Training and qualification of reactor operating personnel

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Scope: For the safe and efficient operation of a research reactor personel qualifications and subsequent training are foremost in the regulators and managements policy. Qualified and competent personnel play an essential role in preventing incidents and how these incidents are handled.

Qualifications and training complement each other. Qualifications indicate a natural propensity or talent an indicator of the ability to assimilate training material. Training complements the participants existing knowledge base as well as the means by which the participant acquires skills and competencies necessary in fulfilling his role.
Qualifications can range from technical through degree to Ph D. Each have their place in the organisation structure of a critical facility. Each employees role has a job description which highlights particular desirable qualities appropriate to that role. A reactor operator requires a comprehensive technical knowledge of the reactor plant as well as other complementary skills outlined below. A TAFE qualification in either electrical or mechanical engineering is most suitable. The Shift managers role (Reactor operator supervisor) requires not only a technical background but also the exercising of professional judgement. Analytical skills are more prevalent in the degree qualified candidate. The General Managers role encompasses many faculties from technical through managerial to leadership skills. These are fostered through the PH D journey. And appear as attributes of the well seasoned mature and assiduous employee with a PH D background.

In order to nurture safety culture and maintain the standards required in operating a nuclear facility we need to look further and mention attributes that are desirable in reactor staff such as:

- Analytical and diagnostic skills to identify plant abnormalities
- The ability to follow policy procedures and guidelines
- Working in a team environment
- Good communicative skills
- Ability to assume responsibility for incidents and take action as required

Well written selection criteria and the initial selection process will reveal the desirable attributes of potential reactor staff.

Introduction

Training for a research reactor facility is based on IAEA guidelines which recommend the Systematic approach to training. This involves performance and task based training which when used correctly establishes and maintains competency and qualifications of staff. The system relies on job and task analysis, feedback from operations personnel, operating experience, other plant experiences, response to incidents and an up to date and well programmed simulator.

OPAL's approach to training and qualification of reactor personnel follows the above regime.

The training is carefully structured to ensure that the selected candidate fulfils not only his personal ambitions but also the organisations needs. Our discussions will now briefly outline this approach

TRAINING PROGRAMS FOR REACTOR SHIFT PERSONNEL

The training program is comprised of an appropriate combination of classroom instruction, simulator training, and practical hands on sessions and supervised selfstudy. Incorporated are three fundamentals Safety and awareness (STAR principle), communications and workplace interaction.

Training needs are identified formally and incorporated into training plans. The prime objective of training is to ensure the safe and efficient operation of the reactor.

There are six basic components to the training which are carried out in a staged process:

1 Reactor Fundamentals
2 Classroom Design and Operations Theory
3 Simulator
4 Practical: This allows personnel to relate their classroom theory to on the job
5 Ongoing Training: This consists of two components update training and refresher training
6 Shift rotation

1. Reactor Fundamentals

The operation of the reactor is governed by the fission process therefore a basic understanding of this process and all its by-products is a requirement of all accredited reactor personnel. The reactor fundamentals topics are incorporated into the Operators training program but can be held as a stand-alone course.

2. Classroom Design and Operations Theory

This component of the training encompasses all facets of OPAL reactor design and its operation from an operator's perspective. It includes safety design considerations and all the elements of engineering which provide the operator with a working knowledge of plant. The training is modularised in system groups. Each group has a dedicated training methodology which complements the operators knowledge requirements for that specific system. The modules also incorporate shift attachments with specific tasks.

3. Simulator

The Simulator is designed to provide reactor operations personnel with a realistic experience of reactor control and operation. The screens are a duplicate of the Reactor Control and Monitoring System (RCMS) as found in the Main Control Room (MCR). The model that is programmed into the software accurately duplicates the responses and control of the OPAL Reactor as it would be in real time. It also enables a variety of scenarios to be programmed enabling operators to experience actions and response which would not be possible on the reactor itself. Refer to Appendix 9.

4. Practical Training

Practical training is comprised of two components; those being trained whilst on shift and completion of a practical check sheet. Both components are under the supervision of the Shift Manager. Following completion of various classroom training modules the operator may be

attached to shift as a supernumerary. This provides a sound basis for mating theory with practical. The practical check sheet ensures that all reactor operating personnel have completed the necessary hands-on training for the safe and efficient operation of the reactor.

5. Ongoing Training

In order to maintain operator knowledge and job competence at the highest level Ongoing training or Operations refresher and update training is carried out on a fortnightly basis. The scope of this training involves:

- Revisiting the required knowledge, Intellectual abilities and manual skills related to plant operations and administrative procedures covered in the original training, thereby preventing deterioration of performance
- Introducing an appropriate awareness of lessons learnt during the operating period since from safety events
- Correcting performance discrepancies as reported by supervisors and managers
- Ensuring the necessary level of teamwork and diagnostic skills
- Ensuring that all recent events, plant modifications, BMS documents, and conduct of operations issues are relayed to all shifts

6. Shift Rotation

Accredited staff rotate through three positions, namely Main control room, Outside plant and Project work which is carried out when of shift and known as day work. This rotation promotes operational experience and good work morale The MCR is a dedicated control centre which focuses specifically on the Reactor Control monitoring system and reactor protection system. The outside plant encompasses all the operational plant which supports the reactor facility. This position involves isolation and running of plant for maintenance, surveillances and field checks. Project work exposes the operator to the design and operations of the reactor by way of document writing and editing.