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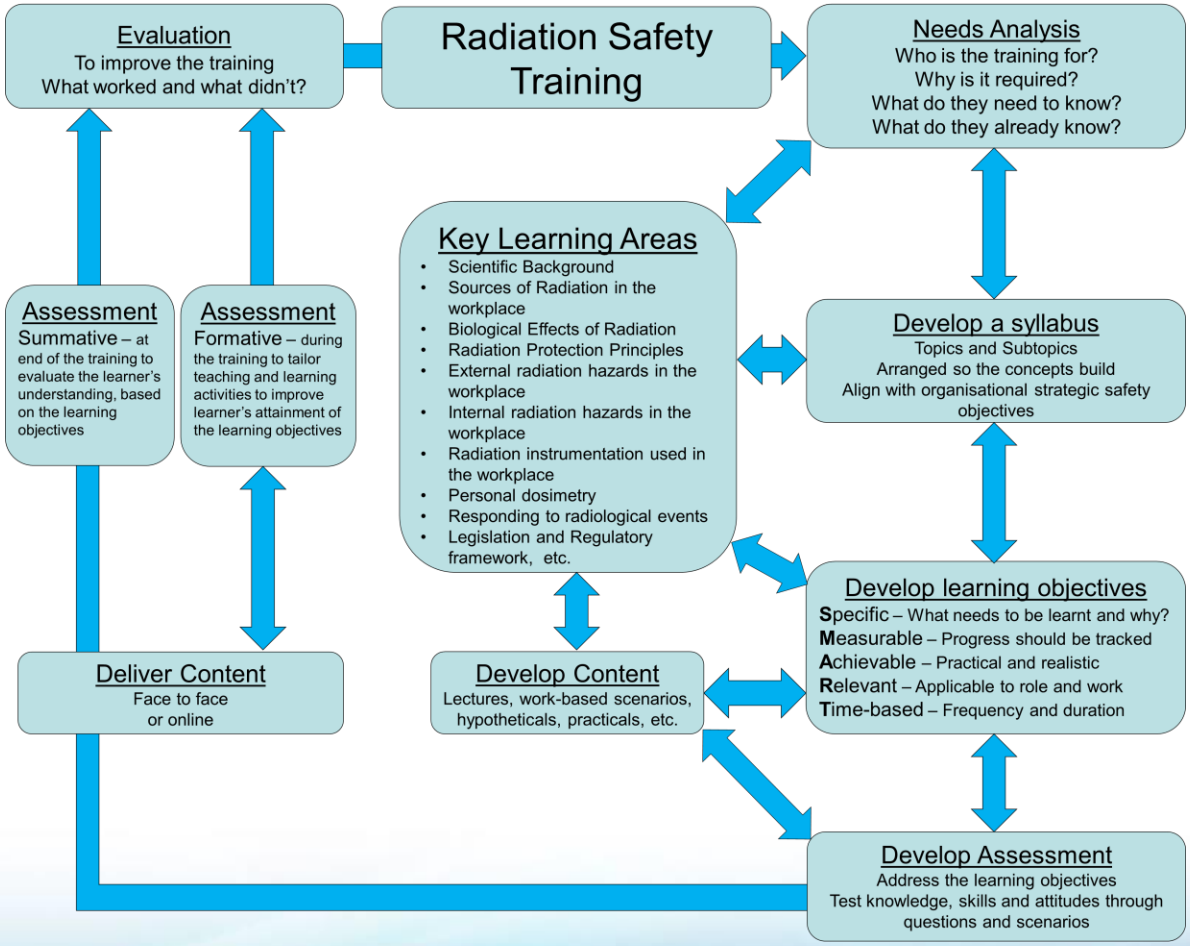
Radiation Safety Training at the Open Pool Australian Lightwater (OPAL) Multipurpose Reactor

John Bus

IGORR 18 Conference, Sydney Australia, 4-7 December 2017

The Systematic Approach to Radiation Safety Training



Bus, J., "A Systematic Approach to Radiation Safety Training", Australasian Radiation Protection Society (ARPS) 41st Annual Conference, Adelaide, Australia, September 2016.

Radiation Safety Training for Workers at OPAL

1. Basic Radiation Safety Course
2. Radiation Safety Workshop
3. OPAL Radiation Safety Course
4. OPAL Radiation Safety Refresher

Who is the training for?

Basic Course

- This course provides a basic introduction to Radiation Safety at ANSTO for **new workers**

Workshop

- This course provides an introduction for **new workers** and refresher training for **experienced workers** in the Radiation Safety section of the ANSTO Work, Health and Safety Management System

OPAL Course

- This course provides **workers** with an understanding of the radiological hazards and the radiation protection arrangements at the OPAL facility
- It is designed for: OPAL Shift Managers, Reactor Operators, Utilisation staff, Maintenance staff, Health Physics Surveyors/Radiation Protection Advisors and all other Nuclear Operations staff required to regularly access radiologically controlled areas in OPAL for work

OPAL Refresher

- This course provides **experienced workers** with refresher training on the radiological hazards and the radiation protection arrangements at the OPAL facility
- It is designed for: OPAL Shift Managers, Reactor Operators, Utilisation staff, Maintenance staff, Health Physics Surveyors/Radiation Protection Advisors and all other Nuclear Operations staff required to regularly access radiologically controlled areas in OPAL for work

Why is it required?

Basic Course

- To provide participants with the knowledge and skills to work safely in radiologically classified areas

Workshop

- To provide participants with the knowledge and skills required to work safely and responsibly in radiologically classified areas and to meet their responsibilities as workers enrolled on the ANSTO Dosimetry Service

OPAL Course

- To provide participants with a basic understanding of the radiation protection arrangements and the radiological hazards at the OPAL facility

OPAL Refresher

- To provide participants with a more detailed understanding of the radiation protection arrangements and the radiological hazards at the OPAL facility

What do they need to know?

Basic Course

- Properties of ionising radiation
- Dose limits and constraints
- As Low As Reasonable Achievable (ALARA)
- Risks of radiation exposure
- Controls for minimising exposure
- Monitoring personal doses
- Area classification
- Barrier procedures

Workshop

- The principles of Radiation Protection
- The application of ALARA at ANSTO
- Practical methods for controlling internal and external radiation hazards
- The process of classifying radiological areas
- Incident response scenarios
- Management of radioactive waste
- A practical session covering barrier procedure and use of radiological instruments for new workers

OPAL Course

- The OPAL Radiation Protection Plan
- OPAL specific documentation
- OPAL specific radiological hazards and controls
- OPAL area classifications
- Dosimetry requirements at OPAL
- Radiological monitoring requirements at OPAL
- A practical session to practice correct radiological monitoring techniques

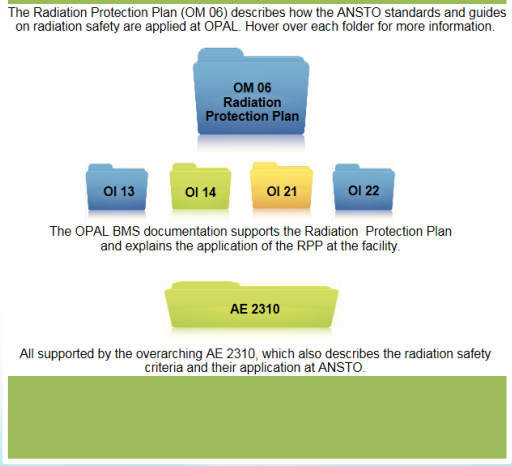
OPAL Refresher

- Overview of OPAL Radiation Protection documentation
- Radiological area classifications at OPAL
- Types of radiological monitoring at OPAL
- Dosimetry at OPAL
- Radiological monitoring instruments at OPAL
- External radiation hazards and their controls at OPAL
- Internal radiation hazards and their controls at OPAL

Syllabus for the OPAL Refresher

OPAL Radiation Safety Documentation Pre-reading

- Read 5 key OPAL Radiation Safety documents such as the OPAL RP plan and Entry and Exit Requirements for Classified Areas at OPAL
- Self paced and the learner can save were they are at, at any time and then come back to where they left off



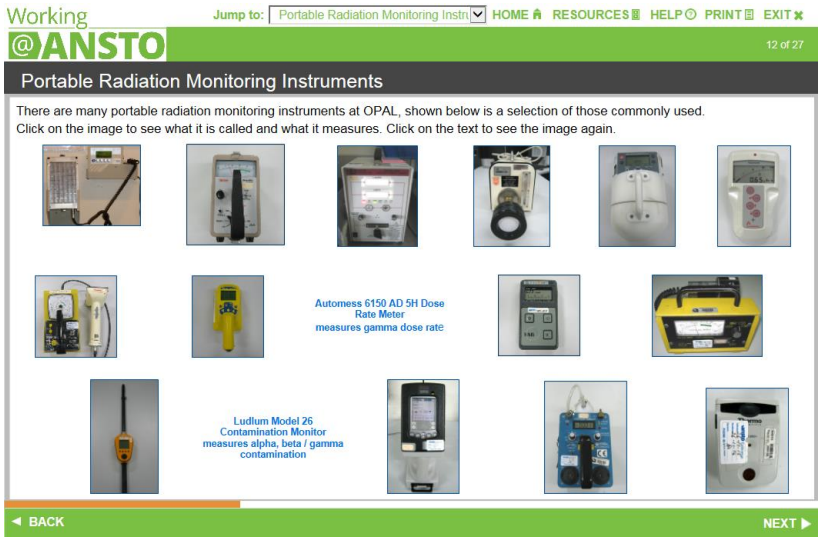
online eLearn module

- Dose Limits and Constraints
- Radiological classifications in OPAL
- Access to Restricted and Forbidden Areas
- Safety Hazard Notice Boards
- Dosimetry Requirements for External/Internal exposures
- Work Place and Area Monitoring
- Portable Radiation Monitoring Instruments and Scenarios
- Radiation Monitoring System
- Maps of L-5 with pictures of components or systems and typical dose rates at Power and Shutdown
- Maps of L-7 with pictures of components
- Maps of L+13 with pictures of systems or components where it's possible to get contamination from
- What is tritium, where can it be found at OPAL and how can it get into your body
- Airborne Contaminants at OPAL
- Liquid Contaminants at OPAL
- Self paced and the learner can save were they are at, at any time and then come back to where they left off

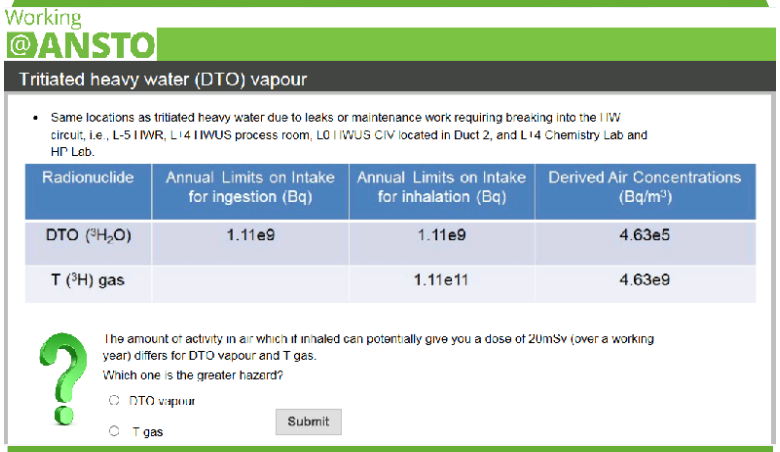
Learning Objectives for the OPAL Refresher

- Describe the radiation protection program at OPAL
- Describe the radiological hazards at OPAL and their origin/source
- Describe the controls in place to minimise exposure to these radiological hazards
- List the dosimetry requirements for each classification area and specific work scenarios
- Describe the contamination controls in place at OPAL to prevent/minimise internal doses
- Describe the radiation area monitors for dose rate and tritium contamination in air and how to obtain readings before entry to certain areas
- Describe the ways tritiated water can enter the body, prevention & monitoring following an intake
- Describe one common radioactive contaminant in OPAL pool water and the best way to prevent it getting on the skin

Example Content for the OPAL Refresher

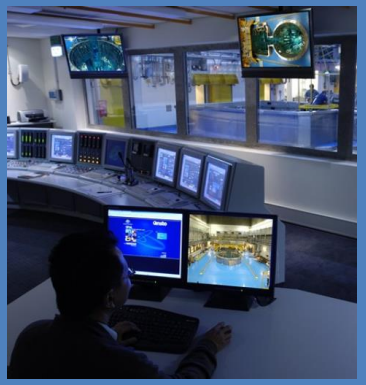


Assessment for the OPAL Refresher



Formative Assessment

- To gauge the participant's understanding that DTO vapour with the more restrictive DAC poses a greater potential hazard than Tritium gas at OPAL



Summative Assessment

Pre-reading:

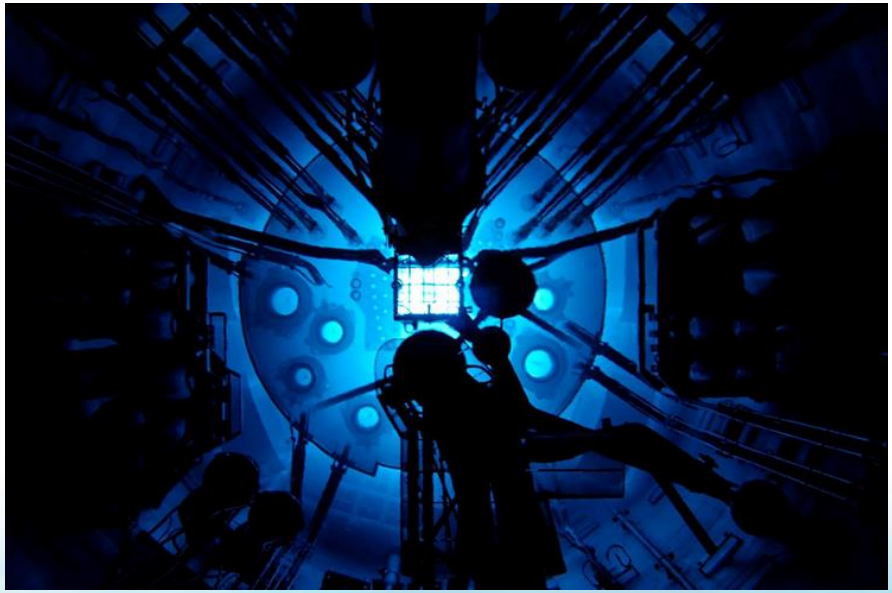
- Assessment 20 multiple choice questions with 60% required to pass

Online eLearn module:

- Assessment 10 multiple choice questions with 80% required to pass

Evaluation for OPAL Refresher

- Prior to rollout - Extensive testing and evaluation by select ANSTO Radiation Protection personnel and OPAL staff.
- Following pilot course - Verbal feedback was collected from learners.
- Yearly review planned, with next version to have a mechanism for written feedback



Conclusion

The successful application of the SAT process has lead to a radiation safety training program that meets the:

- organisational safety goals and regulatory requirements.
- needs of the staff at OPAL in terms of providing them with the knowledge, experience, skills and a questioning attitude to radiation safety.

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Questions