



Department of Minerals and Energy

**NATIONAL NUCLEAR DISASTER MANAGEMENT
PLAN**

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**DEPARTMENT OF MINERALS AND ENERGY
NATIONAL NUCLEAR DISASTER MANAGEMENT PLAN**

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1 Legal Obligations

The Minister of Minerals and Energy is responsible for national policy on nuclear matters and administration of both nuclear acts namely the Nuclear Energy Act, 1999 (Act No. 46 of 1999) and the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999). The Department of Minerals and Energy is responsible to service the Minister's obligations arising from these acts related to the governance of the nuclear industry in South Africa and internationally in the specific areas of nuclear technology, nuclear safety and nuclear non-proliferation. In terms of the Disaster Management Act, 2002 (Act No. 57 of 2002) the DME is therefore also the "National Organ of State" for coordination and management of matters related to nuclear disaster management at national level.

Section 25 of the Disaster Management Act places the following obligations on DME:

"(1) Each national organ of state indicated in the national disaster management framework must—

(a) prepare a disaster management plan setting out—

- (i) the way in which the concept and principles of disaster management are to be applied in the function area;
- (ii) its role and responsibilities in terms of the national disaster management framework;
- (iii) its role and responsibilities regarding emergency response and post-disaster recovery and rehabilitation;
- (iv) its capacity to fulfill its role and responsibilities;
- (v) particulars of its disaster management strategies; and
- (vi) contingency strategies and emergency procedures in the event of a disaster, including measures to finance these strategies;

(b) co-ordinate and align the implementation of its plan with those of other organs of state and other institutional role-players; and

(c) regularly review and update its plan.

(2) The disaster management plan of a national organ of state referred to in subsection (1) must form an integral part of its planning.

(3) (a) A national organ of state must submit a copy of its disaster management plan and of any amendment to the plan to the National Centre."

The Minister of Minerals and Energy is also responsible for making the following emergency planning related regulations under the National Nuclear Regulator Act:

- a) Establishment of a Public Safety Information Forum by the Holder of a Nuclear Installation Licence to inform the public about the arrangements for nuclear emergency planning
- b) Specifying the level of financial security to be provided by the Holder of a Nuclear Installation Licence in case of nuclear damage
- c) Safety standards related inter alia to nuclear emergency planning

The NNR Act also specifically places a responsibility on the Minister of Minerals and Energy relating to claims in excess of financial security following an accident at a nuclear installation.

It should be noted that with regard to certain other radioactive materials (Group IV hazardous substances) the Department of Health will be the responsible National Organ of State in terms of the Disaster Management Act. The Department of Health (Directorate Radiation Control) regulates Group IV hazardous substances under the Hazardous Substances Act, 1973 (Act No. 15 of 1973). Group IV hazardous substances are radioactive material outside a nuclear installation and which does not form part of, or is used in, the nuclear fuel cycle and which is used or intended to be used for medical, scientific, agricultural, commercial or industrial purposes.

As a signatory to the international “Convention on early notification of a nuclear accident” South Africa will also notify the International Atomic Energy Agency in case of a nuclear accident. The South African Nuclear Energy Corporation (NECSA) has been designated by DME as the National Competent Authority to service this Convention and to be the designated Contact Point using the 24 hour NECSA Emergency Control Centre.

2 Concepts and Principles

2.1 Application of the Disaster Management Act to nuclear emergencies

Section 2 of the Disaster Management Act determines that the Act does not apply to an occurrence falling within the definition of “disaster” to the extent that that occurrence can be dealt with effectively in terms of other national legislation. Although most aspects of nuclear emergency planning at nuclear installations can effectively be dealt with in terms of the provisions of the NNR Act it must be noted that a nuclear emergency requiring off-site emergency management cannot be effectively dealt with in terms of that Act alone for the following reasons:

- the nuclear emergency planning provisions of the NNR Act are limited to requirements on the holder of the nuclear authorization and as such the NNR Act has no provision obliging the three levels of government to implement off-site emergency management in the case of an off-site impact of a nuclear emergency – such obligations however arise directly from the provisions of the Disaster Management Act and only indirectly from a provision in the NNR Act, which obliges the Holder of a Nuclear Authorisation to enter into an agreement with the relevant municipal and provincial authorities to establish an emergency plan.
- the NNR Act has no provision to ensure that resources are made available at national level to respond to a nuclear emergency affecting the public living in the vicinity of a nuclear installation. Again this is provided for in terms of the Disaster Management Act whereby national resources & personnel can be made available following the declaration of a “national disaster” (contingency basis) or declaration of a “National State of Disaster” (legal directive) via the National Disaster Management Centre.

It should be noted that other disaster management aspects, that may be required in terms of the Disaster management Act (and its regulations) are effectively dealt with in terms of the NNR Act, for example risk analysis/assessment and risk limitation, etc.

In terms of nuclear emergency planning required under the NNR Act a declared “Site Emergency” is limited to the nuclear site (not affecting the public) and the

management of such an on-site emergency is the responsibility of the operator (holder of the nuclear authorization) as per the regulatory requirements under the NNR Act. However, the managing of the off-site emergency (affecting the public) is the responsibility of the government authorities under the Disaster Management Act. The declaration of a “General Emergency” (in terms of the nuclear licence under the NNR Act) implies a threat to the off-site public which requires the implementation of off-site protective actions. Although a Local Municipality is primarily responsible to manage a local disaster (irrespective of whether a local state of disaster has been declared), it must be realized that, due to the nature of a nuclear disaster, it is known that it cannot be effectively dealt with by the local/provincial authorities alone and therefore it will require the declaration of a “National Disaster” to ensure that national resources are made available. It is therefore important that a “General Emergency” must equate to a “National Disaster”. For purposes of this Disaster Management Plan it is essential that the declaration of a General Emergency at a nuclear installation (e.g. Koeberg Nuclear Power Station, Safari Reactor) must result in the declaration of a “National Disaster” under the Disaster Management Act, and subsequently consideration for a “National State of Disaster”. In the case of such a National Disaster it would be essential that there be Joint Coordination, Decision-making and Management as soon as possible by all three levels of Government at the relevant Joint Coordinating Centre. (Note: For the meaning of terms, reference should be made to the relevant legislation)

It is recognized that in the case where there is a need for urgent protective actions in the public domain, and where the local authority is not yet in a position to order such protective actions, the holder of the nuclear authorisation should as a priority act in the interest of the public by advising/recommending such urgent protective actions. If time permits this should be done in consultation with the standby Disaster Manager of the relevant local government authority.

2.2 Scope of the plan

The scope of this Plan focuses on nuclear disaster management at national government level and relates to oversight in the following areas:

- a) Nuclear Reactors and other Nuclear Fuel Cycle facilities requiring nuclear emergency plans
- b) Nuclear powered vessels
- c) Transport of radioactive material within the nuclear fuel cycle (air, land & sea)
- d) Radioactive contamination from nuclear powered satellites
- e) Radioactive fallout from nuclear weapons

The term “nuclear accident/emergency/disaster” is used in this disaster management plan in its wider sense, referring to any radiological emergency as a result of exposure to radioactivity arising indirectly from a fission process (for example a nuclear reactor) or arising directly from radioactive material.

2.3 Main characteristics of a nuclear accident (at a nuclear reactor)

TIME PHASE	EARLY PHASE hours – days				
			INTERMEDIATE days – weeks		
			LATE PHASE Weeks - years		
DOMINANT RISK	radioactive cloud	deposited radioactivity	radioactivity in food and water		
EXPOSURE PATHWAY	inhalation external exposure	external exposure	Ingestion		
RESPONSE ACTIONS	respiratory/ thyroid protection				
	Shelter			food/water control	
	evacuate*			relocate**	
				Re- entry	
				cleanup	
		access control			
		radiological assessment			
	mass care				
DECISIONS	urgent		complex		

***EVACUATE:** The urgent removal of people to prevent acute exposure from a radioactive plume or highly contaminated area.

****RELOCATE:** The less urgent removal of people to prevent chronic exposure resulting from contamination of the environment, food and water.

2.4 Objectives and Principles of nuclear emergency response

The primary objectives for protection are as follows:

- All possible efforts should be made to prevent serious early health effects (deterministic effects). Examples are vomiting, cataract, sterility, hypothyroidism, deformity of the foetus and death. For these early health effects the severity increases with increasing dose whilst an initiating threshold exists for each effect.
- All possible effort should be made to reduce the incidence of late health effects (stochastic effects). Examples are cancer and hereditary defects. For late health effects there is no demonstrable initiating threshold and the probability of the effect occurring increases with dose.

Achieving these objectives is based on the following principles:

- Any protective action (intervention) must be justified and optimised, that is, it should do more good than harm and it should produce the maximum net benefit.

In order to comply with these objectives it follows that the threshold dose levels, which would cause early health effects, must be avoided and the dose accrued below the threshold must be kept as low as possible. This requires that protective actions must be implemented before the threshold dose levels (for early health effects) have been accrued by members of the public. Protective actions based on prescribed protective action levels are therefore particularly urgent during the early phase when there is a threat of release of radioactivity or when a radioactive plume is approaching a residential area.

The typical Protective Actions that may be employed are

- a) Notification (Authorities & Affected Public)
- b) Isolation of Affected Area
- c) Sheltering
- d) Evacuation
- e) Use of Thyroid Prophylaxis
- f) Relocation
- g) Control of foodstuff & water

2.5 Objectives of nuclear emergency preparedness

The objectives of emergency response are most likely to be achieved by ensuring a sound programme for nuclear emergency preparedness. The objective of nuclear emergency preparedness is to ensure that arrangements are in place for a timely, managed, controlled, coordinated and effective response at the scene, and at the local, regional, national and international level.

3 OVERVIEW OF KEY RESPONSIBILITIES

3.1 National Executive

The National Executive is primarily responsible for the coordination and management of any national disaster and must deal with such a disaster in terms of existing legislation and contingency arrangements (DM Act, S26). These obligations of the National Executive will be serviced by the relevant officials and infrastructure of the three levels of government.

3.2 National Disaster Management Centre

The Centre is responsible to declare a National Disaster on the recommendation of the affected municipality or province (DM Act S23). The Centre will execute its powers and duties as per the DM Act.

3.3 Minister of Provincial and Local Government (PLG)

The Minister may declare a National State of Disaster if existing legislation and contingency arrangements are inadequate to effectively deal with a National Disaster

(DM Act, S27). The Minister (PLG) may then make regulations or issue directives after consultation with the responsible Cabinet member in connection with the release of national resources and personnel, etc.

3.4 Minister of Minerals and Energy

The Minister makes regulations related to nuclear emergency planning and will assume a leading role in the National Executive's oversight during a nuclear disaster. The Minister is responsible to address claims in excess of the financial security provided by the holder of the nuclear authorization.

3.5 Department of Minerals and Energy

The Chief Directorate Nuclear is specifically responsible to service the following DME obligations with regard to nuclear disaster management and response.

- a) Service the Minister's (M&E) obligations regarding nuclear emergency planning matters under the NNR Act (Issue regulations on Financial Security, Public Safety Information Forum and Safety Standards).
- b) Ensure compliance with section 25 of the DM Act regarding the obligations of the National Organ of State to prepare and maintain a National Nuclear Disaster Management Plan and coordinate its implementation.
- c) Ensure establishment and Chair Nuclear Emergency Planning Steering and Oversight Committees (EPSOC) for relevant nuclear installations as per a formal Terms of Reference.
- d) Represent DME at meetings of the Intergovernmental Committee on Disaster Management established in terms of the DM Act.
- e) In case of a National Disaster declared as a result of a nuclear emergency, deploy a DME representative to the Joint Operations Centre (JOC) of the relevant local government authority (or other appropriate centre) and deploy a DME representative to the National Disaster Management Centre. At these centers DME will participate in Joint decision making and management of the emergency in accordance with the procedures at these facilities.
- f) Responsible for Joint Coordination of post-disaster recovery and rehabilitation with other two levels of government and with the necessary input from the holder of the nuclear authorisation and the nuclear regulator .
- g) Responsible for notifying, through official channels, South Africa's bordering States about a nuclear emergency (Note: As a result of the distance to bordering States it is highly unlikely that a nuclear accident in South Africa will pose a hazard to any).
- h) Responsible for establishing any procedures required in terms of this plan.

3.6 Provincial Government

Establish and implement a Provincial Disaster Management Plan and establish a Provincial Disaster Management Centre. Execute powers and duties as per the DM Act. In terms of the DM Act the responsible Provincial Government for the Koeberg NPS is the Western Cape Province and for the Safari Reactor and other facilities at the NECSA (Pelindaba) site it is the North West Province (this may change to Gauteng).

3.7 Municipal Government

Establish and implement a Municipal Disaster Management Plan and establish a Municipal Disaster Management Center. Execute powers and duties as per the DM Act and formal procedures. In terms of the DM Act the responsible Municipality for the Koeberg NPS is the City of Cape Town and for the Safari Reactor and other facilities at the NECSA (Pelindaba) site it is Madibeng (this may change to Tshwane).

3.8 Holder of the Nuclear Authorisation

Where the possibility exists that a nuclear accident affecting the public may occur the holder of a nuclear authorization must enter into an agreement with relevant municipalities and provincial authorities to establish a nuclear emergency plan and submit such plan for approval by the National Nuclear Regulator (NNR Act S38).

The holder is responsible for technical and radiological assessment during all phases of the emergency and based on such assessment the holder is responsible for implementing on-site protective actions and recommending off-site public protective actions to the relevant government authority(ies) based on formal procedures. The holder is responsible for providing financial security as per regulations in case of nuclear damage.

It should be noted that the obligation of “prevention” under the Disaster Management Act is addressed by the operator (holder of the nuclear authorisation) through the implementation of the regulatory requirements under the NNR Act.

3.9 National Nuclear Regulator

In terms of the NNR Act the regulator must ensure that the nuclear emergency plan, of the holder of a nuclear autorisation, is effective for the protection of persons should a nuclear accident occur. The regulator must recommend standards for the protection of the worker and the off-site public to be published as regulations by the Minister of Minerals and Energy. The NNR Act provides for certain duties of the regulator regarding nuclear accidents (section 37) and the keeping of records of nuclear accidents (section 40).

3.10 SA Nuclear Energy Corporation (Necsa)

Necsa acts as the National Competent Authority and Contact Point (24 hour Emergency Control Centre) for the following International Atomic Energy Agency Conventions:

- Convention on early notification of a nuclear accident
- Convention on assistance in the case of a nuclear accident or radiological emergency

Necsa must establish a formal procedure to implement these obligations.

3.11 Other National Departments & Institutions

Other National Departments and Institutions will be involved as appropriate in terms of their legislation, functions and as directed in terms of a National State of Disaster.

3.12 International Atomic Energy Agency (IAEA)

In terms of the international Conventions referred to in 3.10 the IAEA will inform and provide information to any State party to the Conventions. On request from South Africa the IAEA will also provide assistance in case of a nuclear emergency or the IAEA may request assistance from South Africa in case of a nuclear emergency elsewhere.

4 DME's capacity to fulfill its role and responsibilities in terms of nuclear disaster management

In terms of the mandate and obligations under the Nuclear Energy Act, National Nuclear Regulator Act and the Disaster Management Act, DME has a Chief Directorate Nuclear covering the areas of nuclear safety, technology and non-proliferation. The Chief Directorate: Nuclear is responsible to give strategic direction and provide national coordination. The Chief Directorate Nuclear must ensure the availability of technically educated and experienced staff.

5 DME's nuclear disaster management strategies

- a) Ensuring integrated nuclear disaster management planning and, following the declaration of a "National Disaster", ensuring Joint Coordination, Decision-making and Management by all three levels of Government. In practical terms it must be recognized that the relevant local government authority will be the first responder. However, the other two levels of government must report at the Joint Operations Centre of the local authority as soon as possible.
- b) Ensuring oversight at national level of institutional nuclear emergency preparedness in accordance with state of the art international principles. The nature and extent of emergency arrangements shall be commensurate with the potential magnitude and nature of the potential threat associated with the facility or activity.
- c) Ensuring ongoing human resource capacity in DME to serve obligations
- d) Ensuring training of DME staff with responsibilities in emergency response
- e) Conduct nuclear emergency exercises and participate in institutional exercises at frequencies agreed with stakeholders
- f) Keep line management & ministry informed about nuclear disaster management plan
- g) Ensuring that procedures are in place to request resources at national and international level.
- h) Ensuring that procedures are in place to deal with radioactive waste arising from decontamination

6 Contingency strategies and emergency procedures in the event of a nuclear disaster, including measures to finance these strategies

In the event of a nuclear disaster DME will rely on the existing departmental infrastructure and resources as a contingency strategy as well as the existing procedures and emergency plans of the relevant municipality and the relevant holder of the nuclear authorization. This strategy will not require any special arrangements to finance but will require training of officials.

7 Co-ordination and alignment of the DME nuclear disaster management plan with those of other organs of state and other institutional role-players

The DME nuclear disaster management plan is aligned with other role-players and such alignment is coordinated on an ongoing basis by DME's participation in the Nuclear Emergency Planning Steering and Oversight Committees.

8 Review and update of the nuclear disaster management plan

The DME nuclear disaster management plan will be reviewed on an ongoing basis and updated as required.