Performance of regulatory inspections in radiation protection at the Koeberg Nuclear Power Station (KNPS)

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Introduction

The South African National Nuclear Regulator (NNR) was established by the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) to provide for the protection of persons, environment and properties against possible harmful effects of ionizing radiation due to operation of Koeberg Nuclear Power Station "(KNPS)"located near Cape Town, South Africa.

Method

In 2011, eleven inspections were conducted by the Senior NNR RP & EP Inspector in the area of radiation protection. The scope of an inspection is determinated by the appropriate authorization condition, operating experience and operational events. The Inspector develops a check list prior to the inspection from the requirements in the NNR Requirements Documents, Eskom standards, KNPS process documents and KNPS working procedures. The Inspections are performed by either having a review/assessment focus and/or a pure compliance focus.

The inspection is concluded by compiling a report where the non-compliances are documented. Grading of non-compliances is performed in accordance with the impact they have on nuclear safety. Enforcement action is pursued based on the severity of the non-compliance or group of non-compliances observed.

Figure 1. *NNR Nuclear Inspectors performing plant inspections*

Results

- Maximum public dose for 2011 was 2.962 µSv versus NNR regulatory limit of 250 µSv/ year for KNPS
- Maximum individual dose was 17032 µSv versus NNR regulatory limit of 20000 µSv. Average dose was 388.6 µSv/person versus NNR ALARA target of 4000 µSv for 2011
- RP Inspections raised generic findings which resulted in the issue of a directive and a review in depth of waste management programme by KNPS

Problems & non- compliances identified

Problem 1: Certain inspection findings should be investigated/ audited & analysed further but NNR supplementary resources not available
Consequence: Findings not investigated in depth where required
Reason: Limited capacity

Figure 2. *The lid of the waste steel drum came off, the reason was not investigated*

Problem 2: Identified Inspection findings are not considered important if not linked to the integrity of the core or fuel
Consequence: Delayed response and findings not treated with the appropriate rigor
Reason: NNR grading system is not appropriate

Figure 3. *Example of inspection findings not considered important: registers not stored in the locked waterproof/ fireproof cabinet*

Problem 3: Inspectors only competent within area of expertise.
Consequence: Possibility that an Inspector is unable to detect non-compliances as part of inspections that requires cognitive thinking.
Reason: Inspectors are qualified/ trained only in one area of expertise or they are not appropriately trained.

Problem 4: Inspection findings are of a recurring nature and sometimes not resolved by the licensee.
Consequence: Encourages development of a laissez-faire attitude.
Reason: Inadequate penalty system in the NNR enforcement process.

Solution

The NNR undertook a Self-Assessment to review the effectiveness of the national legislative and regulatory framework for nuclear and radiation safety. The methodology is derived from all the relevant IAEA safety standards and used Self-Assessment Tool (SAT) software. The implementation of the Self-Assessment project plan assisted with the resolution and close-out of some of the problems identified. Examples:

✓The NNR will embark on a staff expansion (+- 32 persons) program over the next two/ three years.

✓Implementation of an enhanced training program for the NNR Inspectors that includes requalification training.

✓Establishment of legislative amendments to address issue of sanctions for non-compliance & development of an enforcement process.