CHALLENGES IN THE TRANSPORT OF RADIOACTIVE MATERIALS WITHIN SOUTH AFRICA

Paul Hinrichsen
National Nuclear Regulator

CHALLENGE !
TWO COMPETENT AUTHORITIES

The **National Nuclear Regulator** operating under the National Nuclear Regulators Act, (Act No.47 of 1999)

Covers Nuclear Installations, as defined, plus facilities involved in the nuclear fuel cycle such as uranium mines or mines having uranium/thorium in excess of 0.5 Bq/g

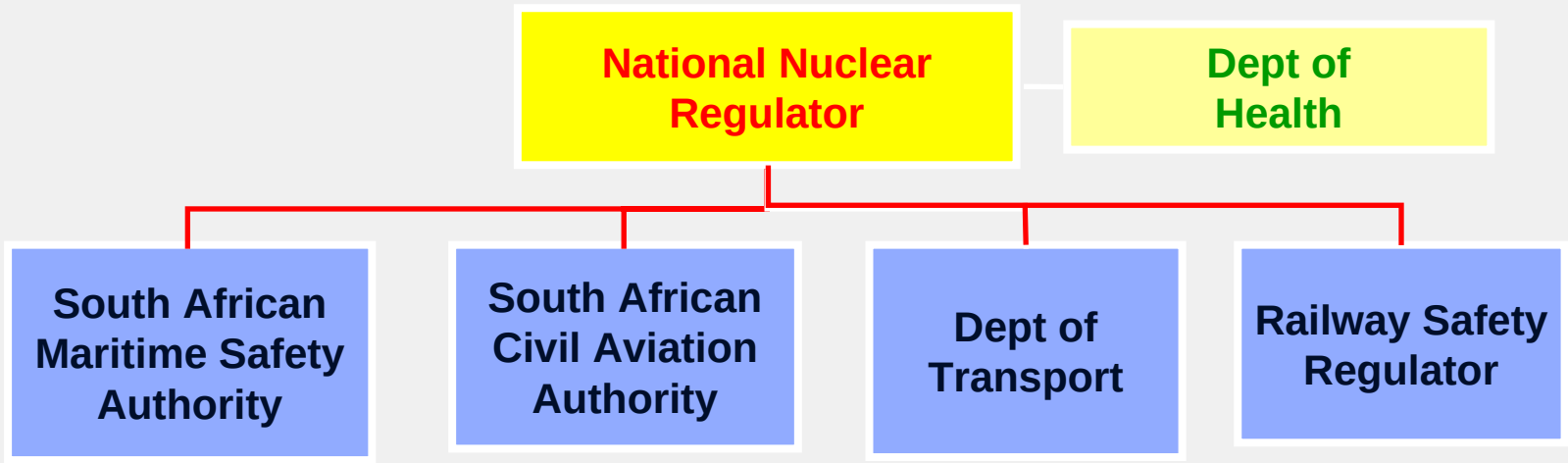
CHALLENGE !
TWO COMPETENT AUTHORITIES

The **Department of Health** (DOH) operating under the Hazardous Substances Act, 1973, (Act No 15 of 1973).

Regulation of radioactive material which is outside a nuclear installation and will be used for medical, scientific, agricultural, commercial or industrial purposes,

CHALLENGE !

OTHER TRANSPORT RELATED REGULATORY BODIES



CHALLENGE !

OTHER TRANSPORT RELATED REGULATORY BODIES

- Our legislation requires that the NNR concludes Co-Operative Governance Agreements with all national regulatory bodies where there is an overlap of responsibilities
- These Agreements define how these national regulatory bodies and the NNR are to co-operate on matters related to the transport of Class 7 dangerous goods.

CHALLENGE !
OTHER AFRICAN REGULATORS

- The Forum for Nuclear Regulatory Bodies in Africa (FNRBA) was formally established in March 2009.

- The aim of the Forum is to:

  - provide a platform for fostering regional cooperation,
  - provide for the exchange of expertise,
  - information and experience,
  - provide an opportunity for mutual support
  - coordination of regional initiatives,
  - to leverage the development and optimisation of resources.

CHALLENGE!
OTHER AFRICAN REGULATORS

The Forum has established a Transport Working Group for which the Terms of Reference were adopted at the Plenary of the Forum which was held in May 2010

CHALLENGE!
AFRICAN REPRESENTATION AT TRANSSC

Africa is a LARGE continent

Wikipedia;

- Africa is the world's second-largest and second most-populous continent, after Asia.
- The continent has 54 sovereign states of which

36 attended the General Conference in Sept 2009

CHALLENGE!
AFRICAN REPRESENTATION AT TRANSSC

Member State Representation At TRANSSC		
Geographical Region	Number of Member States Represented	Number of Delegates
North America	2	9
South America	2	9
Europe	13	37
Asia	1	4
South East Asia	2	2
Africa	1	1

CHALLENGE!
AFRICA HAS A ROLE TO PLAY IN RADIOACTIVE TRANSPORT

Through the FNRBA South Africa is trying to address the issue of why Africa has such a small voice at TRANSSC Meetings;

CHALLENGE!
NNR: TRANSPORT REQUIREMENTS

- International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material No. TS-R-1 (2009 Edition)
- Requirements Document RD-021

  Requirements for the Transport of Material Associated with Nuclear Installations.
- Guidance Document GD-1050

  Guidance on Developing a Procedure for the Safe Transport of Naturally Occurring Radioactive Materials

BIG CHALLENGE!

NNR ACT SECTION 20 (2) : NUCLEAR VESSEL LICENCE

2) No vessel which is propelled by nuclear power or which has on board any radioactive material capable of causing nuclear damage may—

(a) anchor or sojourn in the territorial waters of the Republic; or

(b) enter any port of the Republic.

except under the authority of a nuclear vessel licence.

BIG CHALLENGE!

NNR ACT SECTION 20 (2) : NUCLEAR VESSEL LICENCE

(b) publish a copy of the application in the Government *Gazette* and two newspapers circulating in the area of every such municipality. *[30 days]*

Seems reasonable if transporting nuclear fuel

or

Bringing a nuclear powered vessel into port

<u>Commercial Transport of NORM at < 10 Bq/g ?</u>

BIG CHALLENGE!

NNR ACT SECTION 20 (2) : NUCLEAR VESSEL LICENCE

No Nuclear Vessel Licence = No Port Entry !

Is this a Denial of Shipment ?

NO !

This is a None-Compliance with National Regulations !!!

TRANSPORT REQUIREMENTS BY FACILITY

TRANSPORT REQUIREMENTS BY FACILITY

Nuclear Fuel

- South Africa has one nuclear power station Koeberg NPS 30 km north of Cape Town.
- Installed capacity of 920 Mw(e) per unit (2 units).
- Requires approx 53 uranium oxide fuel elements to be shipped to South Africa every 18 months (35 tonnes) usually in Type B(U) containers of French design.
- No dispatch of irradiated nuclear fuel

TRANSPORT REQUIREMENTS BY FACILITY

Waste

- Koeberg produces about 400 drums of LILW per annum.
- LLW is sealed into steel drums.
- ILW is solidified with a sand/cement mix and poured into concrete drums.
- Shipped to Vaalputs in north.

TRANSPORT REQUIREMENTS BY FACILITY

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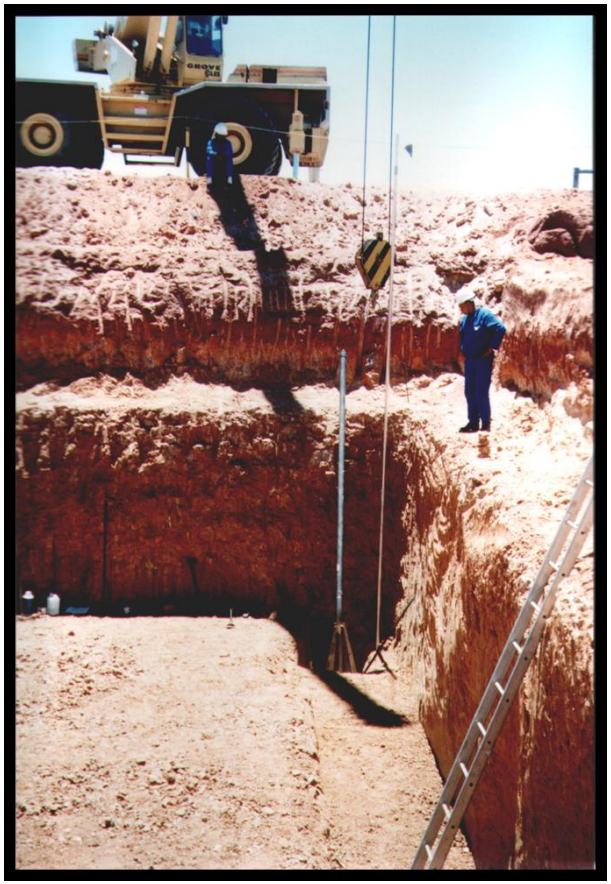


TRANSPORT REQUIREMENTS BY FACILITY

South African Nuclear Energy Corporation (NECSA)

- NECSA transports about 4000 radio isotopes per annum.
- This includes the production of;
- $^{99}Mo/^{99m}Tc$ generators
- $^{81}Kr/^{81}Rb$
- ^{192}Iridium, ^{131}I, and ^{60}Co
- Consumer products – luminescent signs

CHALLENGE FOR NECSA !
SHARED REGULATION FACILITY

South African Nuclear Energy Corporation

(NECSA)

- Sections of the NECSA Facility regulated by NNR

- Sections of the Facility is regulated by the DoH

TRANSPORT REQUIREMENTS BY FACILITY

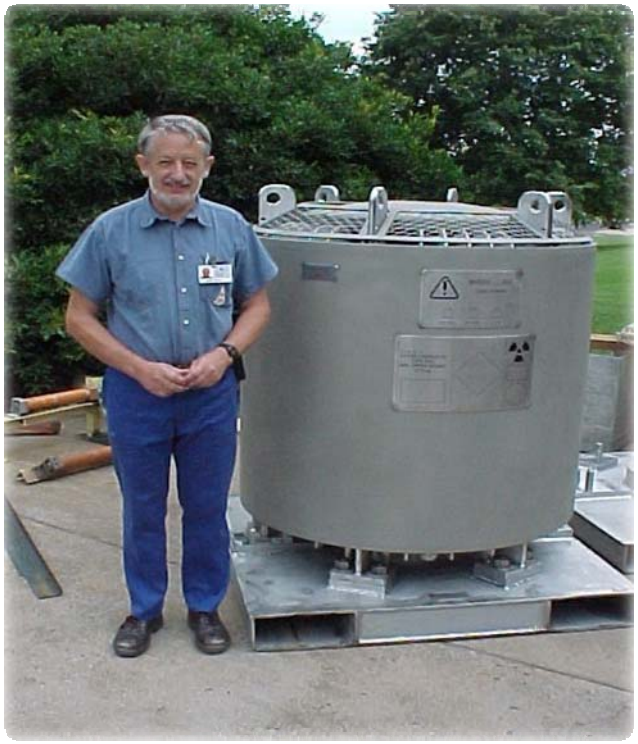
South African Nuclear Energy Corporation (NECSA)

- NECSA produces volumes of waste which is currently stored on-site.
- National Radioactive Waste Policy makes Vaalputs the national radioactive waste repository LILW;

South African Nuclear Energy Corporation (NECSA)

Transport Package Design

Cobalt Transport Container
(250 kCi Capacity, 7Te)



TRANSPORT REQUIREMENTS BY FACILITY

NORM Transports: Gold Mining Industry

Shipments of;

- uranium ore
- Calcine
- Pyrite
- Amonium di urinate (ADU)

Transported as LSA 1

TRANSPORT REQUIREMENTS BY FACILITY

NORM Transports: Gold Mining Industry

These transports are usually within the boundaries of the authorised site and hence exempt from TS-R-1 by way of para 107 (b).

TRANSPORT REQUIREMENTS BY FACILITY

NORM Transports: Mineral Sands Industry

Shipments of;

- Zircon
- Monazite
- Baddeleyite

Transported as LSA 1

TRANSPORT REQUIREMENTS BY FACILITY

NORM Transports: Mineral Sands Industry

These transports are beyond the boundaries of the authorised site and hence NOT exempt from TS-R-1

TRANSPORT REQUIREMENTS BY FACILITY

NORM Transports: Gold Mining Industry

Surface Contaminated Objects

- Gold mining industry generates 150 000 t/pa of scrap metal of which about 10% is radioactively contaminated.
- Identified in 1993 – Mine unknowingly exported a large volume of radioactive scrap metal without sufficient prior screening

TRANSPORT REQUIREMENTS BY FACILITY

NORM Transports: Gold Mining Industry

Surface Contaminated Objects

- Strict controls applied
- Transported as SCO-1

TRANSPORT REQUIREMENTS BY FACILITY

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TRANSPORT REQUIREMENTS BY FACILITY

- 1 oz gold per drum
- $1000 per oz
- 10 drums per week
- $10 000 per week
- $40 000 per month
- $1 = R7

TRANSPORT REQUIREMENTS BY FACILITY

R280 000 per month

FOR MUD !!!!!

THREE DISPOSAL OPTIONS FOR SCRAP METAL

Option 1

Clean to below 0.4 Bq/g beta/gamma

Clear

Option 2

Clean to below 4.0 Bq/g beta/gamma

Sell to authorised facility

THREE DISPOSAL OPTIONS FOR SCRAP METAL

Option 3

Wash all visible scales from scrap

10 Bq/g activity concentration

Sell to authorised smelter

Smelted in ratio 10:1

Resultant product at 1 Bq/g act concentration

SECURITY IN TRANSPORT

- National legislation, regulations and policies aligned with the Convention of Physical Protection of Nuclear Material 1980.

- National Key Point Act (currently a National Key Point Bill), which gives the state the right to assess and declare mobile assets, shipment as National Key Point. This Bill will ensure more

THANK YOU !