NATIONAL NUCLEAR REGULATOR

For the protection of persons, property and the environment against nuclear damage.

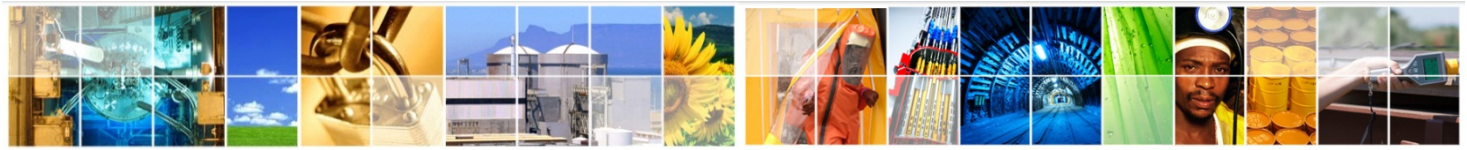
REGULATION OF ACTIVITIES PRODUCING URANIUM AS A BY-PRODUCT: South African Perspective

IAEA Uranium Raw Material for Nuclear Fuel Cycle

23-27 June 2014

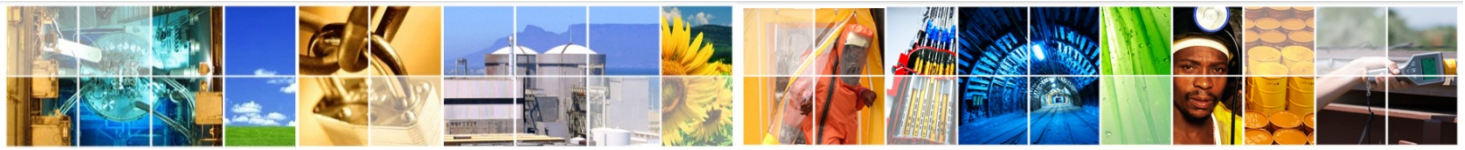
OUTLINE

1. Historical background
2. Legal Framework
3. Regulatory Framework
4. Authorised Actions
5. Condition of Authorisation
6. Radiation Protection
7. Occupational Exposures for 2012
8. Regulatory challenges
9. Conclusion



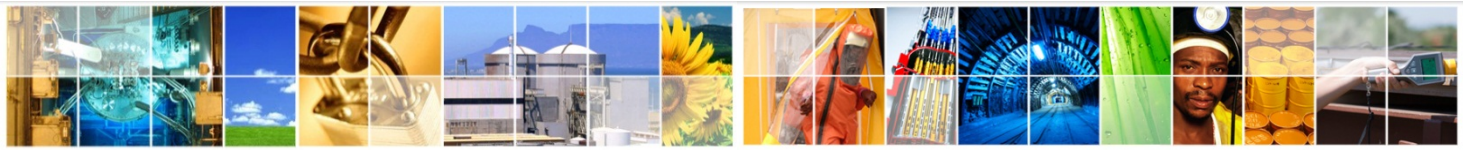
Historical background

- The presence of radioactive material in the gold bearing ores of the Witwatersrand was first noted in 1915; in 1923 the material was identified as uraninite
- The gold bearing reefs of the Witwatersrand Basin were extensively assayed for uranium in the mid 1940s and full scale of Uranium production in the Republic of South Africa commenced in 1952 as a by-product of the Witwatersrand gold mining industry which was established in the 1880s.
- Since the early 1970s uranium has also been produced as a by-product from an open cast copper mine
- A total of 27 uranium plants were constructed during the period 1952 to 1990.

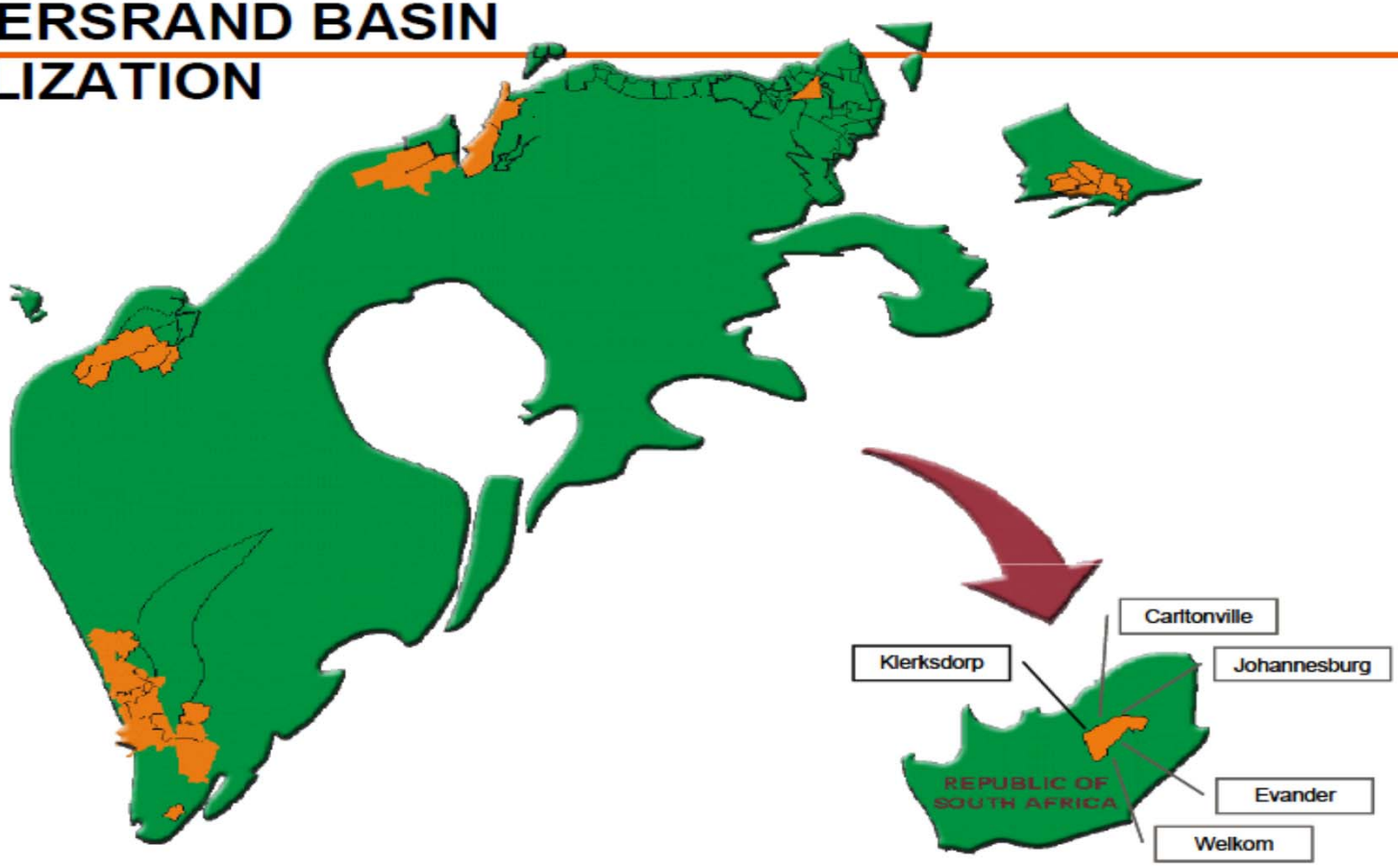


Historical background

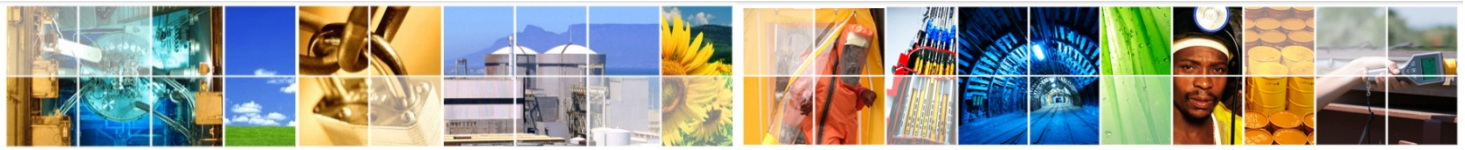
- In the late 1970's- Licensing Branch investigated for the feasibility of implementing formal controls over the radiation hazards arising from the exploitation of uranium bearing ores in the gold mines.
- 1982-Legislation provides for the Atomic energy board to regulate mines
- 1988-Independent regulatory body is established decision to proceed with regulation of mines endorsed.
- Since 1990- Retrospectively issued 45 licences to various mining and minerals processing facilities exploiting materials containing uranium and thorium
- Developed RPM course and trained the trainers



WITWATERSRAND BASIN MINERALIZATION

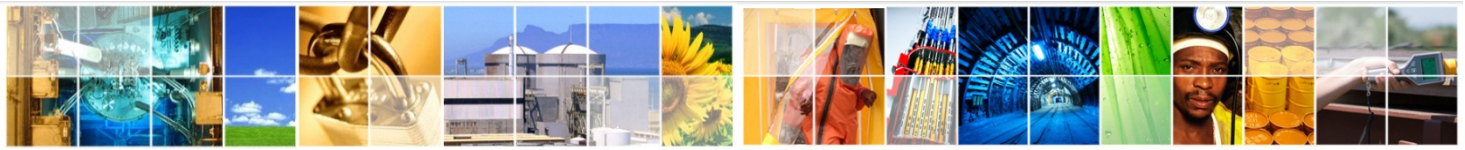


GEOGRAPHICAL DISTRIBUTION NORM AUTHORISATION HOLDERS



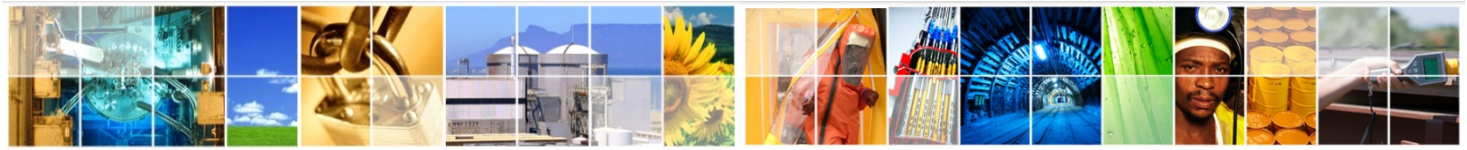
LEGAL FRAMEWORK

- **Department of Energy (DoE)**
  - **Act 46 of 1999 Nuclear Energy Act**
  - **Act 47 of 1999 National Nuclear Regulator Act**
  - **Act 53 of 2008 National Radioactive Waste Disposal Institute**



Other Main Regulatory Bodies

- **Department of Mineral Resources**
  - Mineral Petroleum Resources Development Act
- **Department of Environmental Affairs**
  - National Environment Management Act
  - Atmospheric Pollution Prevention Act, 1965
- **Department of Water Affairs**
  - National Water Act



Regulatory Framework

- National Nuclear Regulator Act NO. 47 OF 1999
- Safety Standards Regulatory Practices R388
- Requirements Documents (phase out by- Regulations)
- Licensing Documents(phase out- Regulatory guides)
- UNSCEAR ,IAEA, ICRP, etc

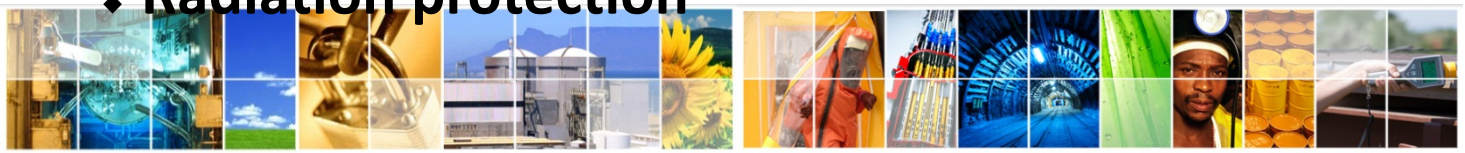
National Nuclear Regulator

Guidance Document

No.	Title	Rev.
	A GUIDE DOCUMENT FOR THE RELEASE OF NORM CONTAMINATED SITES FROM REGULATORY CONTROL	

Regulations –SSRP-R388

- Contains the following:
  - Principal Radiation Protection and Nuclear Safety Requirements
  - Specifies objectives such as
    - Dose limitation
    - Operational safety assessment
    - Controls an limitations on operation
    - Maintenance and inspection programme
    - Staffing and qualification
    - Radiation protection

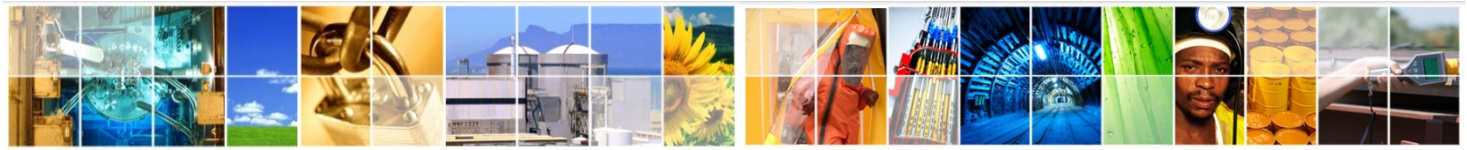


NUCLEAR AUTHORISATIONS

National Nuclear Regulator Act, Act 47 of 1999

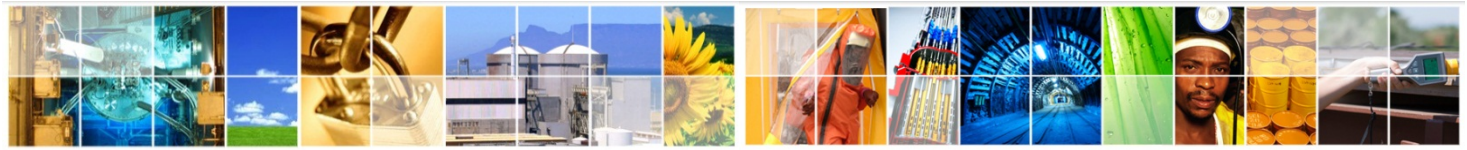
-Certificate of Registration-COR

-Certificate of Exemption-COE



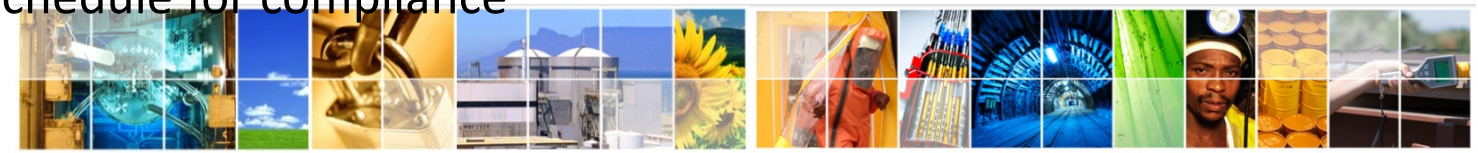
Typical Actions Regulated

- Mining and Mineral processing
- Scrap processors
- Scrap melters
- Fertiliser manufacturing
- Service providers
- Small users



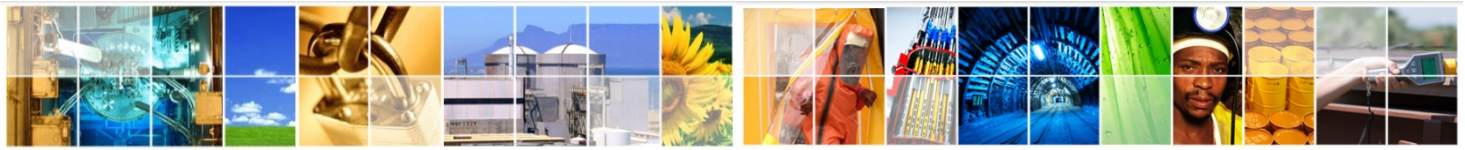
Generic CONDITIONS OF AUTHORISATION

- Description and configuration of the authorised facility and action (Scope);
- Hazard Assessment – for Workers and Public
- Operational Limitation-e.g Specific operations, Demolition, Maintenance activities
- Operational Radiation Protection Programme – for Workers and Public
- Radioactive waste management programme
- Physical Security
- Transportation of radioactive material
- Emergency planning and preparedness
- Occurrences or incident programme
- Quality Management Programme
- Decommissioning plan
- Schedule for compliance



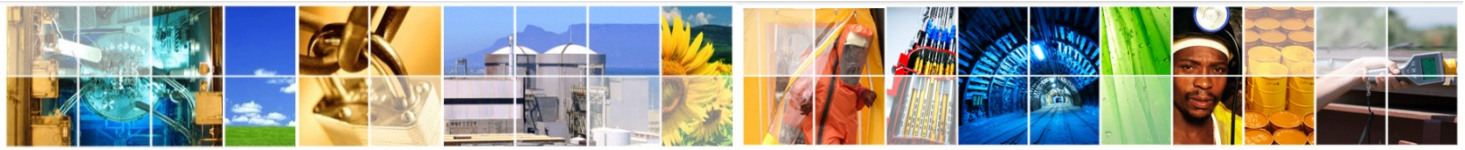
RADIATION PROTECTION

- Radiation Protection Programme – measures in place must be commensurate with the likehood of exposure and the programme should take into consideration the following:
  - ALARA
  - Area Classification
  - Monitoring strategy
  - Dose register
  - Health register
  - Training



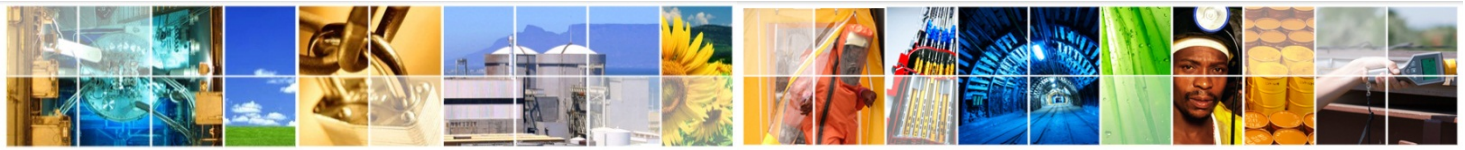
RADIATION PROTECTION CONTINUED

- Based on the dose limits, the NNR requires the holder of CORs to demonstrate that the average effective dose of 20 mSv per year averaged over five consecutive years is not exceeded.
- Holders must have proper dose records for all occupationally exposed personnel over five years.



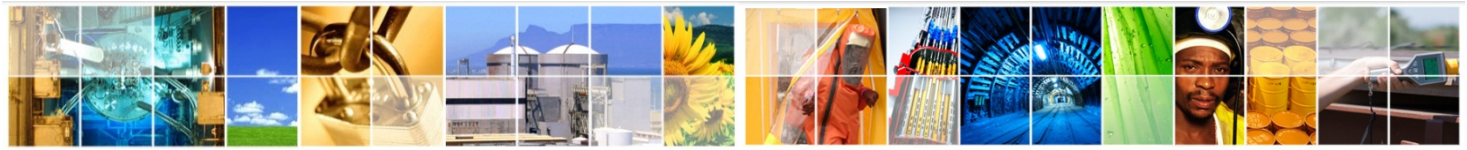
Occupational Exposures till 2012 - Special Case Mines(mSv)

	2008	2009	2010	2011	2012
COR-02 AngloGold Ashanti (Vaal River Operations)	19.89	19.92	21.8	20.77	19.72
COR-23 Steenkampskraal Monazite Mine				25.8	19.6
COR-190 Gold One Ezulwini	41.3	40.09	29.66	33.3	25
COR-215 Margaret Water Company	14.79	18.41	15.5	28.2	33.13
COR-226 Rand Uranium Cooke 1	21.4	26.6	17	24.2	27.4
COR-226 Rand Uranium Cooke 2	21.6	23.6	13.8	22	22.8
COR-226 Rand Uranium Cooke 3	29.4	28.9	14.4	26.6	24



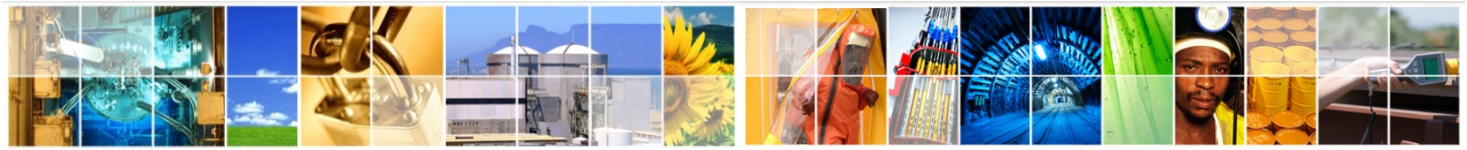
Environmental Verification Programme

- The National Nuclear Regulator (NNR) has an independent verification program as part of compliance assurance.
- The independent verification involves collection of samples in the vicinity of the authorisation holder's facilities, followed by analysis in the laboratory.
- Dose constraint applicable to the average member of the critical group within the exposed population is 0,25mSv per year specific to the authorised action.



Regulatory Challenges

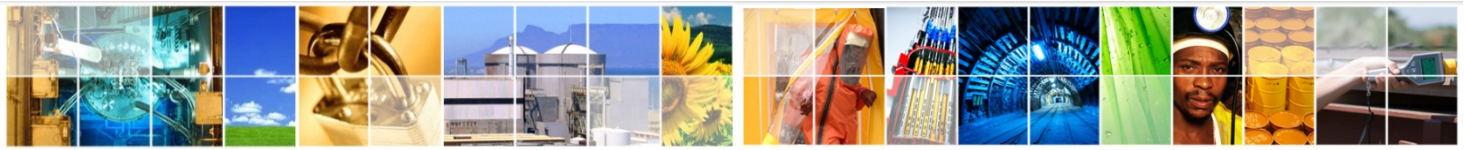
- Historical Contaminated sites
- Public Safety Assessment Methodologies
- Informal Settlement on sources
- Increase of radioactivity in sediments
- ill-legal Mining-Gold, scrap metals
- Waste management
- Slime spillages during recovery process



Conclusions

CURRENT Activities

- Update of the current NNR Act, 47 of 1999
- Development of Regulations- NORM
- National Dose Register
- Establishment of the Radionalysis laboratories-
- Upgrade of the Regulatory Emergency Plan Centre



THANK YOU FOR YOUR ATTENTION!

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