



Australian Government

Australian Nuclear Science and Technology Organisation

ARPANSA Licence Holder Forum: ARPANS Licensing at ANSTO

Discussion Overview

- An overview of ANSTO
- Our Facilities
- Our ARPANS Licences
- OHSE System & Culture
- Safety Assessment & Review
- Challenges

Our Vision

To be recognised as an international centre of excellence in nuclear science and technology for the benefit of Australia



Our Mission

Support government policies and initiatives in nuclear and related areas



Our Mission

Operate nuclear science and technology based facilities



Our Mission



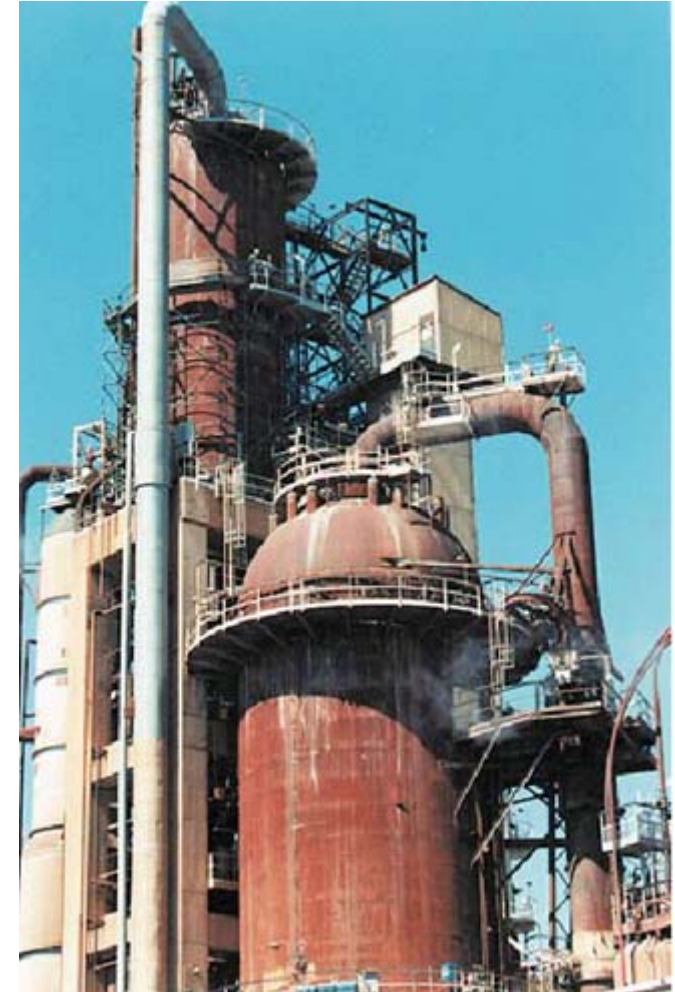
Undertaking research that
advances the application of
nuclear science and
technology



Our Mission



Apply nuclear science to address
Australia's environmental
challenges and increase the
competitiveness of Australian
industry



Our Mission

Manufacture and advance
the use of
radiopharmaceuticals



Our Work: Health

- Radiopharmaceutical Production (ARI)
- Radiopharmaceutical Research Institute
 - Collaborating with medical researchers, hospitals, industry
 - Supporting ARI business unit
- Radiation studies
 - Current project aiming to improve dosimetry for treatment, e.g. proton therapy

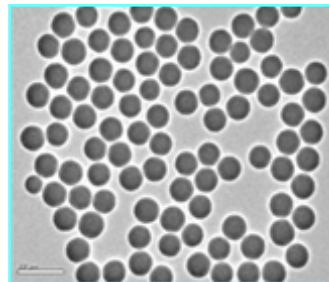
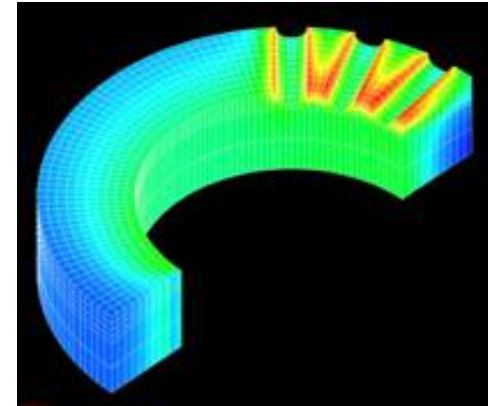
Our Work:

Isotopes in the Environment

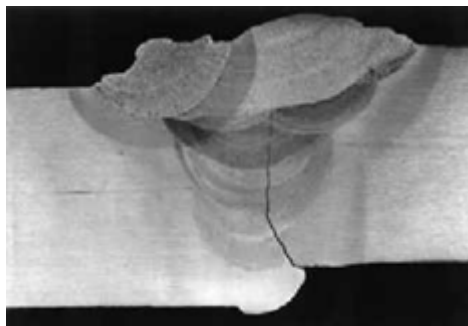
- Climate change
 - Improving climate change models
 - Analysing past climate change
- Sustainable management of water, land and air quality
 - groundwater usage
 - air particle/pollution tracking

Our Work: Materials

- Materials performance and structural integrity in extreme conditions
- Managing radioactive waste
- Nanostructured materials
 - Applications in advanced nuclear systems, environment, energy, health, industry

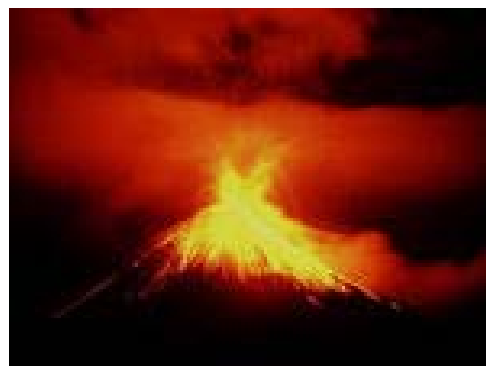


Our Work: Neutron Scattering



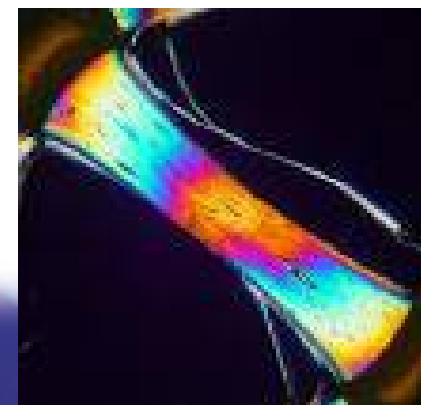
Studying the stresses in welds to help engineers develop better welding techniques

Discovering the structure and function of proteins



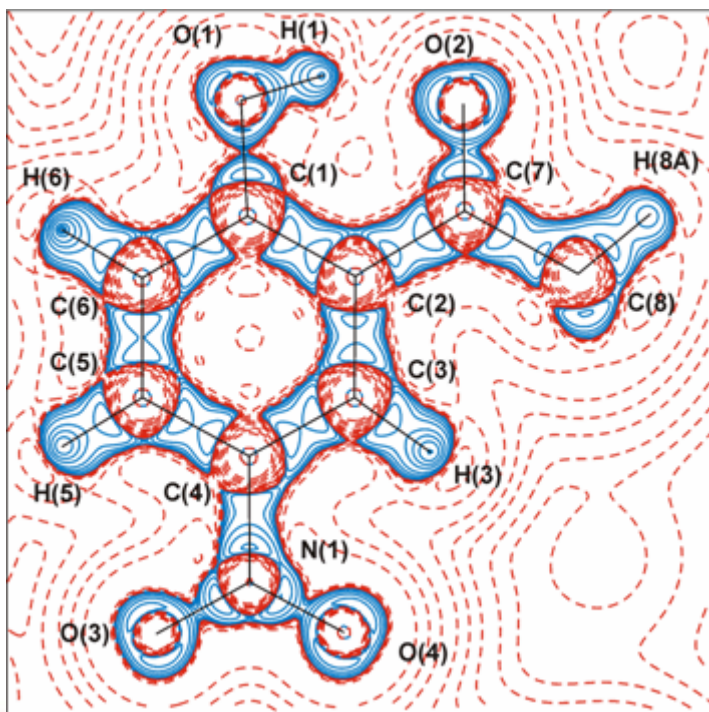
Examining the geological history of the earth

Developing better plastics



Our Work: Drug Design

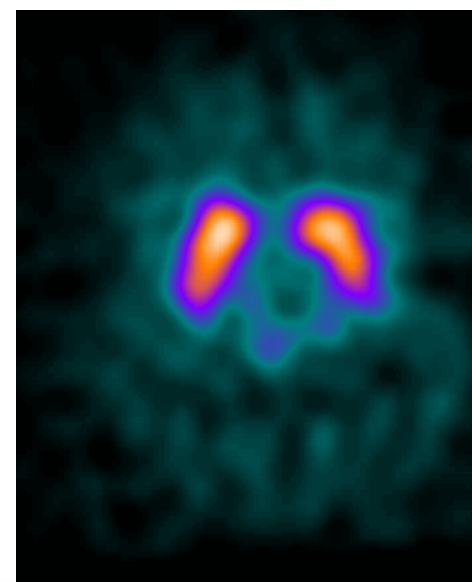
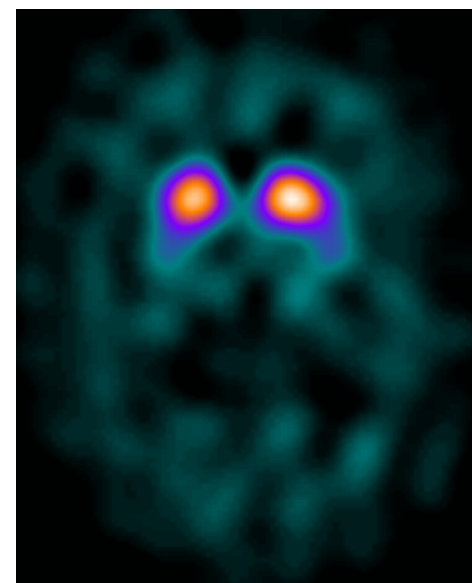
First use neutrons to determine the structure of the molecule and in particular, locate hydrogen.



Then use x-rays to find the electron charge distribution
This tandem process produces very accurate maps of these molecules

Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET)

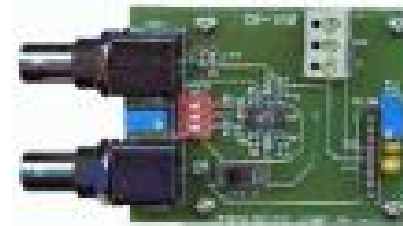
- Diagnostic imaging
 - Focus on cancer & neurodegenerative diseases
 - e.g. differentiating between Alzheimer's Disease and Diffuse Lewy Body dementia
- New PET facility subject to regulatory approval



Our Work:

Security and counter-terrorism research

- Radiation detection and identification, forensics, training



Some Major Facilities

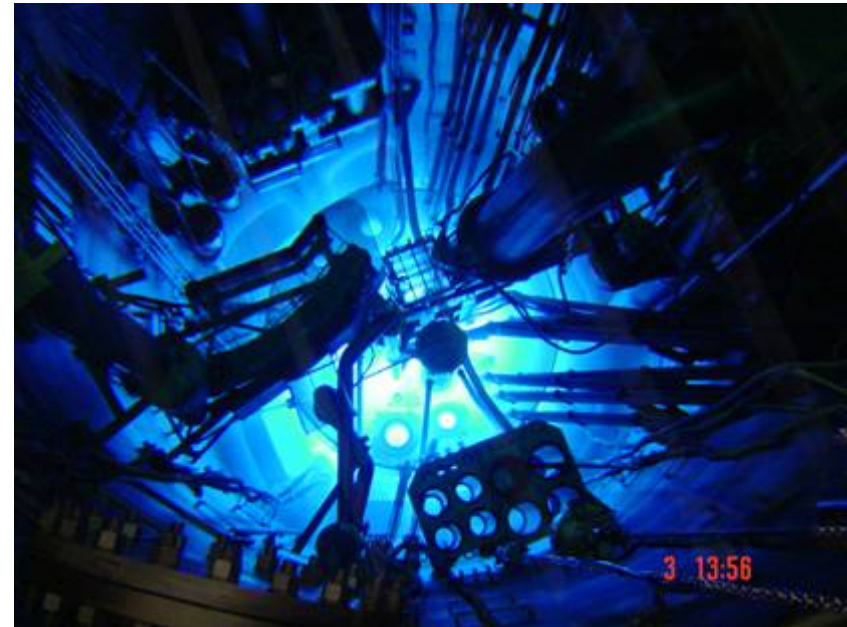
- OPAL research reactor
 - HIFAR and Moata reactors to be decommissioned
- ANSTO Radiopharmaceuticals and Industrials (ARI)
 - Lucas Heights (manufacture and distribution)
 - Camperdown facility (National Medical Cyclotron)
- Accelerators (ANTARES, STAR, Van de Graaff)
- Gamma Irradiator (GATRI)
- Waste Operations



OPAL

Open Pool Australian Light-water reactor

- ANSTO's new world-class research reactor
- Main functions are to:
 - Irradiate materials (radioisotopes, silicon etc)
 - Provide a source of neutrons for advanced studies of materials



Irradiation Facility (GATRI)

- Gamma irradiation facility for “boutique” irradiations
 - Sterilise insects
 - Bones/tendons for human transplants
- Calibrations/dosimetry for other irradiators
- Research e.g. fruit export

ANTARES

- Tandem Particle Accelerator
- Environmental sampling
- Member of IAEA Network of Analytical Laboratories

Regulating ANSTO's Activities: ARPANS Licences

- Facility Licences (include)
 - Nuclear Installations: Reactors (OPAL, HIFAR & MOATA), Waste & Fuel Operations, ARI
 - PRFs: Accelerators (ANTARES, STAR, Van De Graaff), GATRI, National Medical Cyclotron
- Source Licences
- All licensed activities are covered by the ANSTO OHSE System

What is the ANSTO OHSE System?

- Guides internal processes for general regulatory compliance
- Comprised of an Occupational Health Safety and Environment (OHSE) Policy and a suite of documents setting out OHSE Standards and Practices
- Sets out roles, responsibilities and review mechanisms, including:
 - Senior Management Committee - general oversight of major projects;
 - Safety Assessment Committee (SAC) - an internal review body responsible for safety approval of equipment and processes operated within ANSTO; and
 - Reactor Assessment Committee (RAC) - a specialised internal review body responsible for safety review and approvals relating to issues of reactor and nuclear safety.
- Quality systems - accredited under ISO standards for quality (9001) and environmental management (14001)
- Ongoing audits and tracking are undertaken on a Divisional / Institute basis (considering integrating these systems)

OHSE Policy

Commonwealth
Laws & Regulations

NSW Laws &
Regulations

International
Standards

C.O.P, Guidelines &
A/Standards

Best
Practice

Systems

Practices

Behaviour

Set of principles

Action as opposed
to theory

Attitude that directs
your actions

Planning

Risk Management

Communication &
Consultation

Roles &
Responsibilities

Implementation

Plant Safety
Nuclear Safety

Environment
Emergency
Planning

Chemical Safety
Electrical Safety

Manual Handling
Radiation Safety

Occupation Health
Contractor Safety

Measurement & Evaluation

Performance
Measurement

Audits

Reporting

Senior Management Review and Corrective Action

Review of OHS
Management Systems

Continual Improvement
Process Review

Feedback

Safety Strategy

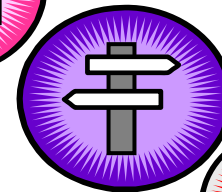
ANSTO OHSE System

ANSTO OHSE Standard



ANSTO OHSE Practices

- Guide
- Checklist
- Form
- Flowchart
- Alert



ANSTO OHSE System

- **Responsible Officers**
 - include General Managers, Facility Officers, Area Supervisors and Licensing Officers
 - Responsible for safety and facility specific regulatory compliance issues
 - Preliminary safety assessment of activities using internal safety assessment process
 - Everyone is responsible for safety!
- **Internal Assessment**
 - Individuals must follow OHSE procedures when undertaking their activities
 - Safe Work Method & Environment Statements (SWMES) or Safe Work Permits (SWP) required for new or infrequent tasks, or for hazardous work
 - SAC assessment/approval may be required

ANSTO's Internal Safety Assessment and Review Process

- Two safety categories:
 - Cat-A (review and approval via SAC/RAC)
 - Cat-B (Divisional/Institute review)
- Risk based approach
 - SAC focuses on higher hazard/risk issues (Cat A)
 - Explanatory documentation (flowcharts etc)
- Ongoing review
 - Cat B picked up through OHSE audit process

ANSTO's Internal Safety Assessment and Review Process: Summary

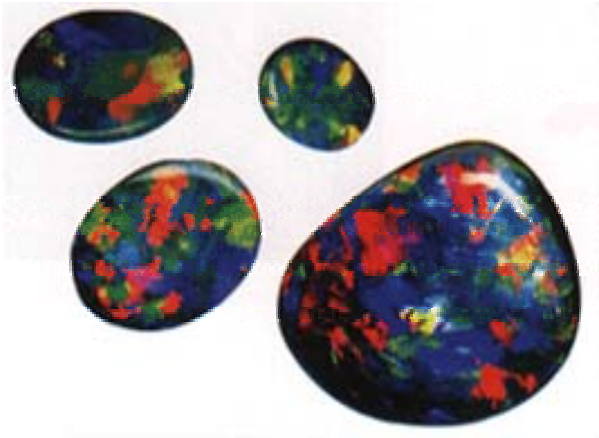
- Internal permitting system (SWP / SAC)
- Covers all aspects of safety not just Radiation Protection & Nuclear Safety
- Explicitly includes environmental aspects
- Ongoing review and audits
- Everyone is responsible for safety

Ongoing Challenges

- Highly regulated organisation
 - Ensuring compliance
- Different activities = different cultures
 - Varied roles (repetitive manufacturing and research to OPAL operation) presents challenges in maintaining single safety culture
- Integration of support systems (event database; integrated OHS, Environment and ISO)
- Community engagement
 - Community concern and public perception

Summary

- Various activities, culture and risks levels
- Risk-based approach
- Internal safety assessment
- Ongoing review and auditing for safety and compliance
- Overarching safety management system applicable to all activities



Australia's Icons

