

IAEA Expert mission on

Feasibility of Establishing a National Dose Register using RAIS in South Africa

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Objectives of the mission

- To provide assistance to SA in investigating the feasibility of using RAIS to establish NDR. In particular:
 - Analysis of the different data structures used by the different Dosimetry service providers (DSP) in South Africa
 - Providing advice on the scope and elements that the NDR should include
 - Identification of the possible NDR data structure in RAIS
 - Identification of means for data exchange between the DSPs and RAIS NDR
 - Identification of training needs

Conduct of the mission

- Meetings have been organized with:
 - PARC & mining companies (NORM)
 - SABS
 - NECSA
 - Koeberg
 - NNR IT
 - DoH
 - SSA

Conduct of the mission

- Points discussed
 - Regulatory framework for NDR
 - Scope of dose register at each DSP
 - Types of doses measured and recorded
 - Identification of workers, facilities and work activities by the DSP
 - Possible formats for data export and means of data transfer

Current situation: An Overview

SABS	<ul style="list-style-type: none">• 24,000 workers• 310,000 dose records/year
NECSA	<ul style="list-style-type: none">• Landauer data: 600 workers, Data records for ~6 years• Alpha measurements will be reported by the mines• WBC for NECSA's own workers - bi-annually (CONFIRM)
Koeberg	<ul style="list-style-type: none">• 1700 workers; up to 2300 when re-fueling• WBC annually
Mines	<ul style="list-style-type: none">• 147 holders of certificate of registration (CoR);• The actual number of mines maintaining dose registers could be less – to be determined• Number of workers having dose records (>100 k – TBD)• Significant number of foreign workers• High turn over rate of workers

Observations & Conclusions

- Legal and regulatory framework for NDR
- Identifications of workers
- Identification of facilities
- Classification of work activities
- Dose types
- Dose records

Legal and regulatory basis for NDR

- There are currently no legal or regulatory requirements relating to NDR in SA;
- In general, the expert team observed good support to the NDR by all stake holders are supporting the establishment of NDR and do not object submitting their data, when requested
- Such request is possible within the existing regulatory framework:
 - For example, through conditions attached to licenses or certificate of registration (CoR; for mines).

No need to wait until new regulations are established

Identification of workers

MINES	<ul style="list-style-type: none">- Industry number (TEBA number): unique throughout the mining industry- National ID for South African citizens- passport ID or other ID for foreigners
SABS	<ul style="list-style-type: none">- SABS BIN number- National ID (for SA citizens) or any other ID number (for foreigners) – stored in the same field
NECSA	<ul style="list-style-type: none">- SABS BIN number- Landauer number- National ID (for SA citizens) or any other ID number (for foreigners)
Koeberg	<ul style="list-style-type: none">- BIN assigned from within a range provided by SABS- National ID (for SA citizens) or any other ID number (for foreigners)- ESKOM number

Identification of Workers

Observation	Potential Solution
No common worker identifier, which is always available	<ul style="list-style-type: none"><li data-bbox="981 444 1715 572">■ Record all existing ID from different DSPs in NDR<li data-bbox="981 672 1750 801">■ Introduce a unique RAN for Workers in NDR

Identification of workers – Proposal for RAN

Nationality	Conditions		Worker RAN in NDR
SA citizen	National ID available	Only one National ID	National ID
	National ID not available, or multiple national IDs		ZA_[DSP code]_sqn
Foreign worker or nationality unknown	Nationality known		[ISO country Code]_[DSP code]_sqn
	nationality unknown		[Unknown Code]_[DSP code]_sqn

Identification of workers – Proposal for RAN

- In the cases where the national ID can't be used as Worker RAN in NDR, the RAN could be built from three parts:
- The first part is related to the worker's nationality ISO code, or a specific code if the nationality is unknown
- The second part reflects the data source of the worker:
 - 'NORM' For mines – Possibly specific code by mine
 - 'SABS' For SABS and Koeberg
 - 'Landauer' For NECSA's Landauer data
- The third part is a sequential number

Identification of facilities

Observations	Potential solution
<ul style="list-style-type: none">• In some sectors (such as mines) there is a sector specific facility number• However, there is no nation-wide ID for facilities in SA, which is available• No common identifier for facilities among the DSPs• SABS internal IDs cover the majority of the facilities• NNR has an identified for the facilities that it regulates• DoH has an identified for the facilities that it regulates	<ul style="list-style-type: none">• Include all existing IDs of the facilities• Introduce a unique RAN for facilities in NDR

Identification of facilities – proposed RAN

- facility RAN in NDR could have the following structure:
[organization code]_[ID at the organization]
- Organization code:
 - 'NNR'
 - 'DoH'
 - 'SABS'
 - [country code] for foreign companies
- For discussions:
 - what about facilities having multiple sites? Need for departments identifiers?

Work activities

MINES	<ul style="list-style-type: none">• known de-facto based on the mining type• further classification exists based on work place
SABS	<ul style="list-style-type: none">• Broad work activities attached to companies
NECSA	<ul style="list-style-type: none">• Landauer data: Similar to SABS• WBC for NECSA's own workers: place of work
Koeberg	<ul style="list-style-type: none">• very detailed, facility-specific and task-based description of work activities (RPC)

Work activities

Observation	Potential solution
<p>There is no nation wide classification of work activities</p>	<ul style="list-style-type: none">• Although work activity data may not exist, prepare NDR as to accommodate the work activities• Populate the work activities with the existing data, and gradually build a classification scheme

Dose Types

MINES	<ul style="list-style-type: none">• Long lived alpha• Radon (internal)• Gamma• Beta (skin) SABS (not all mines)
SABS	<ul style="list-style-type: none">• Gamma + xray deep• Gamma skin• Beta skin• Gamma extremities• Neutron

Dose Types

NECSA/Landauer	<ul style="list-style-type: none">• gamma• gamma eye• gamma skin• WBC (internal)
Koeberg	<ul style="list-style-type: none">• gamma deep• neutron deep• Neutron skin• Neutron eye• gamma eye• gamma skin• internal (WBC)• beta skin• beta eye• Gamma + beta extremities

Dose Types

Observation	Potential solution
<p>The structures of dose registers of the mines, which were not present in the meetings, are not known</p>	<p>NNR to contact all mines which were not present in the meeting in order to confirm data structure</p>

Dose records

Potential problem	Potential solution
<p>Receiving multiple dose records to the same worker in overlapping periods</p>	<p>Develop some logic to distinguish duplicates from correct components of the dose</p>
<ul style="list-style-type: none">• SABS provides TLD data for mines workers• Mines include the same data in their registers	<p>Exclude mines from SABS data</p> <p>Ensure that mines submit dose records for all monitored workers, including those dealing with sources and medical staff</p> <p>Mines to provide also historical data</p>

Proposed NDR data fields

- Facility data fields
- Worker data fields
- Dose data fields

Facility Data fields

NDR data fields	Template data fields
Name	Name
address	address
practices	practice
country	country (if foreign company)
NDR-ran	NNR id
	DoH id
	SABS id
	ESKOM ID

Worker data fields

	NDR data field	Template data field
worker	Name	Name
	surname	surname
	initials	initials
	gender	gender
	birth date	birth date
	nationality	nationality
	NDR-ran	national ID
		passport number or foreign id number
		SABS BIN
		NORM industry number
worker history	facility NDR-ran	facility name
	worker status	facility ID as assigned by DSP
	status date	monitoring/reporting start
		monitoring/reporting end

Dose data fields

NDR data field	Template Data field
begin date	begin date
end date	end date
type	type
value	value
unit	unit
status	status
comment	comment
facility	facility ID + ID TYPE
worker	worker ID + ID Type
work activity code	work activity
DSP	
pre-processing code	

Means of data submission

- Excel files seem commonly accepted
(Excel version to be confirmed)
- Specific templates to be prepared
- Tools for data verification/checking
- QC procedures

The way forward – A proposal

- Three mile stones:
 - MS1: facilities and workers data uploaded; NDR designed and implemented
 - MS2: upload module completed; sample set of data; kick-off the pilot project
 - MS3: Confidence in NDR; concluding the pilot project; official NDR kick-off

The way forward – Towards mile stone 1

- Prepare a template for facilities and workers
- Request the full data from the DSPs
- Get facilities and workers data
- All parties confirm NDR dose data fields
- **EXPERT MISSION:**
 - upload facilities and workers data
 - Design and implement NDR
 - Provide hands-on training to designated persons
 - Prepare a dose template

The way forward – Towards mile stone 2

- Request a subset of dose data as per dose template (e.g. 1980, 1990, 2000, ...)
- get a subset dose data
- **EXPERT MISSION:**
 - Upload dose data
 - Develop module to automatic upload
 - Develop validation/checking tools for data
 - Provide Training to designated persons
- Kick off the pilot project

The way forward – Towards mile stone 3

- Run the pilot for a certain period (e.g. 4 months)
- Identify needs for improvement
- **EXPERT MISSION**
 - Implement identified improvements
 - Add reports
 - Implement arrangements for QC of NDR
 - Train the trainers
- NDR Kick off

Thank you for your attention!

