IAEA
International Atomic Energy Agency

Department of Technical Cooperation (TC)

END-OF-MISSION REPORT

Report Title:	**Feasibility Study of Establishing a national dose register in the Republic of South Africa using the Regulatory Authority Information System (RAIS)**
Project Number:	**RAF9042**
Project Title:	**Sustaining the Regulatory Infrastructure for the Control of Radiation Sources**
Name of Experts:	**Mr Mathieu Souphy** **ICT Team** **Applications Manager and Database Administrator** **Federal Agency for Nuclear Control (FANC)** **Belgium** **Mr Hazem Suman** **Regulatory Infrastructure and Transport Safety Section** **Division of Radiation, Transport and Waste Safety** **Department of Nuclear Safety and Security** **IAEA**
Dates of Mission:	**20-24 August 2012**
Counterparts:	**Mr Alan Mueller,** **Special Nuclear Projects Coordinator** **National Nuclear Regulator (NNR)** **Mr Eljo Smith,** **Deputy Director, Directorate of Radiation Control** **Department of Health (DoH)**

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EXECUTIVE SUMMARY

In March 2012 The Republic of South Africa (RSA) submitted a formal proposal to the IAEA requesting assistance in establishing a national dose register (NDR) using the IAEA-developed Regulatory Authority Information System (RAIS). The Africa Division of the Department of Technical Cooperation and the Division of Radiation, Transport and Waste Safety in the Department of Nuclear Safety and Security agreed to provide the requested assistance.

This mission was conducted from 20 to 24 August 2012 under the TC project RAF9042. Its objective was to perform a feasibility study regarding the possibility of using RAIS for establishing NDR in RSA. The IAEA team consisted of Mr Mathieu Souphy from the Federal Agency for Nuclear Control in Belgium and Mr Hazem Suman from the Division of Radiation Transport and Waste Safety in the IAEA.

The mission was jointly organized by the South African National Nuclear Regulator (NNR) and the Directorate of Radiation Control (RadCon) of the Department of Health. It was hosted by NNR who made the logistical and organizational arrangements. It took place in two regions: Johannesburg/Centurion area and Cape Town. The mission included meetings with the two regulatory authorities in South Africa i.e. NNR, which is the preferred host of the NDR, and RadCon in addition to meeting with all four Dosimetry Service Providers (DSP), representatives of three major mines, and the State Security Agency.

The IAEA team installed RAIS on NNR servers in Centurion and verified that it is accessible by staff in the NNR offices in Cape Town. It's recommended to install a second instance of the system for training and testing purposes and to grant access to the system to RadCon staff. On the margin of this mission, the IAEA team discussed the use of RAIS for establishing an inventory of the sources regulated by NNR, and for establishing a national inventory of sources including those regulated by RadCon.

During the discussions, the IAEA team has identified a number of issues that need to be resolved, such as the unique identification of workers and facilities, the classification of work activities and the management of overlapping dose records. The IAEA team has proposed technical measures to resolve these issues which were agreed by all participating stakeholders. A recommendation was made to consult the other stakeholders (mines) who were not present in the discussions to confirm their concurrence with the achieved conclusions.

The IAEA team concluded that the establishment and operation of the NDR in RAIS is feasible within the existing legal and regulatory framework. The NDR is to be established in a way that does not affect the working practices of the DSPs. The team also provided detailed technical advice on the data structure of the NDR and the means of data exchange with the DSPs. The team made a proposal for the way forward based on three-phases, and identified potential needs for IAEA assistance in each of these phases.

INTRODUCTION

BACKGROUND

In March 2012 The Republic of South Africa (RSA) submitted a formal proposal to the IAEA requesting assistance in establishing a national dose register using the IAEA-developed Regulatory Authority Information System (RAIS). The Africa Division of the Department of Technical Cooperation, in consultation with the Division of Radiation, Transport and Waste Safety agreed to provide assistance to the RSA under the regional technical cooperation project RAF9042.

The project proposal[1] described the background of RSA request. RSA's intention to establish a national dose register started in 2007 when the Joint Co-operative Committee (JCC between the two regulatory authorities in the RSA, i.e. the National Nuclear Regulator (NNR) and the Directorate of Radiation Control (RadCon) of the National Department of Health (DoH), had established a Working Group tasked to investigate the development of a National Dose Register for occupational radiation exposures in the country. The Working Group has over the last few years engaged with Dosimetry Service Providers (DSP) and reviewed international practices. All the DSPs that were engaged expressed their support in the establishment of a NDR, and recommended also that related national legislative and regulatory aspects be put in place.

Additionally, the NNR has entered in 2010 into a Consultancy Agreement with Parc RGM Pty Ltd, a company providing radon monitoring to the mines in RSA, to develop and implement a national dose register for the recording of personal radon exposure levels for workers in mines.

During the same year, 2010, the two regulatory authorities in RSA conducted a Self-Assessment against IAEA standards and actions plans were developed to address deficiencies in the regulatory infrastructure. One of the recommendations emanating from the Self-Assessment was that the regulatory authorities should consider using the IAEA system (RAIS) as a platform for the inventory of radioactive sources. Another recommendation was that a NDR should be established and that the same system, RAIS, can also be used as a NDR. The JCC agreed that RAIS would be the preferred option and that the central dose register would be located in the NNR. This recommendation was accepted by all stakeholders.

This mission was conducted within the framework of the agreed assistance to RSA for establishing a NDR under the TC project RAF9042.

OBJECTIVES

The objective of this mission was to perform a feasibility study regarding the possibility of using RAIS for establishing a NDR in RSA.

The terms of reference for this mission were:

1. To analyse the different data structures used by the different DSPs in the RSA

[1] "Establishment of National Dose Register in South Africa", Project Proposal to the IAEA submitted by the Republic of South Africa, Rev 0, dated 22 March 2012.

2. To provide advice on the scope and the elements that the NDR should include
3. To identify the possible NDR data structure in RAIS
4. To identification possible means for data exchange between the DSPs and RAIS NDR
5. To identify training needs

CONDUCT OF THE MISSION

The mission was jointly organized by the NNR and RadCon, and was hosted by the NNR who made the logistical and organizational arrangements. The mission took place in two regions, namely Johannesburg/Centurion area and Cape Town.

An opening meeting was held on 20th August 2012 at the NNR premises in Centurion with representatives from all stakeholders: NNR, RadCon, the four DSPs in RSA (SABS, Eskom, Necsa, Parc RGM), the State Security Agency (SSA) in addition to representatives from three major mines (Goldfields, Harmony Gold, and AngloGold Ashanti). The meeting was chaired by Mr E. Smit from RadCon who made introductory remarks after a brief self-introduction by the participants. The meeting included a presentation by Mr A Muller on the background of the NDR project in RSA, a presentation by Mr H. Suman on RAIS, its customization features, and its applicability to establish a NDR, and a representation by Mr M. Souphy on Belgium experience in establishing NDR. Discussions took place in the opening meeting addressing the different technical and legal/regulatory aspects of NDR, data security and access control in addition to other issues specific to RSA circumstances such as the inclusion of foreign workers, the handling of historical records and the existing dose registers in mines.

The mission included visits to the DSPs SABS, Necsa in Johannesburg area, and to Eskom dosimetry services at the Koeberg NPP site in Cape Town. Meetings with Parc RGM, the three major mines and SSA took place at the NNR premises. The discussions addressed all NORM related aspects relevant to the NDR including the structure and scope of the DSP data, identification of workers and facilities, the possible formats that the DSP can export data into, possible data exchange mechanisms, foreign workers, and the frequency of monitoring.

The mission included also a briefing to the NNR Management Committee (ManCo) on the objectives and conduct of the mission as well as the preliminary findings.

During the mission, a meeting with the NNR source registry team took place. The NNR is willing to use RAIS to establish an inventory of the sources which it regulates. A meeting with the NNR IT specialists was also held where several technical aspects on RAIS were discussed. RAIS was then installed on NNR servers in Centurion and access from NNR premises in Cape Town over a virtual private network (VPN) was tested.

The mission included also a visit to the RadCon premises in Cape Town. Mr H. Suman made a presentation on RAIS and its use to establish a national inventory of sources. He also addressed the possible options of operation in case of multiple regulatory authorities in the country, as it is the case in the RSA. The need to update the South African radiation safety profile in RASIMS was also raised and discussed.

In the last day of the mission a closing meeting was conducted. Mr H. Suman presented the preliminary conclusion of the IAEA team and a proposal for the way forward.

The full list of persons met is included in Appendix I. The detailed mission program is included in Appendix II.

FINDINGS AND CONCLUSIONS

INSTALLATION OF RAIS AT THE NNR

During the mission, RAIS 3.2 Web was installed on the servers at the NNR headquarters in Centurion. The system is also accessible over VPN from the NNRs office in Cape Town.

The IAEA team suggested also that the NNR IT department installs a second instance of RAIS 3.2 Web for testing purposes, and to grant access to the system to RadCon, so that its staff can start getting familiar with the system. If needed several testing instances of RAIS 3.2 Web for different purposes could be installed.

CURRENT SITUATION

Occupational doses in South Africa are recorded at the following organisations:

1. South African Bureau of Standards (SABS): This is the main dosimetry service provider in RSA. It offers TLD services to about 24000 occupationally exposed workers, resulting in an average number of about 310,000 dose records per year.
2. ESKOM's NPP in Koeberg provides currently TLD dosimetry to 1700 workers, including and short-term workers. In certain circumstances, such as refuelling, the number of monitored persons can go up to 2300. In addition to the TLD monitoring, whole body counting (WBC) is performed annually and in special circumstances, e.g. when a worker is employed or upon separation.
3. South African Nuclear Energy Corporation (Necsa): during the period 2003 to 2009, Necsa used to facilitate Landauer dosimetry services in RSA. Dosimetry data for around 600 workers in this period are available at NECSA in hard copy only. Additionally, Necsa performs whole body counting for its staff on a bi-annual basis.
4. Mines: More than 100,000 workers are occupationally exposed to naturally occurring radioactive material (NORM) in the 147 authorised mines in RSA. The mines offer TLD monitoring to relevant staff members, including workers exposed through activities other than NORM, such as medical staff, through SABS. The mines provide also radon monitoring for their workers through Parc RGM, and estimate the internal exposure based on this radon monitoring results and working conditions. The radon monitoring could be either individually or based on work place monitoring but the dose results are assigned to the workers individually. Among the specific conditions in the mines are the significant number of foreign workers and the high turnover rate of workers.

   It has to be noted however that the number of mines maintaining their own occupational dose register may be less than the existing 147 mines because in many cases, several mines are subject to the same certificate of registration and have the same radiation protection program and the same record of occupational doses.

CONSIDERATIONS FOR ESTABLISHING NDR IN THE RSA

Legal and Regulatory Basis for NDR

Although there are provisions in Regulation 388 for the establishment of organisational dose registers, there are currently no legal or regulatory requirements relating to NDR in the RSA. The main issues raised during the discussions were the absence of legal or regulatory provisions requesting DSPs to provide dose records to the NDR, and potential data confidentiality concerns.

With regard to the first concern, the IAEA team observed good support to the NDR by all stakeholders, who do not object submitting their data when requested. Such request could be done within the existing regulatory framework in the RSA through, for example, conditions attached to the DSPs and Mines authorisations.

The existing provisions on data confidentiality are related to medical/health records. They are prescribed in article 4.5.5 of the Regulation 388 on Health Register, which states that "after consent has been obtained from the employee, the holder must provide the NNR with access to the employee's medical records and health register. The NNR may, with the consent of the employee, appoint an independent medical practitioner to assist in the conduct of a review of said records". Since this text relate such health records to medical practitioners, it seems not applicable to the occupational dose records, which are commonly considered not a medical or health record.

As a result of these discussions, the IAEA team and the participating organizations concluded that there is apparently no real legal or regulatory burden hindering the establishment of the NDR within the existing legal and regulatory framework.

Means of Data Collection

During the discussions it seemed possible that all DSPs could export any requested data into Excel datasheets in a suitable, prescribed format. There was a wide consensus that Microsoft Excel should be used to exchange the data files. Since it's also very convenient to collect these files and automatically import them into NDR, it's proposed to adopt the exchange of Excel files by email or some other physical means as a mechanism for collecting dose data from the DSPs. Security considerations relating to the files transmissions will be discussed later.

Proposed solution

Adopt the exchange of Excel files as a mechanism for collecting exposure data from the DSPs and importing it into NDR. A template of a suitable Excel file should be developed. The DSPs will be asked to export the requested data according to this template.

Open issue

Since not all mines were present in the discussions, it still has to be confirmed whether Microsoft Excel is a usable platform by these mines. Additionally, it has to be confirmed whether all DSPs can use Microsoft Excel 2007 or later.

Identification of workers

Obviously, every physical person (worker) shall be recorded only once in the NDR system. Related information such as employers, dose records and work activities are then to be added as related history records. Because the same worker can possibly be monitored by different DSPs during his/her working life, e.g. by changing jobs or when conducting two jobs, a system has to be established to uniquely identify a worker reported in files coming from different DSPs.

One of the possible issues that quickly surfaced was the difficulty in finding a common identifier for the same person across the various systems in the DSPs.

The RSA has a system of assigning a unique national ID to all its citizens. The national ID does apply also to persons having permanent residency in RSA but otherwise does not apply to foreign workers. The IAEA team was informed that there may be cases where a person could have multiple national IDs.

This unique ID is sometimes recorded by the DSPs but apparently this is not done in a systematic manner.

Currently, each DSP has its own identification system:

- SABS assigns its own unique identifier to the persons monitored by it, which is referred to as SABS BIN number. It also uses the national ID for RSA citizens or any other ID number (for foreigners). However both are recorded in the same fields in SABS database.
- ESKOM/Koeberg assigns a unique BIN to the monitored workers from within a block of BINs provided by SABS. Additionally, each worker has a unique ESKOM number. The national ID and other ID numbers are also recorded.
- Necsa used the SABS number as well as a unique number assigned by Landauer to the monitored workers. It also recorded, though not systematically, the national ID and other ID numbers.
- Mines: The mines use a specific industry number, the so called TEBA number, which is a unique worker identifier throughout the mining industry. They also use the national ID for South African citizens, though not systematically, or the passport ID or other ID for foreign workers.

Proposed solution

To uniquely identify a worker in the NDR, all possible identifiers of this worker shall be tracked. Additionally a NDR-specific unique identifier should be created for NDR purposes. In RAIS, this is the so-called Regulatory Authority Number (RAN). A proposal for the workers RAN in the NDR is provided in Appendix III.

Identification of facilities

The same principle for workers holds true for companies (called ‘facilities’ in RAIS). A common identifier needs to be found to be able to uniquely identify a given company across

the various systems in the DSPs. Unfortunately, there is no nationwide company numbering system that can be used for this purpose, but several facility identification schemes exit. For example:

- SABS assigns an identifier to each facility whose workers are monitored by it. These identifiers cover probably the majority of the facilities in the RSA.
- In some sectors (such as the mines), there is a sector specific facility number.
- It has also to be noted that regulated facilities are given unique identifiers by the regulating authority(ies), i.e. NNR and/or DoH.

Proposed solution

In the NDR, keeping track of all possible identifiers of a facility used by the DSPs and the two regulators (SABS number, NNR Number, DoH number, etc.), and additionally introduce a unique identifier for NDR purposes, the facility RAN in RAIS. A proposal for the facilities RAN in NDR is provided in Appendix III.

Open issue

A facility may have different addresses and different premises or sites. It has to be agreed during the detailed design of the NDR how to deal with such cases.

Classification of work activities

Since NDR data are to be used to analyse occupational exposure in the country in addition to epidemiological studies, dose records in NDR should ideally contain information about the work activities of the exposed worker, and this classification should ideally be made with a standard predefined set of work activities.

During the discussions it was revealed that there is no national classification in the RSA of radiological work activities. Certain practices, such as the mines, have their own classification to serve their purposes.

Moreover, every DSP uses a different method to classify the workers. Some DSPs classify the workers by the place of work, others by facility practices.

SABS, for example, implement a broad description of facility practices. Similarly, NECSA used to adopt facility practices in its Landauer data. For the WBC data, the place of work is used by Necsa. On the other hand, ESKOM/Koeberg has a very detailed, task based description of work activities. This classification is however specific to Koeberg itself. The mines have a de-facto work activities classification based on the mining type. Further classification is based on the specific place of work inside the mine.

Proposed solution:

Implement a structure in the NDR to accommodate the work activities data of the monitored workers. In the initial stages of NDR operations, include all available work activities in the data coming from the DSPs and gradually populate the NDR work

activity records[2]. With time, a significant amount of work activity values will probably have been reported. In a later stage, these collected data can be analysed and will help NNR in establishing a national classification scheme in the future.

Additionally, develop a mechanism to allow the NDR system administrators to merge different work activity values into one, if they are judged to be similar. This mechanism will also be the tool for implementing the national work activities classification, when established, into the NDR

Dose types

During the feasibility study mission, the IAEA team identified the following dose types which the respective DSPs are able to provide:

DSP	Dose Type
Mines	- long lived alpha - radon (internal) - gamma - beta (skin) (only for mines workers who are monitored by SABS)
SABS	- gamma + X-ray deep - gamma (skin) - beta (skin) - gamma extremities - neutron
Necsa	(identical to SABS) - gamma + X-ray deep - gamma skin - beta skin - gamma extremities - neutron
ESKOM (Koeberg)	- gamma deep - neutron deep - neutron skin - neutron eye - gamma eye - gamma skin - internal (WBC) - beta skin - beta eye - gamma + beta extremities

[2] For example, include appropriate fields for work activities in the Excel template which will be used to import dose data into the NDR. The DSPs can fill in these fields at their discretion (free text).

The Excel template will include a list of codes for all possible dose types, so that for each dose record the correct code can be selected.

Open issue:

Not all mines were represented during the meetings. NNR still has to contact them to ensure that the list of dose types is complete.

Managing overlapping dose data

A very important potential issue is the overlapping of dose data. For instance, the same person can work part-time in one company and be monitored by DSP1, and part-time in another company monitored by DSP2. There may be situations where the dose records sent by these two DSPs for this worker, contain overlapping periods. Some of the dose data in the overlapping periods could be duplicates, but some others may be genuine.

Proposed solution:

Adopt a built-in logic into the NDR system to differentiate the situations of genuine exposure data in overlapping periods from those of duplicated recording. But it has to be accepted that not all special cases can be covered by automated logic, and that some exceptions will potentially slip through the mazes. It is therefore also important that the system provides a way to the administrators of the NDR to manually rectify (or merge) inserted data if needed.

Another issue related to overlapping data is the fact that SABS also keeps track the doses for most of the mines, next to the mines themselves. Importing data from SABS as well as from the mines would lead to duplicated recording of certain doses.

Proposed solution:

For the situations where it is clearly identified that two DSPs maintain the same dose records, a choice has to be made which DSP will send these records, in order to avoid duplication. In the case of SABS and the mines, exposure data for mines workers could be reported exclusively by the mines and excluded from SABS reports, so that the mines would be fully responsible for their workers data.

Open issue

It needs to be confirmed from all other mines, which were not presented in the meetings, if they are able to provide the external exposure data, so that the dose data of mines workers can be totally excluded from SABS.

Open issue

In the mines, staff other than persons working in mining activities may be occupationally exposed to radiation (such as medical staff). Some mines (Anglogold Ashanti and Harmony) are able provide the dose data for this staff. In such cases, a decision is to be made on who shall provide these dose data (i.e. SABS or the mines).

Security of the system

During the feasibility study mission, there was also some attention for the security of the NDR. The State Security Agency (SSA) was represented during all the discussions. Following observations were made:

- Confidentiality of the data will not be an issue. As we are dealing with "Sensitive area workplaces", the NNR and DOH may legally view and manage the dose data.
- The SSA can assist in establishing policies and procedures
- The SSA can assist in providing guidelines for security of the data transmission process (e.g. encryption)
- The SSA noted that the system should provide an audit mechanism. RAIS provides auditing out-of-the box, but it still has to be verified with SSA if this mechanism is sufficient, or if it has to be extended.

CONCLUSIONS

The considerations made above enables the IAEA team to conclude that the establishment of and operation of the NDR can be done within the existing legal and regulatory framework. The NDR will periodically collect the occupational dose data recorded at the different DSPs, into a central database maintained by the NNR. It will be established in a way that does not affect the current working practices of the DSPs. The exchange of Excel files was agreed as a means of data transfer from the DSPs databases into the NDR.

From the technical points of view, the IAEA team has identified a number of issues that need to be resolved, such as the unique identification of workers and facilities, the classification of work activities and the management of overlapping dose records. In the views of the IAEA team, these issues can be properly resolved by implementing adequate technical measures, and such solutions were proposed.

There remain a number of open issues. Those are basically related to the need for more consultation with the mines, which were not present in the meetings, to confirm their concurrence with the achieved conclusions.

Appendix IV includes a proposal for the NDR data structure and the corresponding fields in the Excel template.

THE WAY FORWARD

As elaborated in the previous section, the main conclusion of this mission is that establishing a NDR in the RSA using RAIS is feasible. The RSA is thus recommended to consider the outcome of this mission and to undertake further steps towards establishing and operating a NDR. The TC Division for Africa has agreed to provide assistance to the RSA in this undertaking under the TC Project RAF9042.

The exact planning and timing of the future steps in the project is yet to be established. The IAEA team suggests a modular approach consisting of two phases for the design and establishment of the NDR system followed by a third phase as a pilot run of the project. In each phase, expert advice could be provided to the RSA to implement a certain set of activities and is marked by a milestone of expected achievements.

Phase 1

By the end of this phase, following achievements are expected:

1. The NDR is designed and implemented in RAIS.
2. An Excel template, through which the DSPs will export workers, facilities and doses data, is designed and validated by the DSPs.
3. The DSPs provide all their worker and facility data using the developed template.

No dose data are included in this phase yet.

To achieve these results, the RSA may need an expert assistance for the design of the NDR and its implementation in RAIS. An expert mission is probably the right mechanism for providing such assistance.

Phase 2

By the end of this phase, following achievements are expected:

1. The exposure data uploading module is completed and validated, including an automatic mechanism for examining data in overlapping periods, using a predefined set of rules.
2. The DSPs send a sample set of dose data using the template covering several time intervals. This data is uploaded into the NDR using the developed modules.
3. Kick-off of the pilot project.

To achieve these results, RSA may need expert assistance in developing and validating the upload mechanism. This could be done either as a home-based assignment or an onsite expert mission, or a combination of both.

Phase 3

In this phase, the pilot project will be concluded and the NDR will be put in full operation. The completion of following activities is expected:

1. Pilot project runs for a few months with satisfying results.

2. Bugs, if any, are identified and fixed, and improvements implemented based on the results of the pilot project.
3. Various reports implemented as needed.
4. Training provided to the NDR administrators.
5. Official kick-off of the NDR

The RSA may also need expert assistance in this phase to implement the identified improvements and to develop the needed reports.

APPENDIX I LIST OF PARTICIPANTS

IAEA TEAM

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Mr M Strauss	Managing Director, Parc RGM

State Security Agency (SSA)

Mr R Erasmus	Counter proliferation investigator, SSA

APPENDIX II WORKING PROGRAMME

Date/Time	Program	Venue/Presenter
20 Aug 2012		NNR Offices, Centurion
09:00	Opening and welcome	E Smit
09:15	Background on NDR project	E Smit
09:25	Objective of the IAEA expert mission	H Suman
	National Dose Register	A Muller
09:30	Overview of RAIS and Consideration for implementing NDR	H Suman
10:45	Break	
	Dose register and radiological passbook for external workers in Belgium	M Souphy
11:00	Discussion	All
12:00	Conclusions	E Smit
12:30	Lunch break	
	Overview of NORM regulations in South Africa	P Mohajane
	meeting with NNR NORM, parc radon gas monitors and cor holder(s) to review the design, processes and compatibility of dsp databases	
13:30	Meeting with NNR CEO	
21 Aug 2012		
08:30	NNR source register team • Demonstration of sources module • Discussion	NNR offices, Centurion
11:00	South African Bureau of Standards - discuss dosimetry systems and review the design, processes and compatibility of DSP databases	SABS offices
13:00	Lunch	
14:00	Meeting with NNR IT team: - NNR ICT Overview	JR Boulton
	Installation of RAIS 3.2 Web on NNR servers	NNR offices, Centurion
22 Aug 2012		
09:00	NNR Management Committee	
10:30	Nuclear Corporation of South Africa – discuss/visit dosimetry systems and historical data	NECSA premises
12:30	Lunch	
14:00	State Security Agency – discuss data security requirements	NECSA premises

Date/Time	Program	Venue/Presenter
16:00	IAEA/counterparts discussions	NNR offices, Centurion
	Transfer to Cape Town	
23 Aug 2012		
09:00	Eskom/Koeberg NPP – visit/discuss dosimetry systems and review the design, processes and compatibility of dsp databases.	Koeberg Site
12:00	Lunch	
14:00	Radiation Control (DoH) • RAIS overview • Discussion	RadCon offices, Cape Town
24 Aug 2012	NNR Offices, Cape Town (Video Link to NNR Offices in Centurion)	
09:00	Opening and welcome	E Smit
09:10	Preliminary feasibility outcomes	H Suman
10:30	Discussion	All
12:00	Closure	E Smit

APPENDIX III SUGGESTED NDR IDENTIFIERS

As mentioned before, one of the issues faced is to uniquely identify workers and facilities, since these workers or facilities can exist in the databases of several DSPs. The suggested way to achieve this is to collect all possible identifiers for a given worker or facility, across all the different databases in the various DSPs, and to introduce a new identifier within NDR (called Regulatory Authority Number, or RAN, in RAIS).

The workers identifiers used by the various DSPs were described earlier. The suggested worker RAN for the NDR could be the unique RSA national ID of the worker if available, or a string having specific structure for cases where the national ID is not usable (i.e. either not available or when the worker has multiple national IDs).

The proposed RAN string 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 ESKOM
    - 'Landauer' For NECSA's Landauer data
- The third part is a sequential number

The following table summarizes the proposes worker RAN for the NDR

Nationality	**Condition**	**Worker RAN in NDR**
South African citizen	One National ID available	National ID
	National ID not available or multiple National IDs.	ZA_[DSP_Code]_sqn
Foreign worker or nationality unknown	Nationality known	[CountryCode]_[DSP_Code]_sqn
	Nationality unknown	[UnknownCountryCode]_[DSP_Code]_sqn

For facilities, the situation is similar. The NDR shall also collect all possible facility identifiers, and a new facility RAN shall be created. Following structure for the facility RAN in the NDR could be used:

[OrganizationCode]_[ID at the organization]

with [OrganizationCode] being:

- 'SABS'
- 'DOH'
- 'NNR'
- CountryCode for foreign companies

APPENDIX IV PROPOSED DATA STRUCTURE OF THE NDR

The NDR will be developed in RAIS. The advantage of using this system is that is very flexible in the sense that it can easily be adapted / extended to fit certain requirements. This is called customization of the system.

Some basic structures of a dose register are already present in an out-of-the-box RAIS installation. We can build on this basic structure to extend it to the scope needed for the South African NDR using RAIS customization features.

As mentioned in previous sections, there is a general consensus amongst all stakeholders that Microsoft Excel could be used to send the dose data to the NNR in a predefined format. NNR will then upload this data into the NDR which is developed in RAIS. An Excel template will be provided to the DSPs, in which they should place the data records into the correct predefined fields.

It should be noted that ideally Microsoft Excel 2007 or later is to be used because of the native compatibility with the XML standard. The Excel template will most likely be backed by an XML schema (XSD). This will be transparent for the users, and they will not see the difference with a regular Excel file. But doing so will technically simplify the programming logic for the application that will automatically process the incoming files and populate the NDR with the data.

The following tables present the various entities and data fields that will be needed for the NDR. Some of these data fields are already present in RAIS, while others have to be created using RAIS customization tools. The left column represents the NDR, and the right column represents the respective corresponding fields in the Excel template which will be used to populate the NDR fields. As said earlier, the exact structure of the Excel template is still to be defined, but this will give a preliminary overview of the fields that will be included.

Dose data fields

NDR data field in RAIS	Corresponding Excel template data field(s)
RAN *Text field, required and must be unique. Will be automatically generated using custom logic*	*(none, will be auto-generated)*
BeginDate *Date field, required*	BeginDate
EndDate *Date field, required*	EndDate
DoseType *lookup field, required*	DoseTypeCode *(code list will be included in the template)*
Value *numeric field, required*	Value
Unit *lookup field, required*	UnitCode *(code list will be included in the template)*
Status *lookup field, required*	StatusCode *(code list will be included in the template)*
Comment *Text field*	Comment

Facility *lookup field, required*	Combination of Facility ID and Facility ID Type
Worker *lookup field, required*	Combination of Worker ID and Worker ID Type
Originator *lookup field, required*	Represents a code identifying the DSP that sent the file. Will probably be a fixed header field in the template
PreprocessingCode *Text field, required*	*(none, will be auto-generated)*

Facility

NDR data field in RAIS	Corresponding Excel template data field(s)
RAN *Text field, required and must be unique. Will be automatically generated using custom logic*	- NNR ID - DoH ID - SABS ID - ESKOM ID *It will be required to provide at least one of these IDs, but preferably as many as possible*
Name *Text field, required*	Name
Address *Text field*	Address
Practices *multiple lookup field*	Practice (or list of practices separated by a semicolon)
Country *lookup field*	Country ISO Code *(code list will be included in the template)*

Person (worker)

	NDR data field in RAIS	Corresponding Excel template data field(s)
"Worker" entity	RAN *Text field, required and must be unique. Will be automatically generated using custom logic*	- National ID - Passport number or foreign ID - SABS BIN number - NORM industry number (= TEBA) - ESKOM number - Landauer number *It will be required to provide at least one of these IDs, but preferably as much as possible*
	Surname *Text field, required*	Surname
	First name *Text field*	First name
	Initials *Text field*	Initials
	Gender *lookup field*	GenderCode *('M' or 'F')*
	Birthdate *date field*	Birthdate

	Nationality *lookup field*	Nationality country ISO code *(codelist will be included in the template)*
"Worker history" entity	Facility *lookup field, required*	Facility ID *(one of the aforementioned facility IDs)*
	Worker Status *lookup field, required*	StatusCode *(codelist will be included in the template)*
	Status Date *date field, required*	Status Date