikat dari BSrE, silahkan lakukan verifikasi pada dokumen elektronik yang dapat diunduh dengan melakukan scan QR Code

2

PROGRAM KESIAPSIAGAAN NUKLIR KAWASAN NUKLIR BANDUNG

Nomor: 003/II.6.5/ITRG 2.2-1/KN 01 02/2022

Edisi: 01 – Revisi: 00

2022

KAWASAN NUKLIR BANDUNG

DIREKTORAT PENGELOLAAN FASILITAS KETENAGANUKLIRAN

Jalan Tamansari No. 71, Kelurahan Lebak Siliwangi, Kecamatan Coblong

Kota Bandung, 40132

PROGRAM KESIAPSIAGAAN NUKLIR KAWASAN NUKLIR BANDUNG DIREKTORAT PENGELOLAAN FASILITAS KETENAGANUKLIRAN BADAN RISET DAN INOVASI NASIONAL			
LEMBAR PENGESAHAN			
Nomor Dokumen	Edisi/Revisi	Tanggal Berlaku	Halaman
003/II.6.5/ITRG 2.2-1/KN 01 02/2022	01/00	30 Desember 2022	Hal 2 dari 30

Proses/ Kegiatan	Nama Pelaksana & Nama Fasilitas/Instalasi	Tanda Tangan	Tanggal
Disiapkan	Dra. Juni Chussetijowati Pengawas Radiasi Madya	TT ELEKTRONIK	10 Desember 2022
	Rezky Anggakusuma, S.Si., M.K.M. Pengembang Teknologi Nuklir Ahli Pertama	TT ELEKTRONIK	10 Desember 2022
	Afida Ikawati, MT. Sub Koordinator Proteksi Radiasi dan Keselamatan Kerja - Pengawas Radiasi Muda	TT ELEKTRONIK	10 Desember 2022
Diperiksa	Sigit Nugroho Pamungkas, M. Eng. Koordinator Keselamatan Kawasan Nuklir Bandung	TT ELEKTRONIK	14 Desember 2022
	Dwi Yuliansari Nurazizah, A.Md. Sub Koordinator Jaminan Mutu Reaktor TRIGA 2000 Bandung	TT ELEKTRONIK	20 Desember 2022
Disetujui	Zulfiyandi, A.Md. Koordinator Jaminan Mutu	TT ELEKTRONIK	26 Desember 2022
Disahkan	Dr. Mohammad Subekti Plt. Direktur PFK	TT ELEKTRONIK	30 Desember 2022

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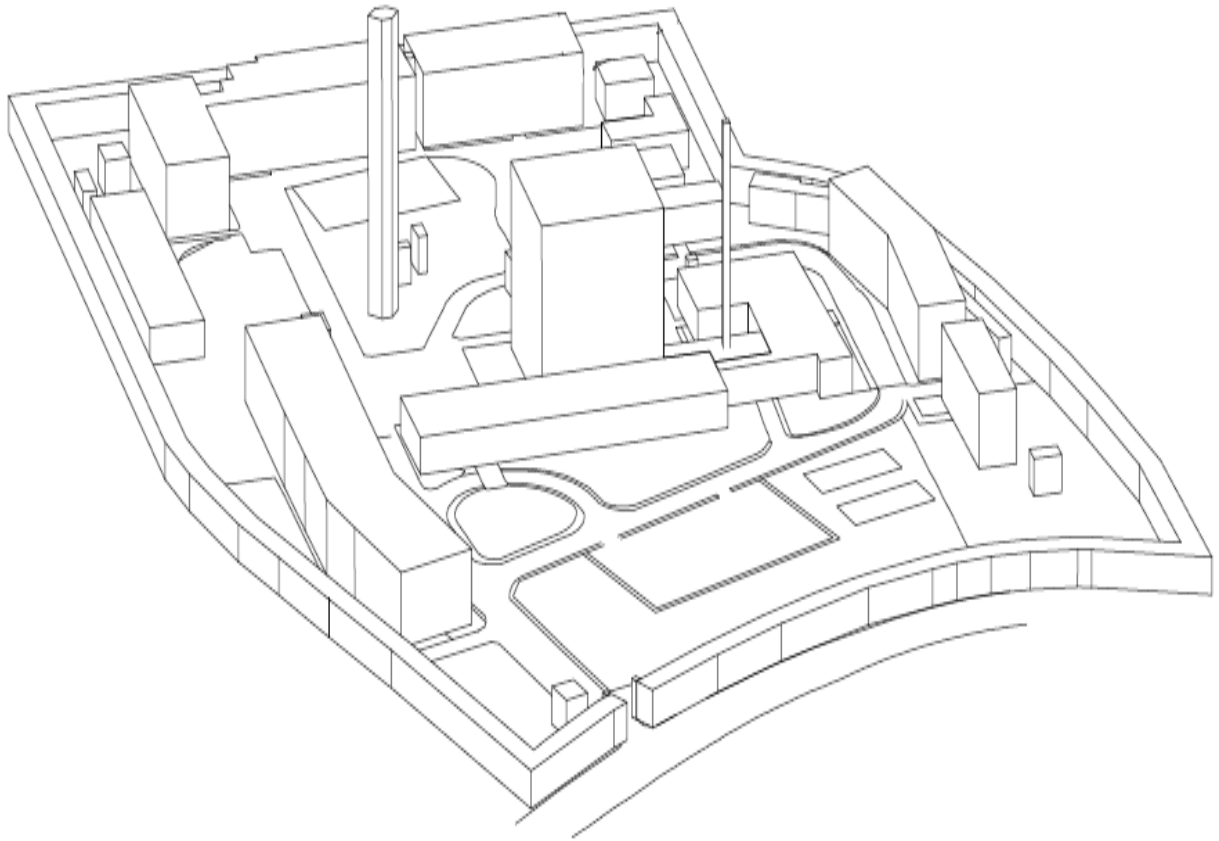
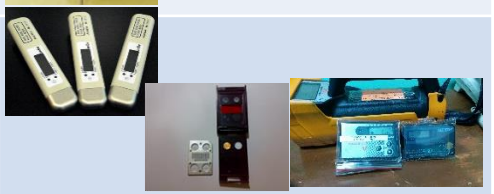
INFRASTRUKTURE (5)

3. Facility & Equipment

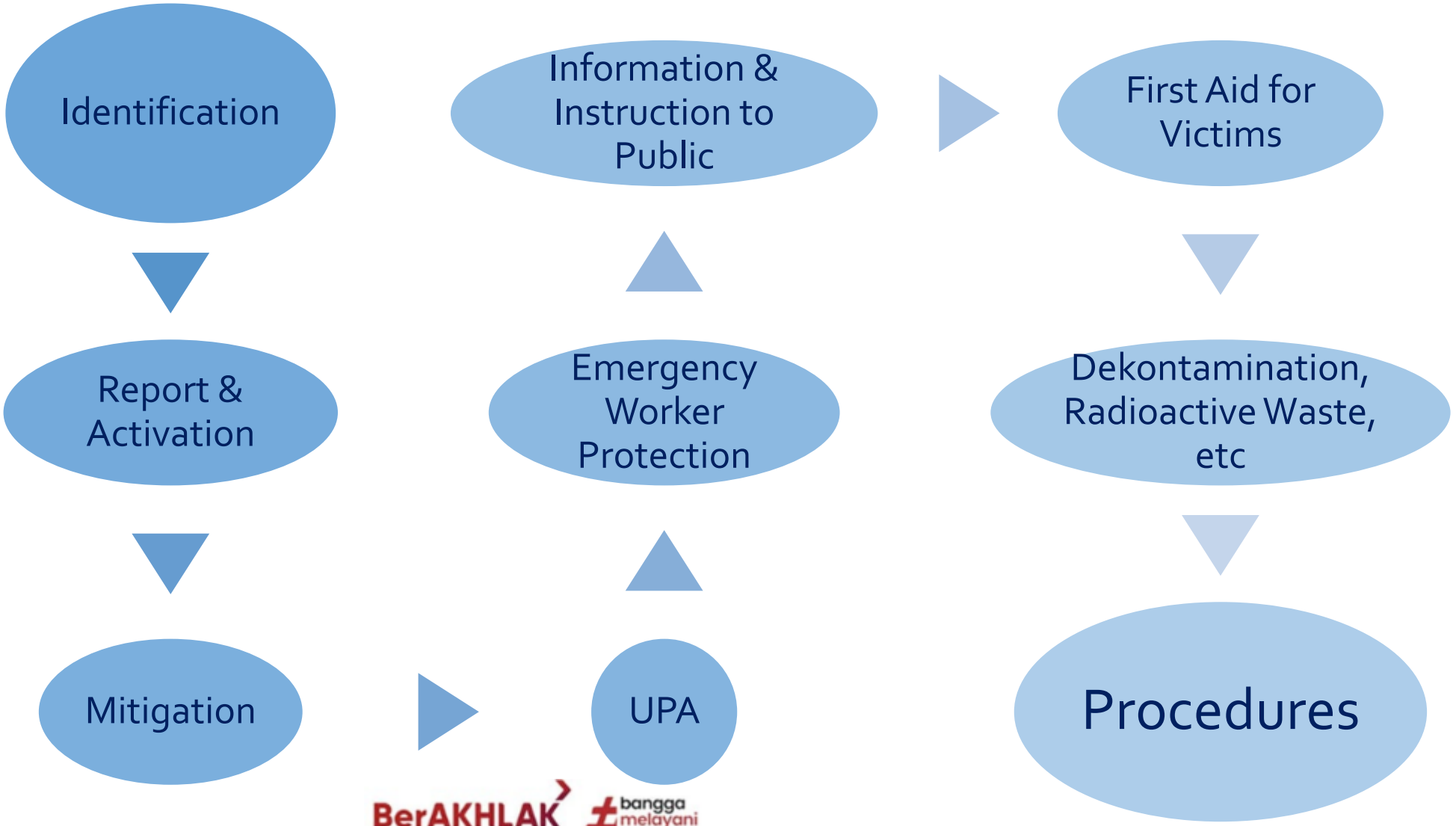


- PAZ : reactor hall / building
- UPZ : Bandung nuclear area fence

NO	EQUIPMENT	PICTURE
1	Handheld surveimeter	
2	Fixed radiation monitoring	
3	Pocket dosimeter. TLD badge	
4	PPE	
5	Radioactive waste	

INFRASTRUCTURE (5)

4. Procedures



INFRASTRUCTURE (6)

Aim

- Classification of installation & radiological abnormal conditions

Input

- Reactor system status, radiological installation condition, fuel pool status, security status
- Dose rate around the installation

Output

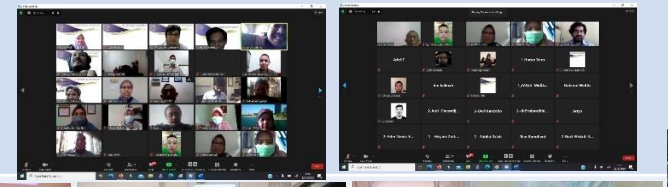
- Accident Classification

INFRASTRUCTURE (7)

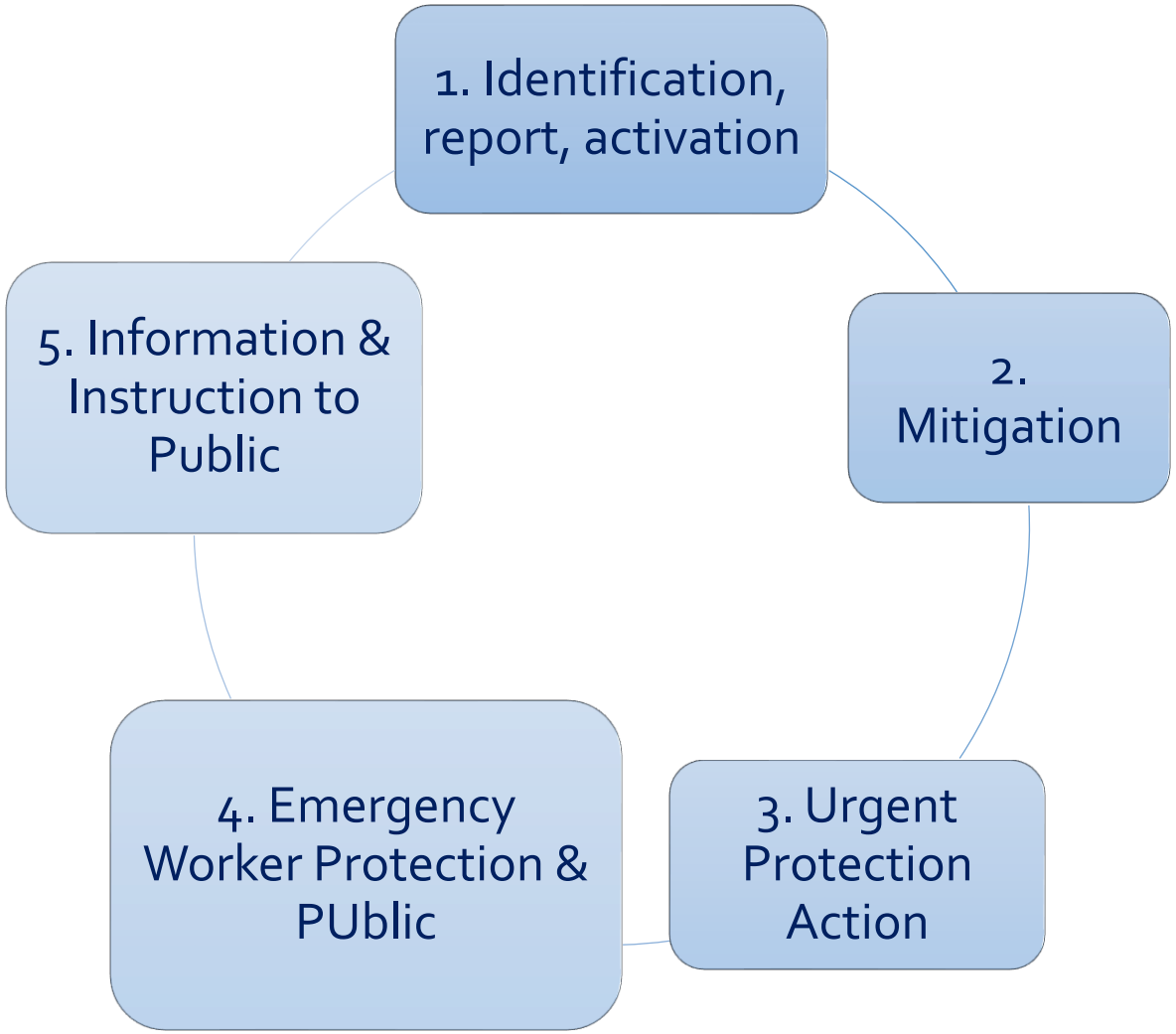
5. Training and/or Drill

5. Training and/or Drill

INFRASTRUCTURE (8)

NO	ACTIVITIES	DOCUMENTATION
1	2013 National EPR exercise– *Drill* Field exercise in Province scale	
2	4 December 2019 Facility EPR exercise – TTE (*Table Top Exercise)* BATAN - Stakeholders	
3	22 Desember 2020 Facility EPR exercise – TTE (*Table Top Exercise)*	
4	30 November 2021 Facility EPR exercise – Drill	
5	6 October 2022 Facility EPR exercise- Drill BRIN - BAPETEN	
6	7 December 2023 Facility EPR exercise – TTE (*Table Top Exercise)*	

RESPONSE FUNCTION (1)



RESPONSE FUNCTION (2)

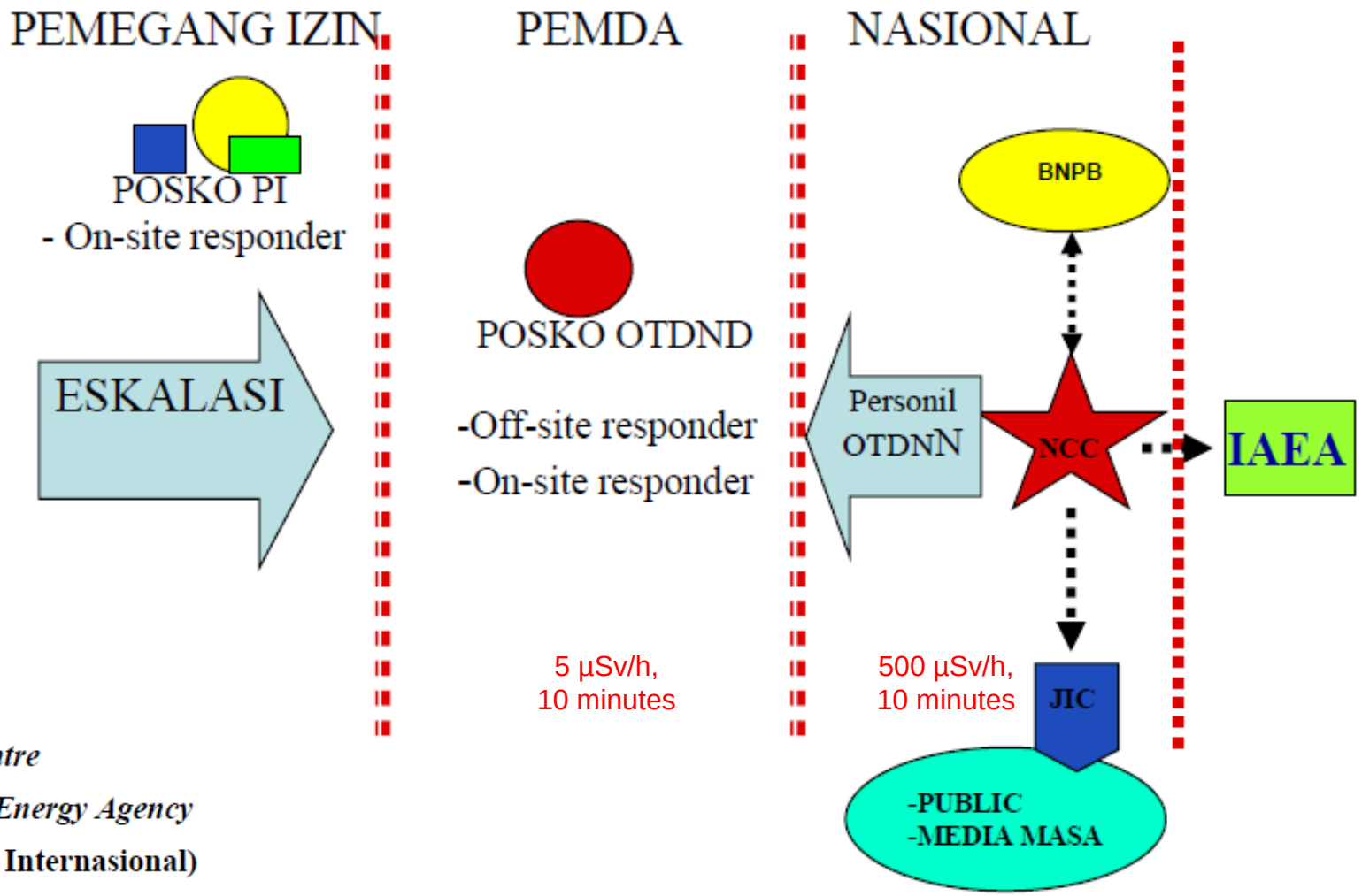
1. Identification, Report & Activation

NUCLEAR / RADIOLOGIC EMERGENCY CLASIFICATION

General Emergency	• Off-site radioactive release / exposure • Province Emergency (5 µSv/hour for 10 minutes) • National Emergency (500 µSv/hour for 10 minutes)
Site Area Emergency	• A significant protection level decrease for population onsite and offsite area near facility • Beyond Design Basis Accident (DBA)
Facility Emergency & Alert	• No risk for population off-site facility area • A significant personnel protection decrease

RESPONSE FUNCTION (3)

1. Identification, Report & Activation



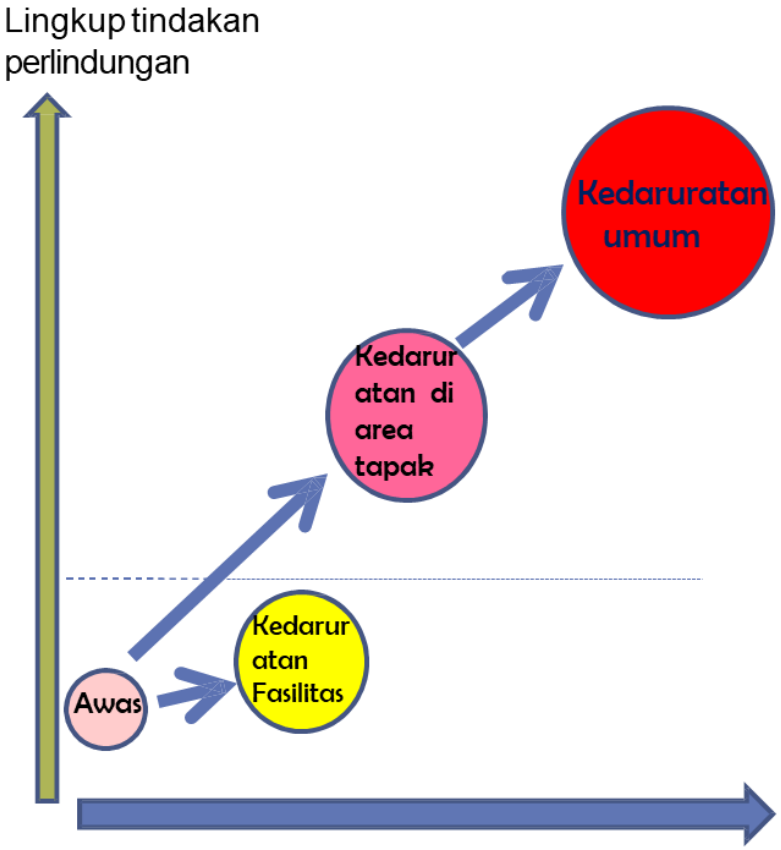
Keterangan:

JIC : *Joint Information Centre*

IAEA : *International Atomic Energy Agency*

(Badan Tenaga Atom Internasional)

RESPONSE FUNCTION (4)



1. Identification, Report & Activation

Report

Initial : personnel experiencing or RPO

Verbal to BAPETEN : 1 hour

Written to BAPETEN : 2 day

Activation Emergency Organization by **License Holder or Director of PFK**

Direktorat Keteknikan dan Kesiapsiagaan Nuklir
Badan Pengawas Tenaga Nuklir
E-mail: sos@bapeten.go.id
Telp: 021-6385-6518
Faks: 021-630-2187

RESPONSE FUNCTION (5)

Report

- Report to BAPETEN
- Verbal report in 1 hour
- Written report in 2 day (2 x 24hour)

Information

Content:

- Accurate, regularly updated, fast, timely
- Appoint a public relations / spokesperson

- Emergency status
- Description & brief description of the accident
- Emergency response actions that have been & will be taken
- Impact & escalation estimates
- Immediate action recommendations

RESPONSE FUNCTION (6)

1. Identification, Report & Activation

FORMULIR PELAPORAN PENANGGULANGAN KEDARURATAN NUKLIR

Tanggal	:	
Jam	:	
Instansi	:	
Alamat	:	
Lokasi	:	

Nama Pelapor	:	
Jabatan	:	
Unit Kerja	:	
Telp	:	
Faks	:	
E-mail	:	

Kategori	I	II	III	IV
Fasilitas / Instalasi	☐Reaktor Daya ☐Reaktor Nondaya Daya: Tipe: ☐Lain-lain ..... Klas kedaruratan ☐Waspada ☐Kedaruratan area tapak ☐Kedaruratan umum	☐Reaktor Daya ☐Reaktor Nondaya Daya: Tipe: ☐Lain-lain ..... Klas kedaruratan ☐Waspada ☐Kedaruratan area tapak ☐Kedaruratan umum	☐Reaktor < 2 MWt ☐Fasilitas penyimpanan bahan bakar bekas kering ☐Fasilitas produksi radioisotop ☐Lain-lain	☐Radiografi industri fasilitas terbuka ☐*Well logging* ☐Fasilitas *gauging* industri ☐Lain-lain .....

Sumber radiasi yang terlibat:	
Bentuk Fisik	☐ padat ☐ cair ☐ gas
Jenis Isotop	
Aktivitas	

Paparan Radiasi					
Jarak (meter)	1	10	25	50	.....
mRem/jam					
Kontaminasi					
Lantai/Ruangan	Bq/cm^2				
Udara	Bq/liter				

Jumlah Korban	
Nama	Keterangan
Tindakan Penanggulangan yang telah dilakukan	
Bantuan yang diharapkan	

....., ...

Pelapor

Nama Lengkap

KEPALA BADAN PENGAWAS TENAGA NUKLIR,

ttd

AS NATIO LASMAN

Direktorat Keteknikan dan Kesiapsiagaan Nuklir
Badan Pengawas Tenaga Nuklir
E-mail: sos@bapeten.go.id
Telp: 021-6385-6518
Faks: 021-630-2187

RESPONSE FUNCTION (7)

2. Mitigation

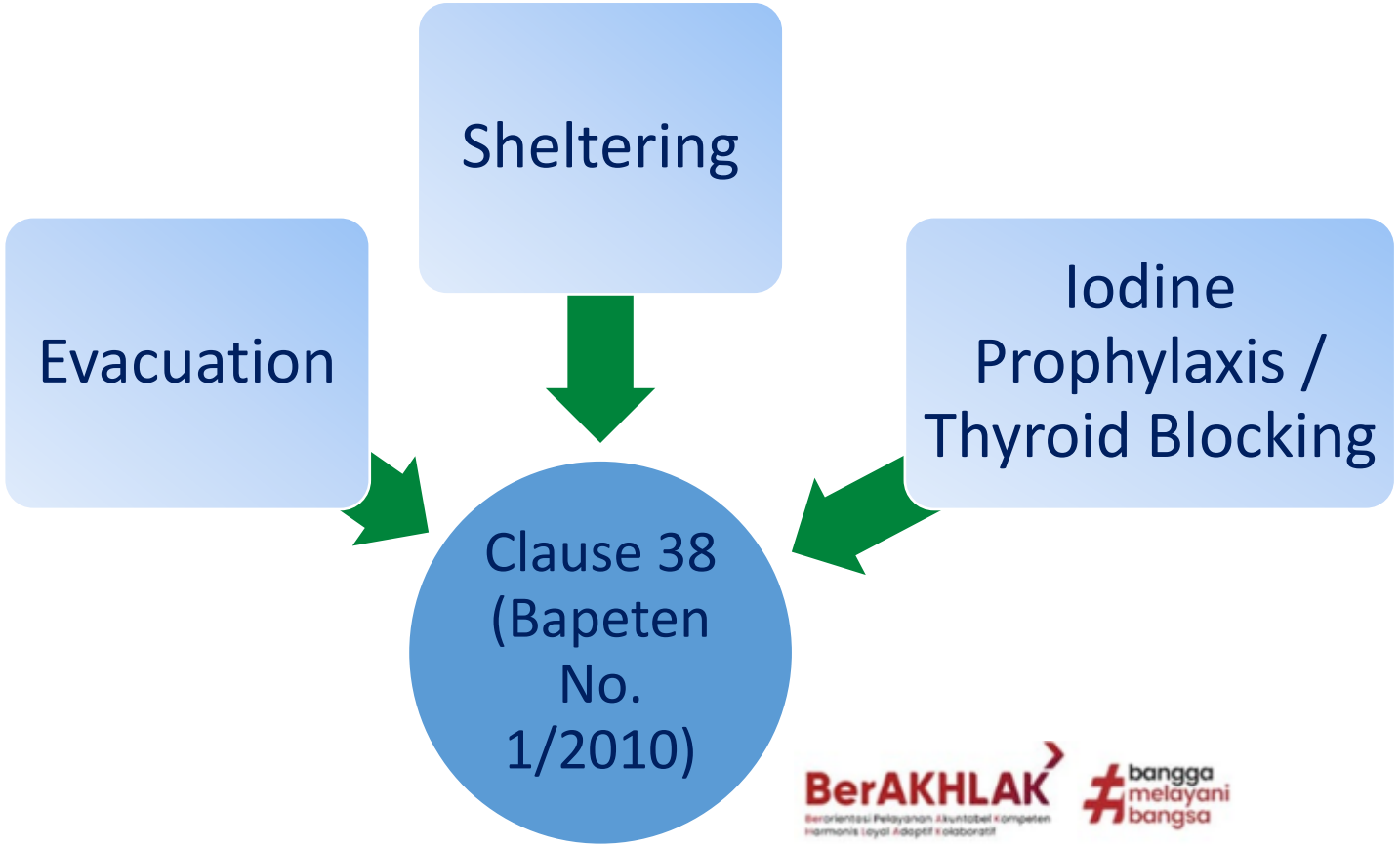
actions to restrain and reduce radiation exposure if an event occurs that may cause or increase radiation exposure

Reactor	Shut down the reactor, Suppress / minimize radiation source
Reactor Cooling	Turn on the emergency core cooling system in Reactor
Ventilation System	Close all the radioactive release

RESPONSE FUNCTION (8)

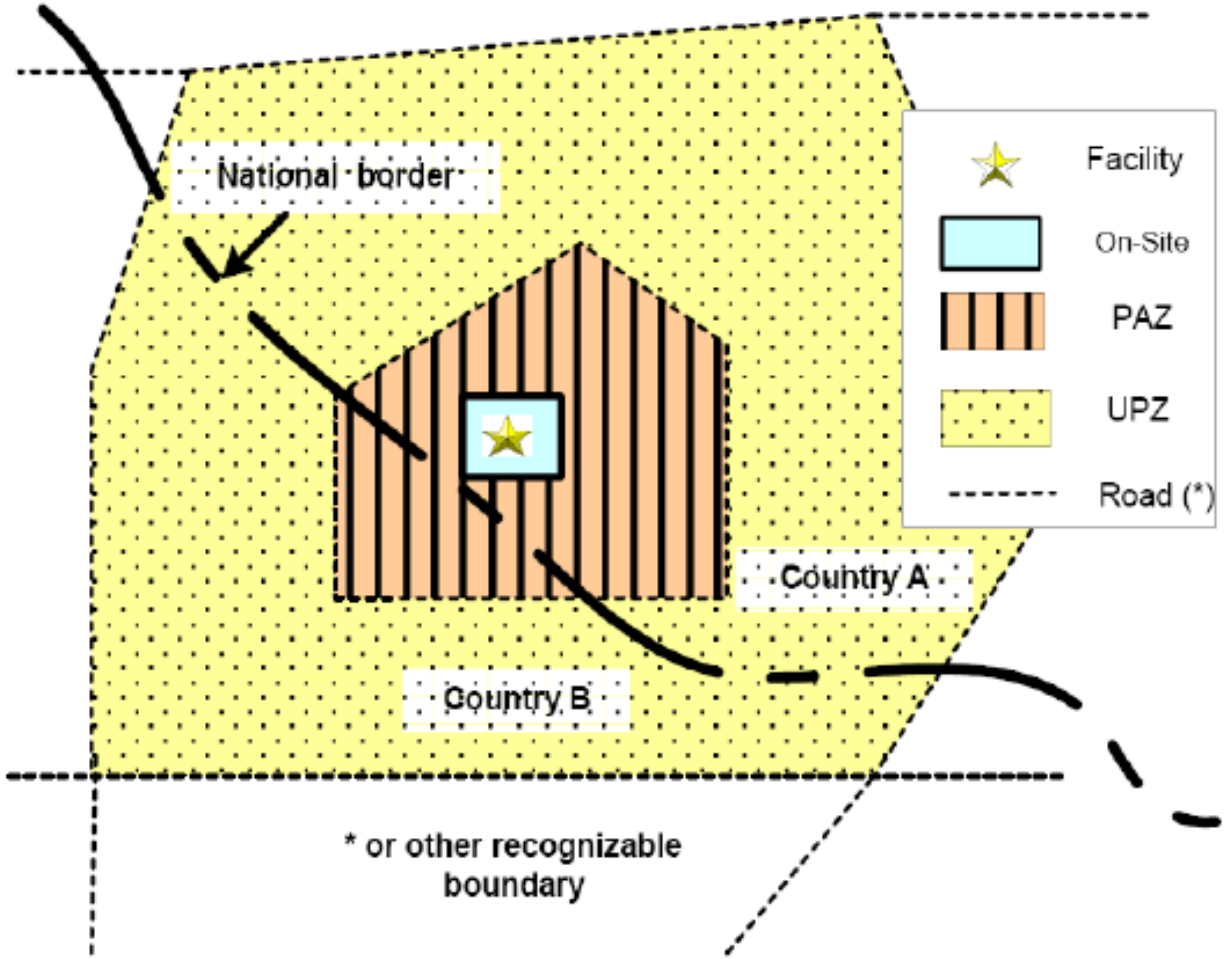
3. Urgent Protection Action

actions that must be taken immediately to avoid or reduce doses to the public in a nuclear emergency to provide effective results.



RESPONSE FUNCTION (9)

3. Urgent Protection Action



Zona tindakan pencegahan (Precautionary Action Zone, PAZ)

- mengurangi secara signifikan risiko efek deterministik

Zona perencanaan (Urgent protective action planning zone, UPZ)

- menghindari dosis lepas-kawasan

RESPONSE FUNCTION (10)

3. Urgent Protection Action

Source:

Spent fuel / fresh fuel, radioactive material / source, radioactive waste

Emergency preparedness categories in Indonesia:

- category II (GSR part 7)
- threat category II facility (GS-G-2.1, PP 54/2012)

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A/D_2 from Appendix III is $\geq 10^2$–10^3 [f]	None	0.5 km
Fissionable mass is possible within 500 m of	None	0.5–1 km

Safety Guide No. GS-G-2.1

RESPONSE FUNCTION (11)

3. Urgent Protection Action

Nuclear Emergency Zone

- The area around the facility or installation in which there is:
  - zona tindakan pencegahan (*precautionary action zone, PAZ*),
  - zona perencanaan (*urgent protective action planning zone, UPZ*),
  - zona pengawasan bahan pangan (*food restriction planning radius, FRP*)
    → EPD (Extend Planning Distance) , ICPD (Ingestion and Commodities Planning Distance)

Precautionary Action Zone (PAZ)

- for facilities in category I,
- for which arrangements shall be made for taking **urgent protective actions** and other response actions, before any significant release of radioactive material occurs, on the basis of conditions at the facility (i.e. conditions leading to the declaration of a general emergency), in order to avoid or to minimize severe deterministic effects

RESPONSE FUNCTION (12)

3. Urgent Protection Action

Urgent Protective Action Planning Zone (UPZ)

- for facilities in category I or II, for which arrangements shall be made to initiate **urgent protective actions** and other response actions, if possible before any significant release of radioactive material occurs, on the basis of conditions at the facility (i.e. conditions leading to the declaration of a general emergency), and after a release occurs, on the basis of monitoring and assessment of the radiological situation off the site, in order to reduce the risk of stochastic effects.
- Any such actions shall be taken in such a way as not to delay the implementation of **precautionary urgent protective actions** and other response actions within the **precautionary action zone (PAZ)**.

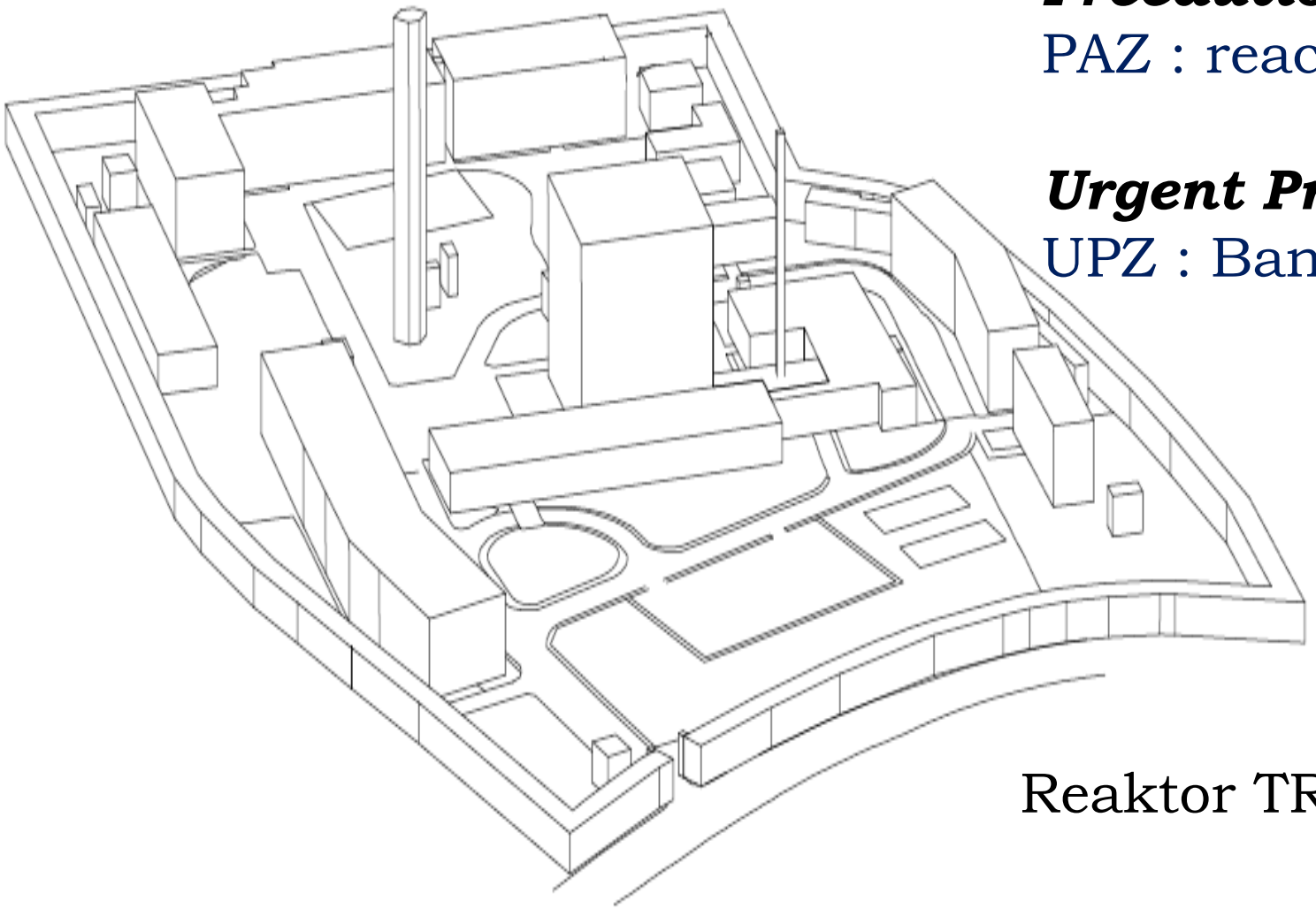
RESPONSE FUNCTION (13)

3. Urgent Protection Action

Extended Planning Distance (EPD)	• for facilities in category I or II (beyond the UPZ), for which arrangements shall be made to conduct monitoring and assessment of the radiological situation off the site in order to identify areas, within a period of time that would allow the risk of stochastic effects in the areas to be effectively reduced by taking **protective actions** and other response actions within a day to a week or to a few weeks following a significant radioactive release
Ingestion and Commodities Planning Distance (ICPD)	• for facilities in category I or II (beyond the EPD), for which arrangements shall be made to take response actions 1) for protecting the food chain and water supply as well as for protecting commodities other than food from contamination following a significant radioactive release and 2) for protecting the public from the ingestion of food, milk and drinking water and from the use of commodities other than food with possible contamination following a significant radioactive release

RESPONSE FUNCTION (14)

3. Urgent Protection Action



Precautionary Action Zone

PAZ : reactor hall / building

Urgent Protective Action Planning Zone

UPZ : Bandung nuclear complex fence

Reaktor TRIGA 2000 Bandung

RESPONSE FUNCTION (15)

3. Urgent Protection Action

RESPONSE FUNCTION (16)

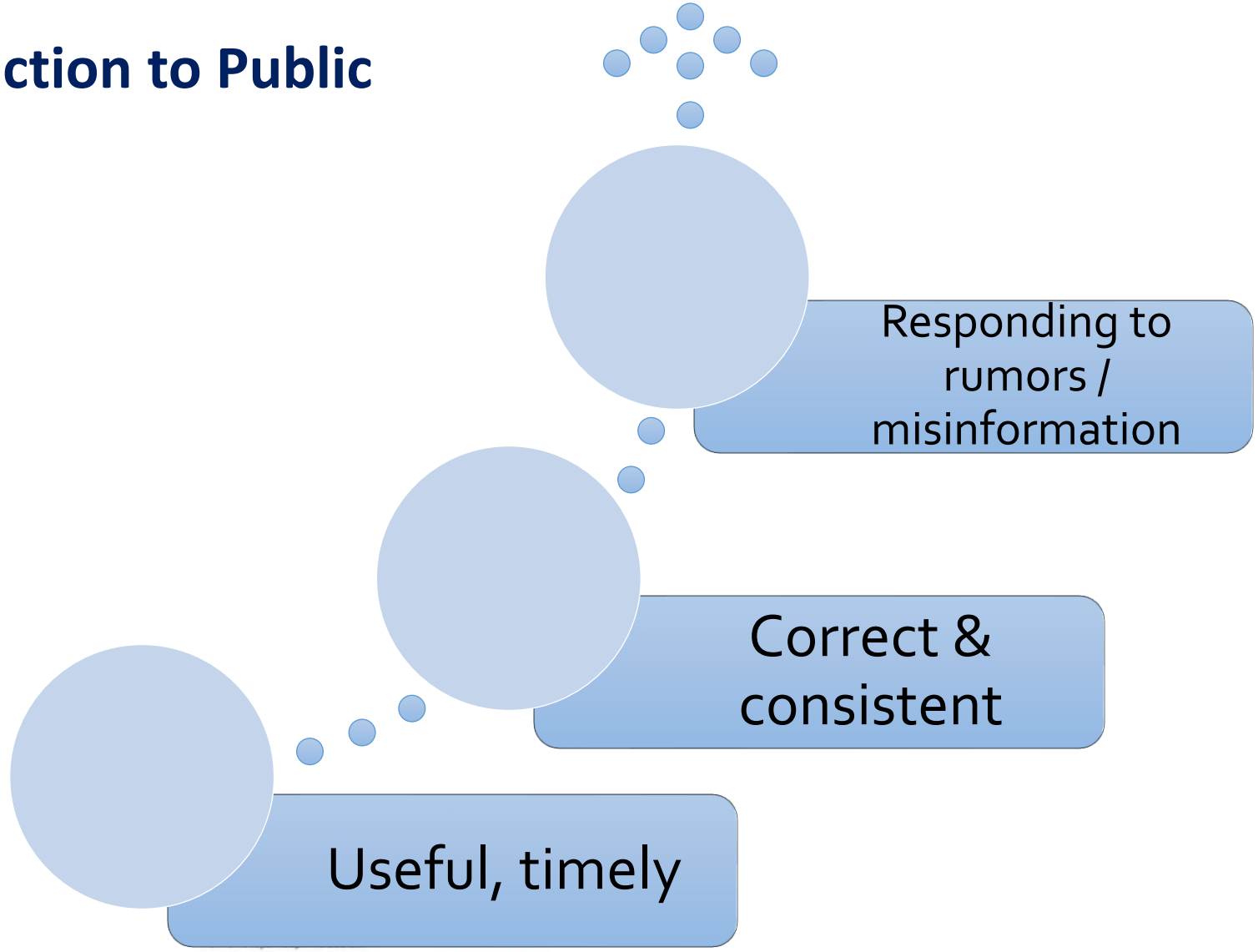
4. Emergency Worker Protection & Public

Emergency worker is an officer in charge of carrying out emergency response in a nuclear area, precautionary action zone (PAZ) , or planning zone for immediate protective action (UPZ).

- **> 500 mSv**
  - Penyelamatan nyawa
  - Bersifat sukarela
- **500 mSv**
  - Penyelamatan jiwa potensial
  - Pencegahan efek kesehatan / pelepasan lebih besar
  - Perlindungan segera
- **200 mSv**
  - Wajib menyediakan / dapat meminta pemantauan Kesehatan sebelum PR Kembali menerima dosis dari paparan kerja
- **100 mSv**
  - Pencegah luka serius
  - Menghindari dosis kolektif yang besar
- **50 mSv**
  - Intervensi tahap kedaruratan lainnya
  - Maksimal dosis yang boleh diterima masyarakat
- **NBD**
  - Operasi pemulihan

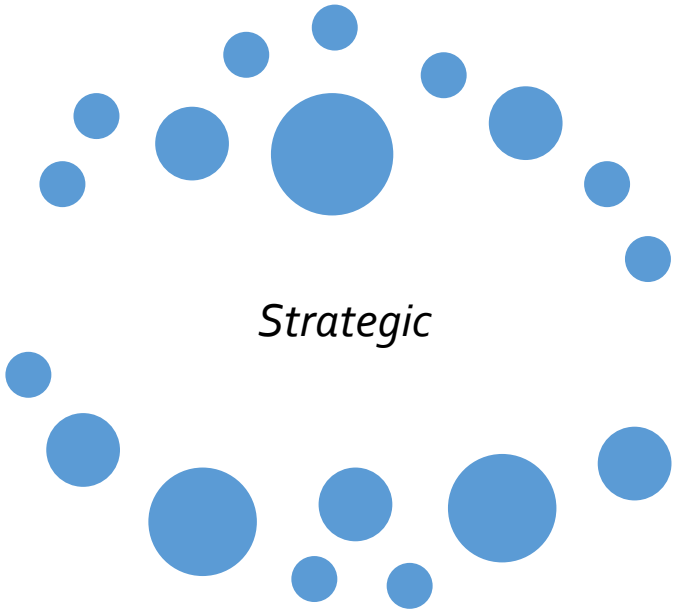
RESPONSE FUNCTION (17)

5. Information & Instruction to Public



NUCLEAR EMERGENCY (1)

Emergency Response Strategy

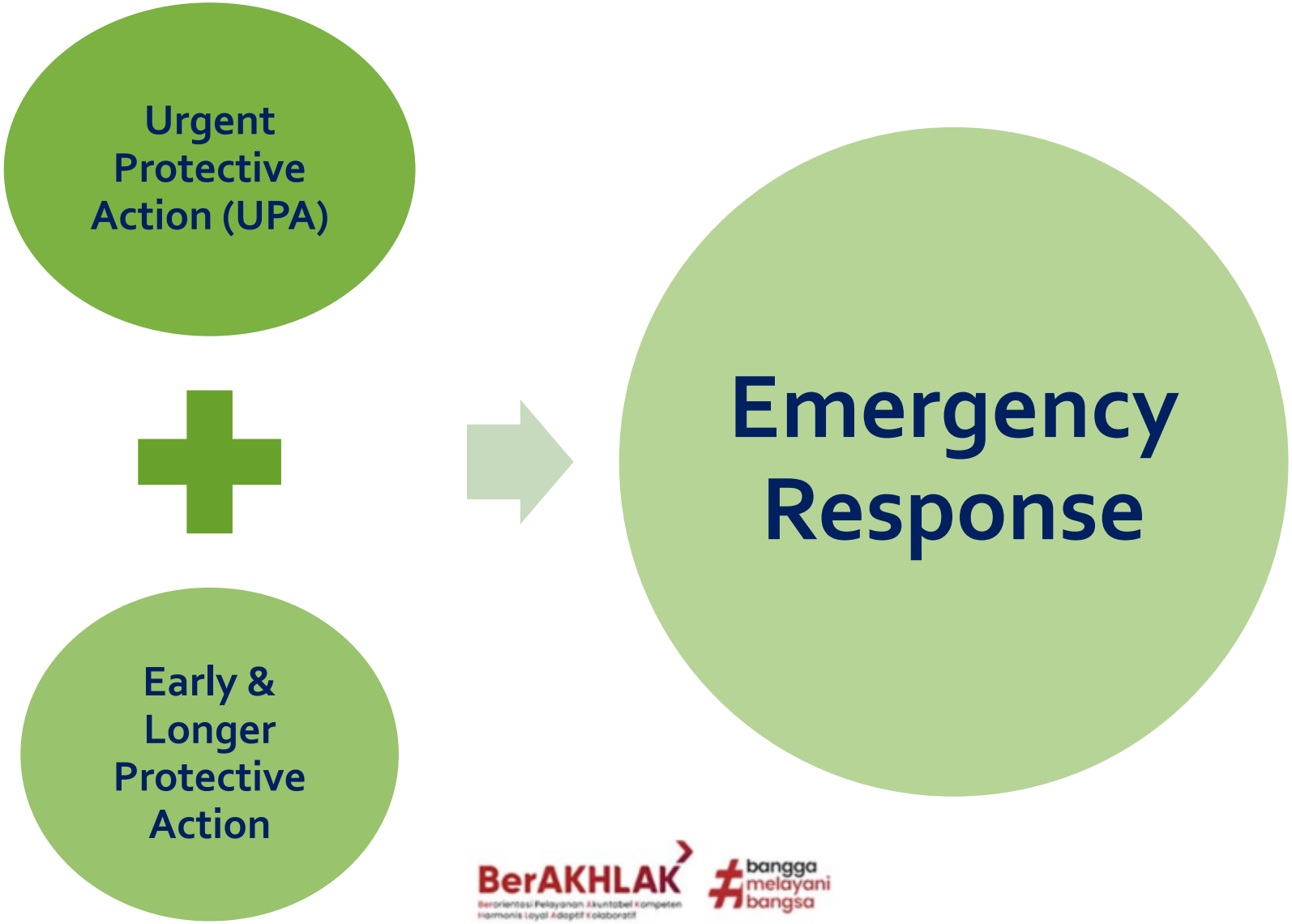


- ***Classify*** **/ Klasifikasi**
- ***Life Saving*** **/ Selamatkan Jiwa**
- ***Assess and protect*****/ Ases dan Lindungi**
- ***Inform*** **/ Informasikan**
- ***Manage*** **/ Kelola**

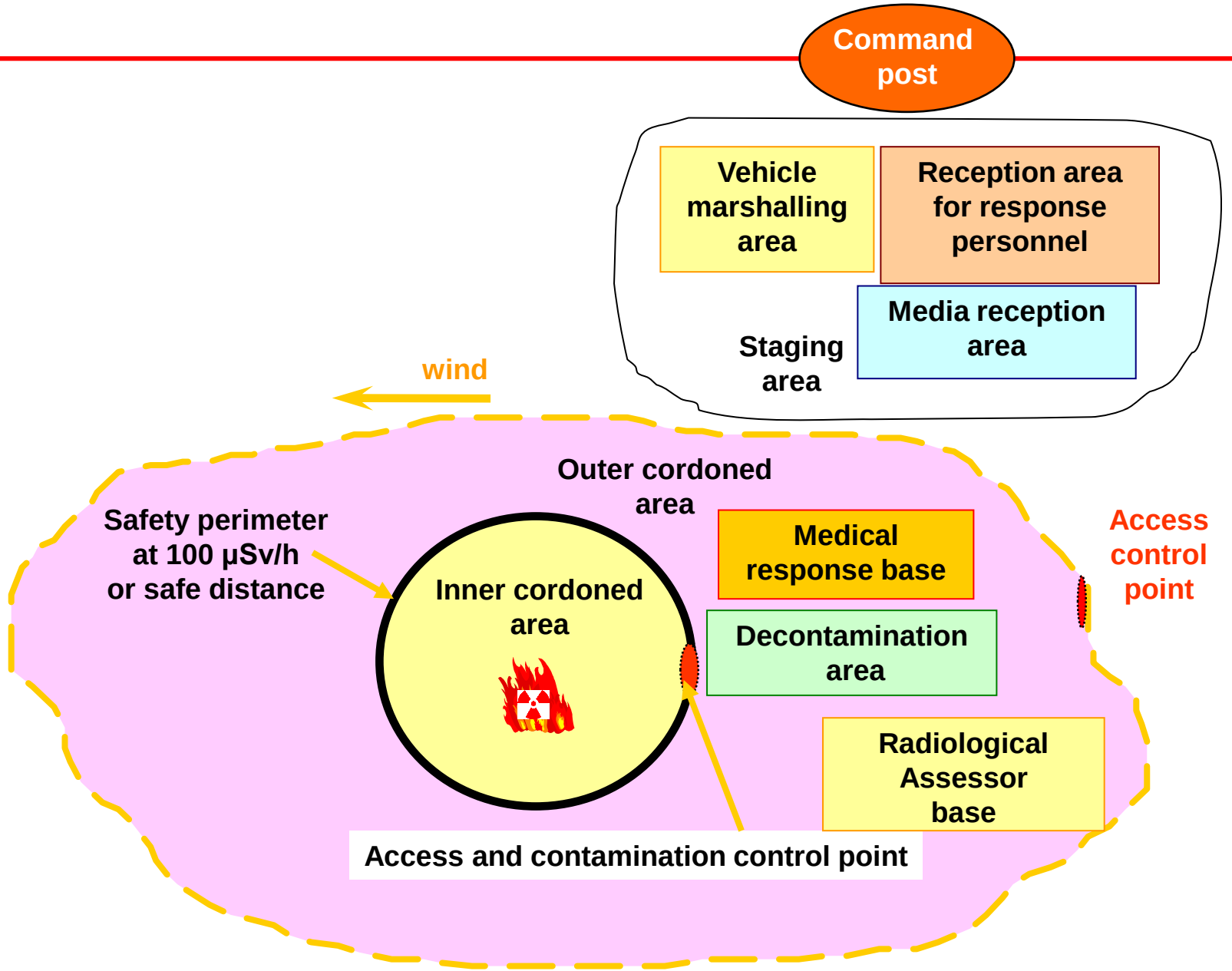
CLAIM

Emergency Preparedness & Response

NUCLEAR EMERGENCY (2)



NUCLEAR EMERGENCY (3)



CONTINGENCY PLANNING NUCLEAR ACCIDENT IN BANDUNG – WEST JAVA (1)

Disaster Risk Analysis → Beyond Design Basis Accident (DBA)

1 (one) fuel falling & breaking during the transfer outside the core

Ventilation system failed

Release of radioactive (I-131, Cs-137) to the environment

Radiation exposure rate in the perimeter: 5µSv/hour for 10 minutes

The release will reach a radius of 1 km from the reactor, with the worst impact reaching a radius of 500 m

Wind direction: to Southeast, wind speed: 1.3 m/s

The Lebak Siliwangi and Lebak Gede sub-districts in the Southeast East direction community / resident had to be evacuated

CONTINGENCY PLANNING NUCLEAR ACCIDENT IN BANDUNG – WEST JAVA (2)

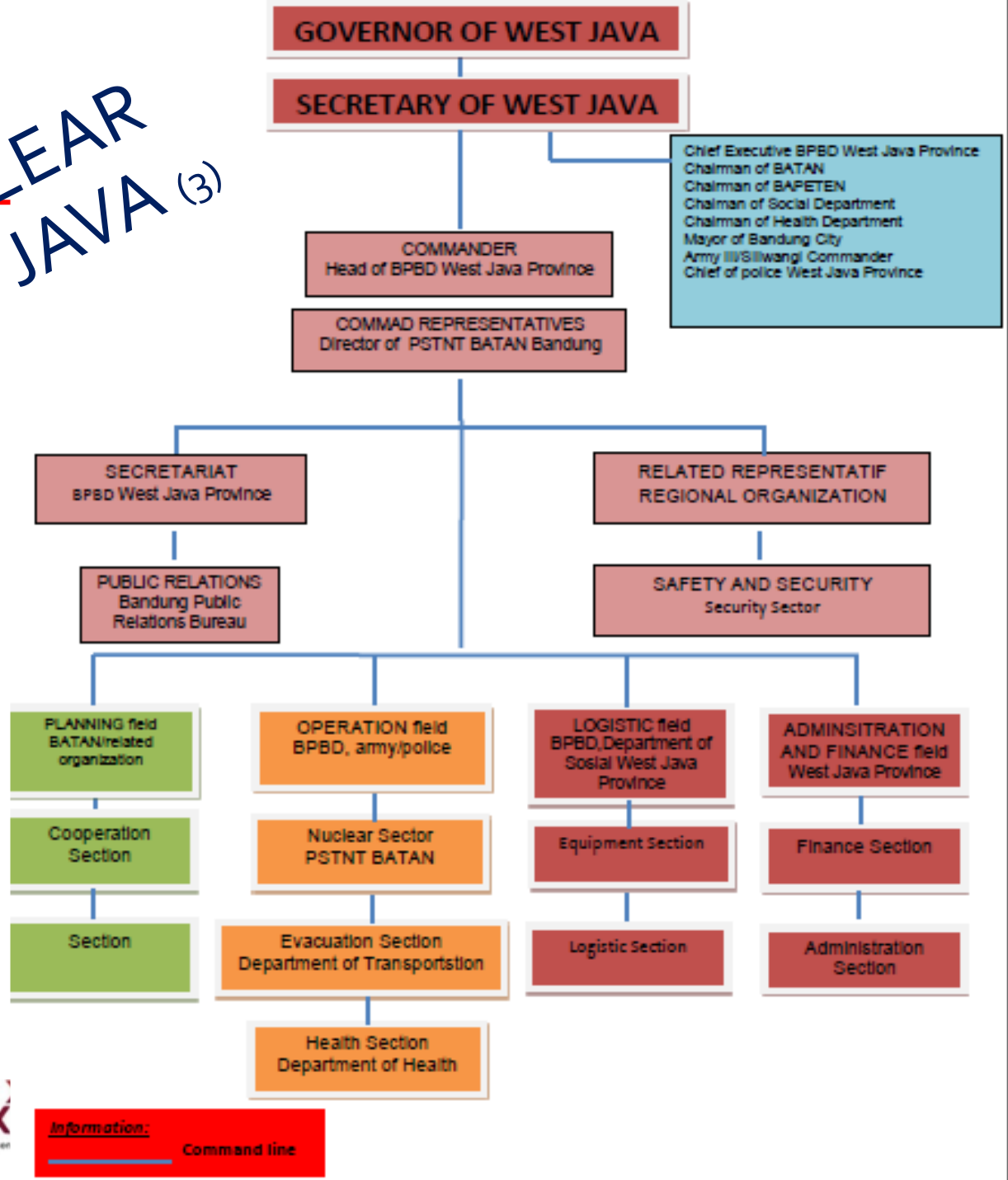
TABLE 8. SUGGESTED EMERGENCY ZONES AND AREA SIZES[a]

Facilities	Precautionary action zone (PAZ) radius[b,c]	Urgent protective action planning zone (UPZ) radius[d]
Threat category I facilities		
Reactors >1000 MW(th)	3–5 km	5–30 km[e]
Reactors 100–1000 MW(th)	0.5–3 km	5–30 km[e]
A/D_2 from Appendix III is $\geq 10^5$ [f]	3–5 km	5–30 km[e]
A/D_2 from Appendix III is $\geq 10^4$–10^5 [f]	0.5–3 km	5–30 km[e]
Threat category II facilities		
Reactors 10–100 MW(th)	None	0.5–5 km
Reactors 2–10 MW(th)	None	0.5 km
A/D_2 from Appendix III is $\geq 10^3$–10^4 [f]	None	0.5–5 km
A/D_2 from Appendix III is $\geq 10^2$–10^3 [f]	None	0.5 km
Fissionable mass is possible within 500 m of	None	0.5–1 km

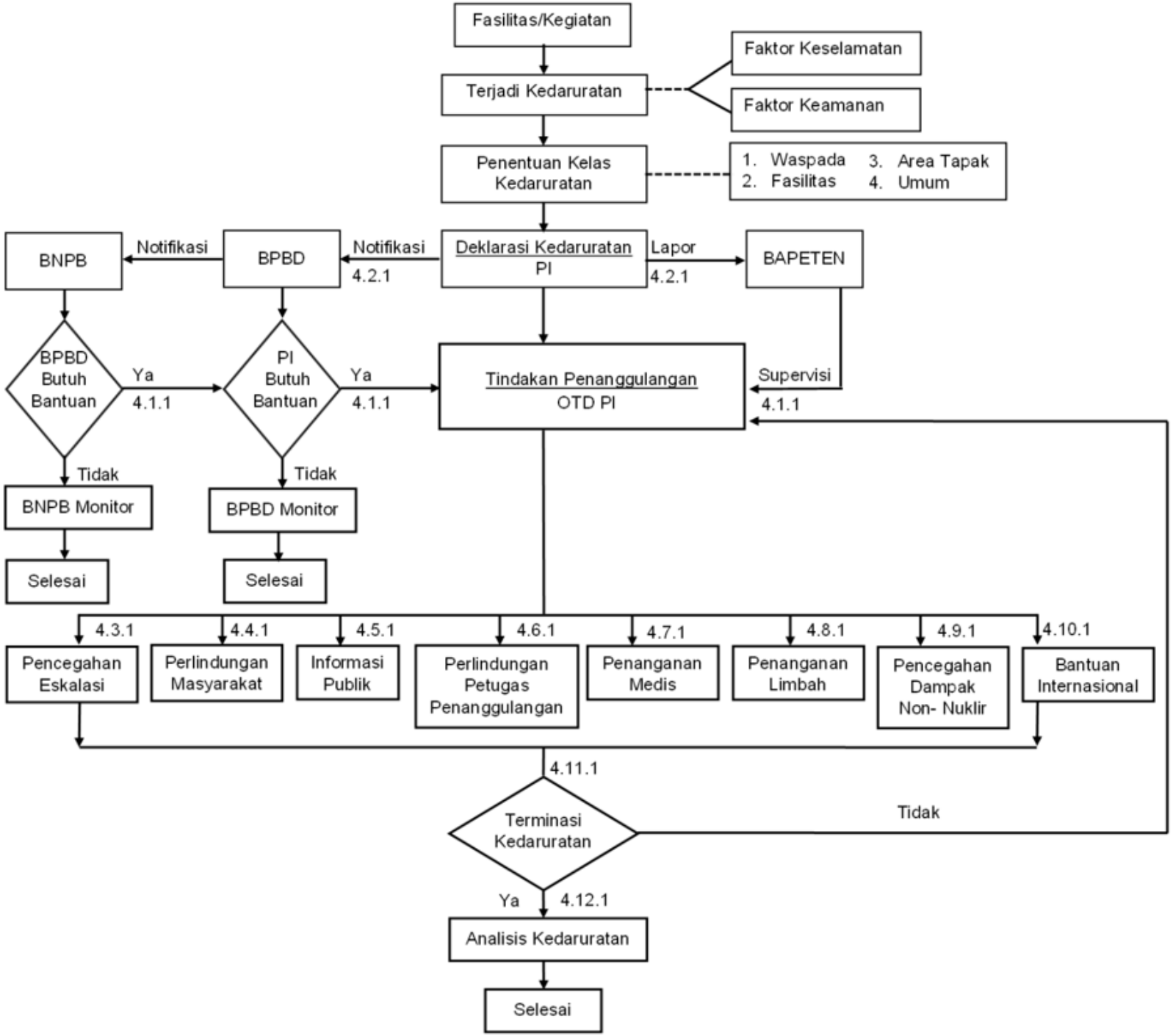
Safety Guide No. GS-G-2.1

- PAZ : Bandung nuclear complex fence
- UPZ : 500 meter
- LPZ : 1 km

CONTINGENCY PLANNING NUCLEAR ACCIDENT IN BANDUNG – WEST JAVA (3)



Source: Contingency Plan Nuclear Accident in Bandung – West Java, 2014



National Nuclear Emergency Response Flowchart for Incidents at Installations / Facilities / Activities

Bagan Alir Penanggulangan Kedaruratan Nuklir Nasional untuk Kejadian di Instalasi / Fasilitas / Kegiatan

THANK YOU