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Development of the Borehole Disposal Concept

By

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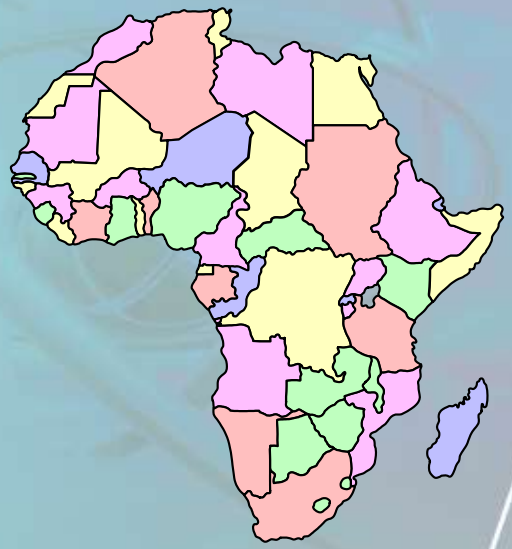
An African Project

Initiated in 1995 at an AFRA workshop in Pretoria



Uncontrolled Storage

vs.

Safe disposal

Objective of the Project

- To develop a simple and economically viable disposal concept complying with international radiation protection principles

The Project

96 | 97 | 98 | 99 | 00 | 01 | 02 | 03 | 04 | 05

Phase I

Description of the Concept

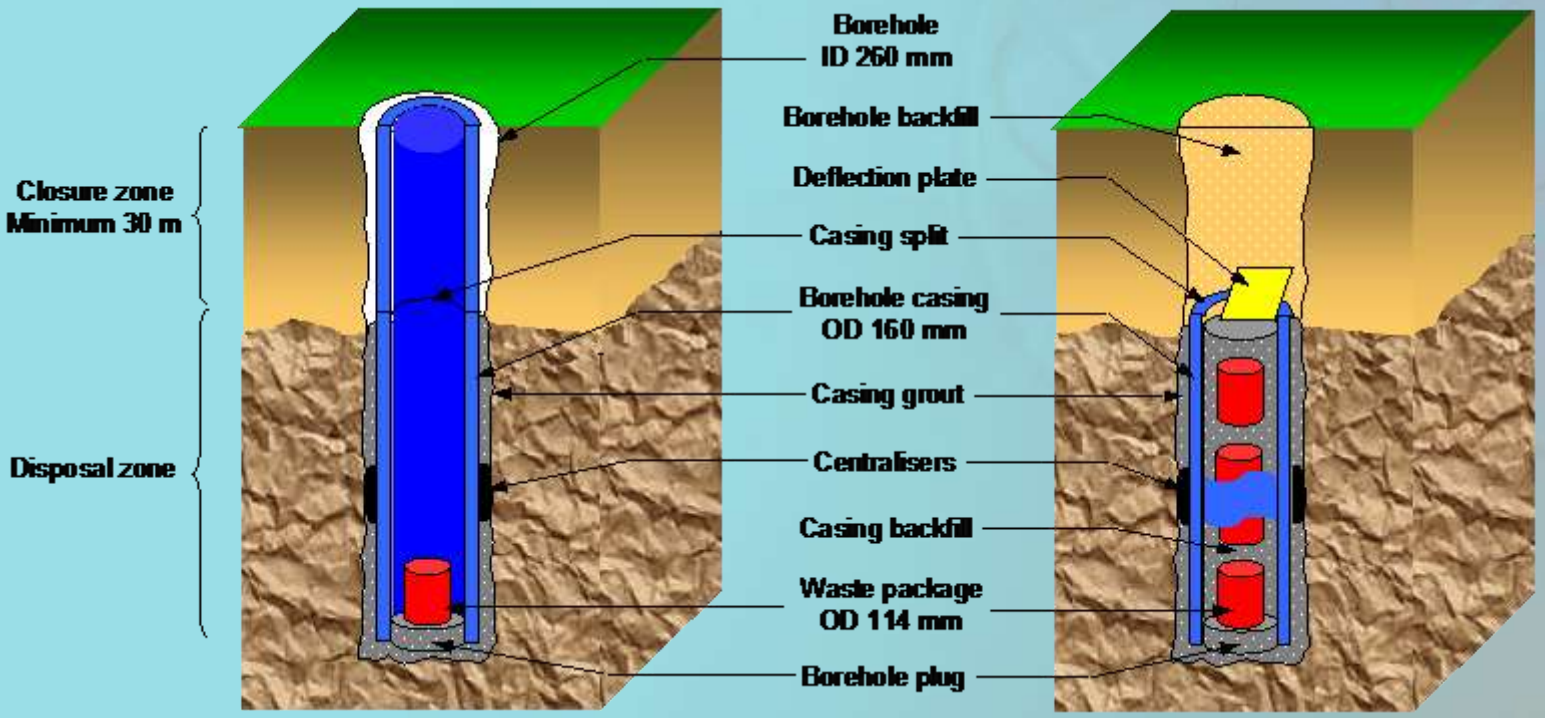
Phase II

Evaluation of the Concept

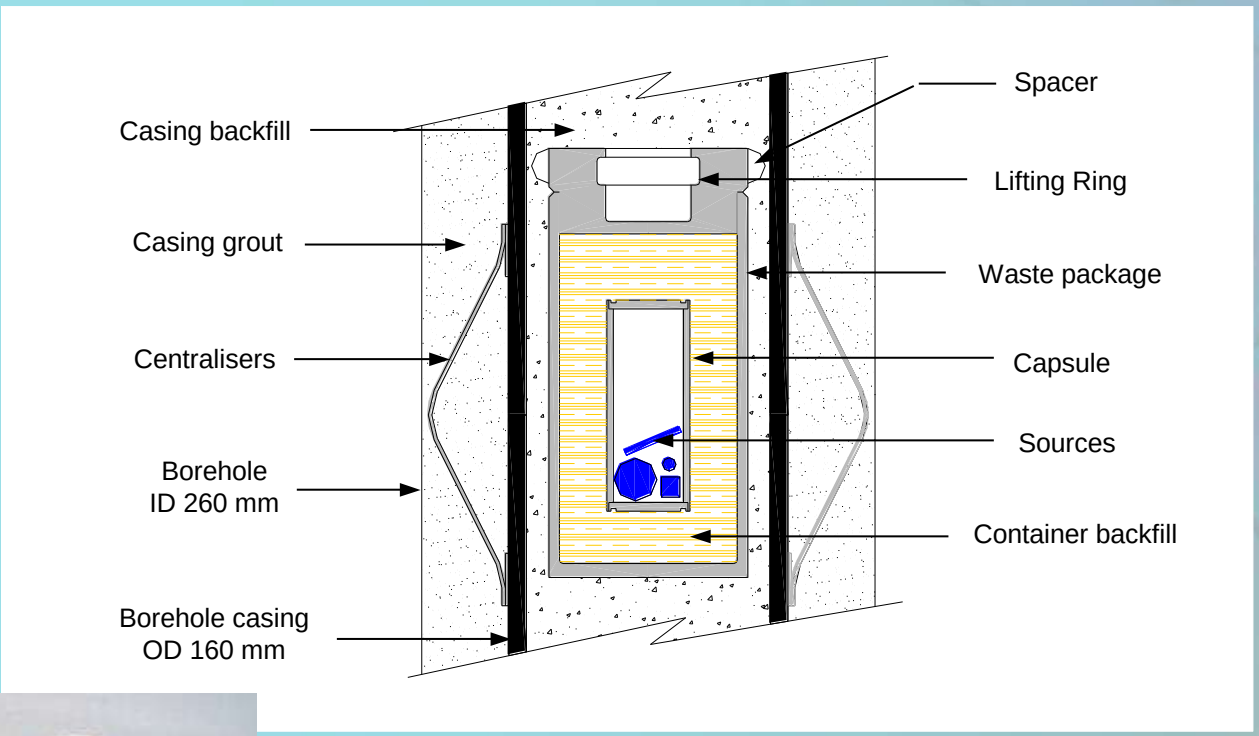
Phase III

Second Evaluation & Demonstrating its Technical Feasibility

AFRA Borehole Disposal Concept

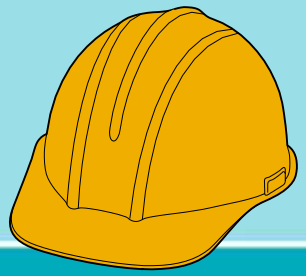


Waste Package



Demonstration of Safety and Practical Implementation

- Operational Safety Assessment
- Post-Closure Safety Assessment
- Practical Demonstration



Different Options Investigated

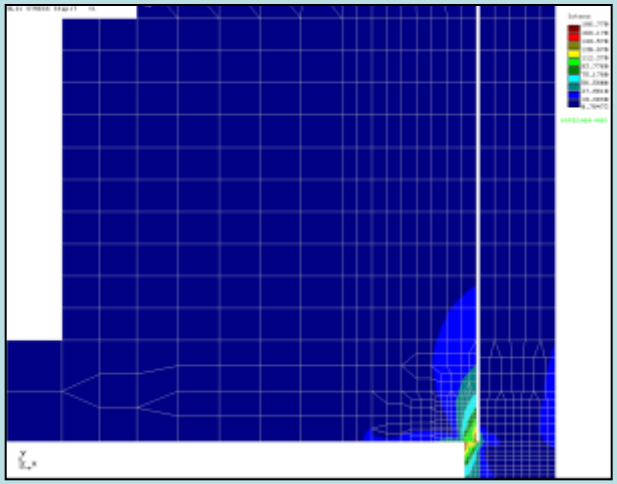
- Container design
- Container material
- Container manufacturing
- Container and borehole backfill
- Borehole drilling and casings

Container Design

MIG Welding

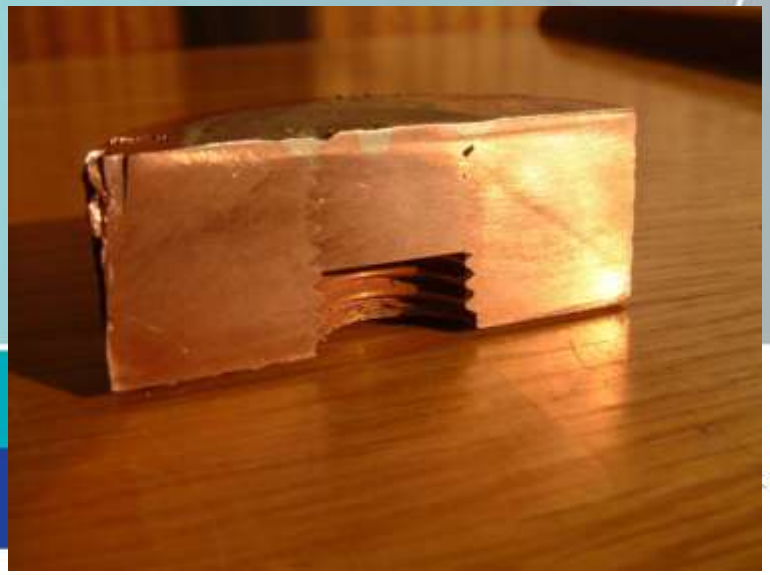
Screw Lid

TIG Welding



Finite Element Analyses

Copper Container



Lead Container

Waste Package

Capsule

Borehole Drilling

Percussion Drilling

Borehole Casing

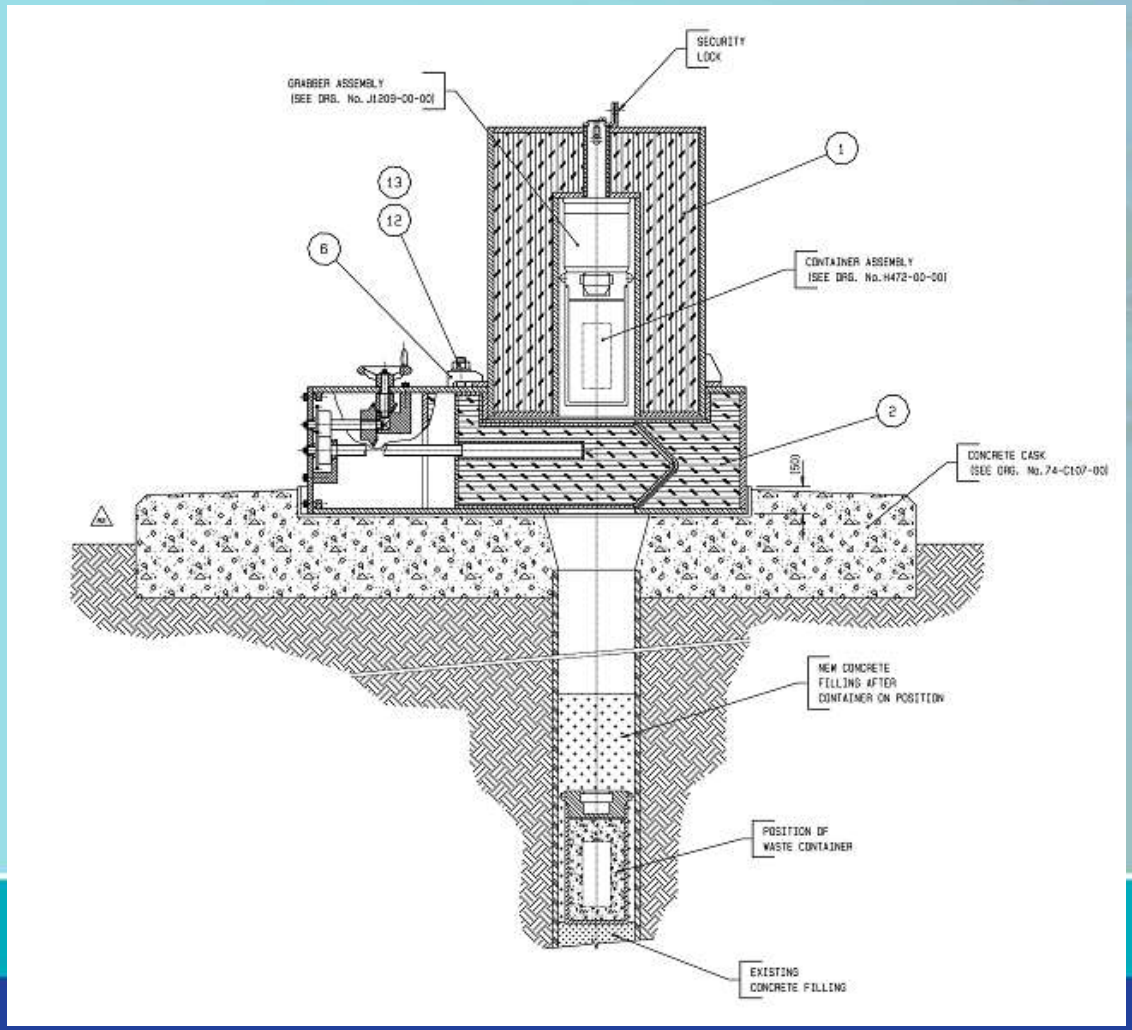
Emplacement of Casing

Welding of Casing

Grouting of Casing

Borehole Headgear

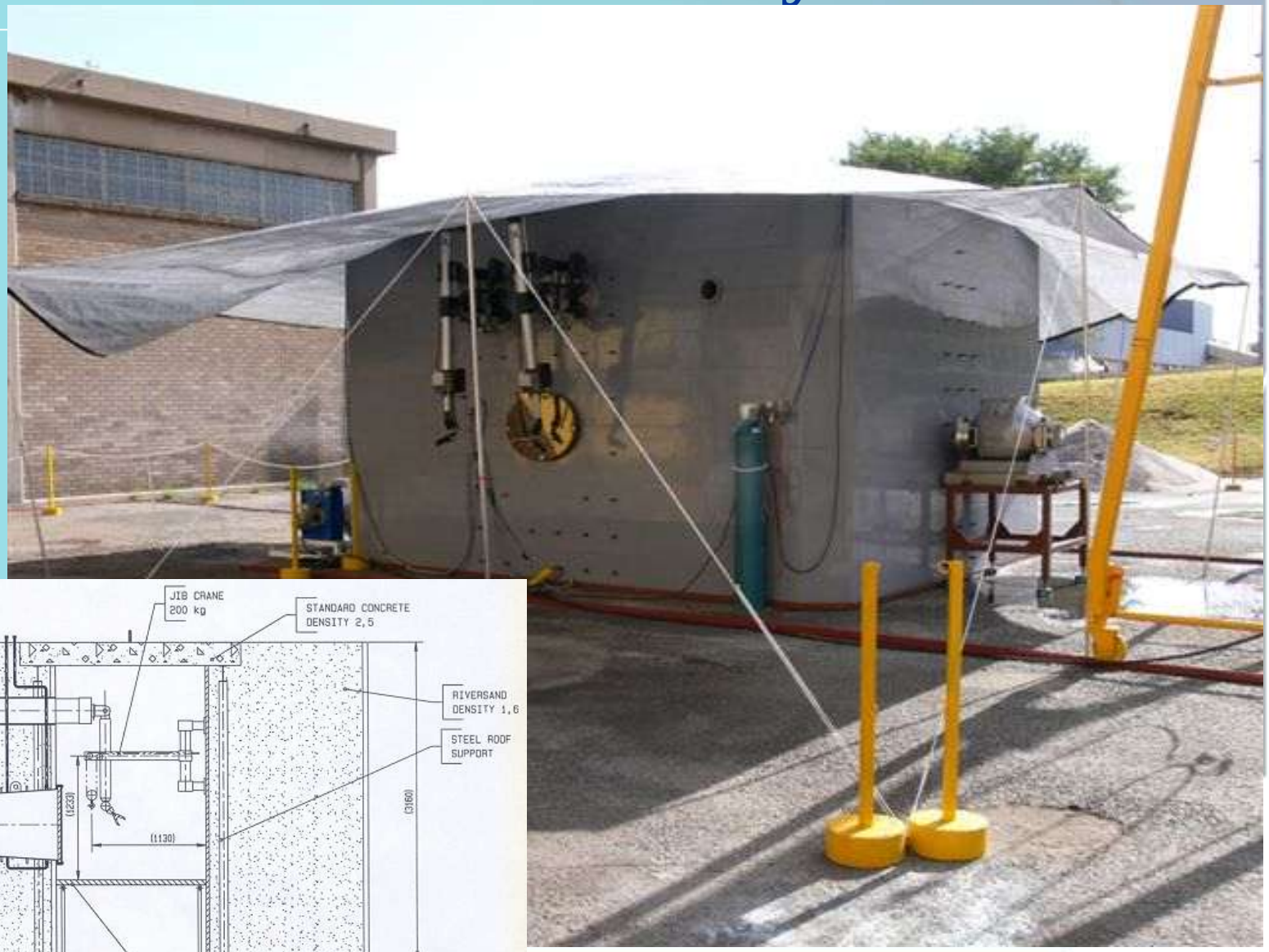
Transfer Cask



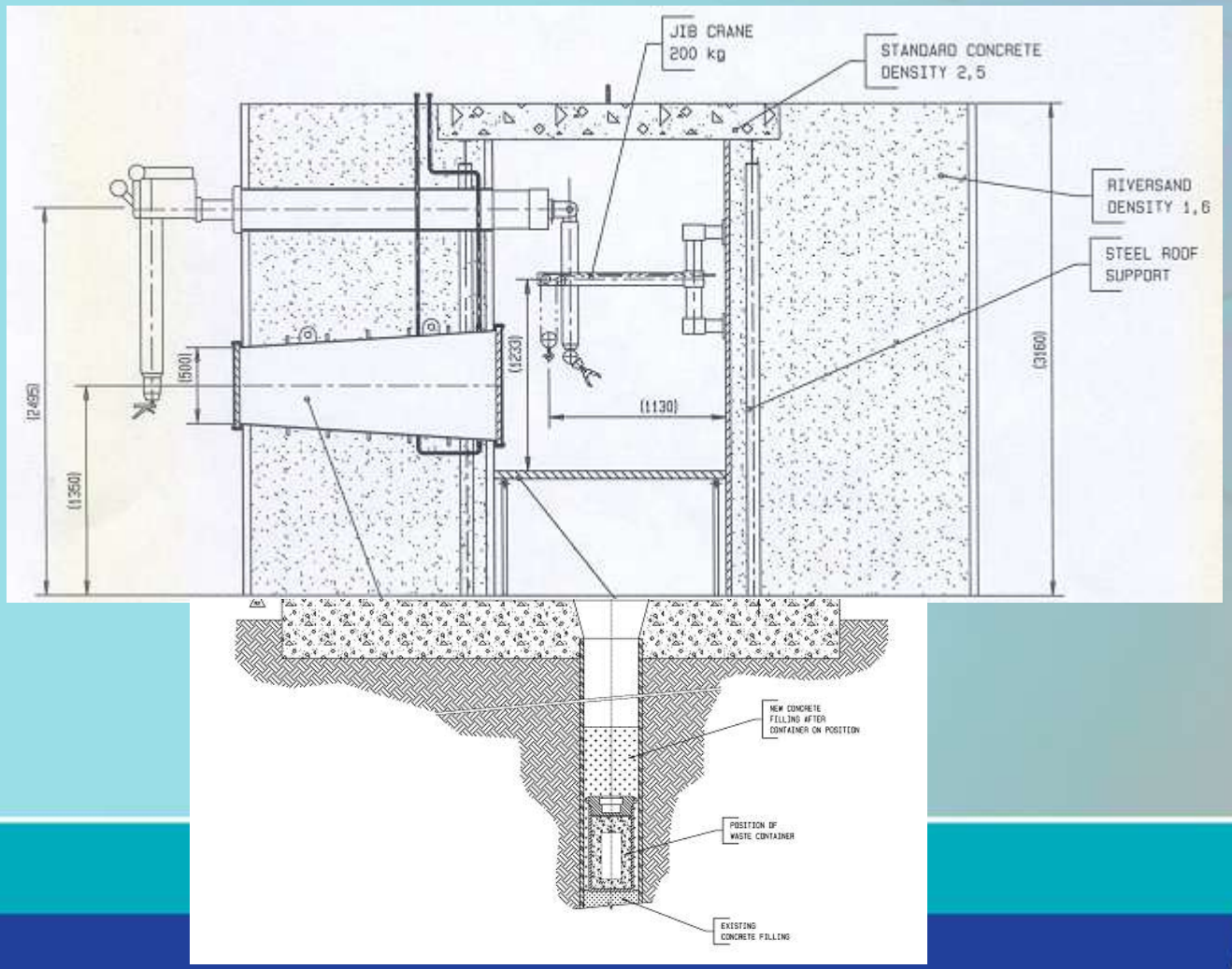
Conditioning Facility

Conditioning Facility

SHARS Facility



SHARS & BOSS


JIB CRANE
200 kg
STANDARD CONCRETE
DENSITY 2,5
RIVERSAND
DENSITY 1,6
STEEL ROOF
SUPPORT
(2495)
(1350)
(500)
(1233)
(1130)
(3160)
NEW CONCRETE
FILLING AFTER
CONTAINER ON POSITION
POSITION OF
WASTE CONTAINER
EXISTING
CONCRETE FILLING

Emplacement Equipment

Emplacement Configuration

Conclusion

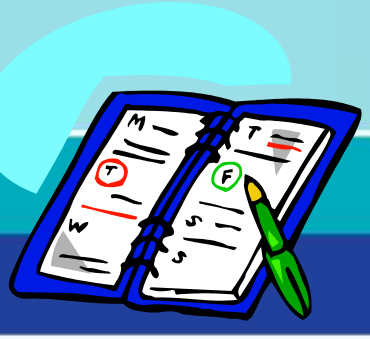
- The concept is designed for small volumes of high specific activity radioactive waste
- The concept provides for cost effective access to suitable geology using readily available construction materials and technologies
- The repository requires limited land area and has a low probability of human intrusion due to the small footprint of the borehole

Conclusion (cont.)

- Short period of construction, operation, and closure
- The design includes a multi-barrier system that provides chemical and physical isolation and containment
- It also provides defence-in-depth. If one barrier fails, others will provide containment

Future Programme

- A international peer review team accepted the technical feasibility, economical viability and the overall safety of the concept
- The AFRA Member States have decided to proceed to Phase IV of the project with the main aim to implement the borehole disposal technology



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