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ANSTO Camperdown Decommissioning Licence Application

Document AC-D-LA-E6b Rev 1

# ANSTO CAMPERDOWN FACILITY DECOMMISSIONING

# SAFETY MANAGEMENT PLAN

(Rev. 1)

**Prepared By**

**Australian Nuclear Science and Technology Organisation**

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# 1 PURPOSE AND SCOPE

The purpose of this *Safety Management Plan* (document number AC-D-LA-E6b, hereafter called "the plan") is to outline the safety management arrangements that are in place within ANSTO's Engineering and Capital Programs (ECP) division for the purpose of decommissioning the IBA "Cyclone 30" 30MeV Cyclotron (known as the National Medical Cyclotron) – a Prescribed Radiation Facility and the Radiopharmaceuticals Operations (Camperdown) – a Nuclear Installation, at Camperdown, NSW. Both facilities are authorised under combined licence F0044-5A, 5B, 5C. For convenience, these two facilities are referred to as "the facility" in this plan.

The scope of this plan are all safety and licensing issues required by the ARPANS legislation [Ref 1, 2] and the ANSTO safety arrangements. It specifically covers the issues referred to in the ARPANSA licensing guidelines relating to the review of plans and arrangements [Ref 3]. The safety issues are addressed in the following headings in this plan.

This plan should be read in conjunction with the other plans and supporting documents comprising the decommissioning licence, specifically AC-D-LA-E6c *Radiation Protection Plan* [Ref 4] and AC-D-LA-E6f *Emergency Plan* [Ref 5].

# 2 SAFETY CULTURE

The ANSTO strategic directions emphasise the goal of ensuring that ANSTO facilities and activities are safe. ANSTO is responsible for the safety of its staff and the public as stated in APOL 2.1 *Occupational Health, Safety and Environment Policy* [Ref 6]. During the decommissioning of the ANSTO Camperdown Facility, the Major Project Delivery Office (MPDO), which is a part of the ECP division, will formulate and execute the project activities in compliance with AG2389 *Occupational Health and Environment Management Arrangements* [Ref 7] (hereafter called the "safety arrangements") which implement the safety requirements of the strategic plan and safety policy. The safety policy and safety arrangements are readily available to and accessed by staff on the ANSTO intranet.

An aspect important to safety culture is that the implentation of the safety requirements is not subject to inappropriate commercial pressures. In ANSTO the funding and safety approval processes are clearly separated. The funding for the decommissioning activities has been approved by the Capital Investment Committee (CIC) and the safety approvals are given by the separate Safety Assessment Committee (SAC).

The ANSTO safety arrangements have several layers of protection for staff, contractors and the environment. The ANSTO standard AS2310 *Radiation Safety* [Ref 8] has defence in depth as a main strategy. Some general examples of this approach are discussed below.

A comprehensive risk assessment for the decommissioning activities has been conducted in accordance with AG-2400 *Conduct of a Risk Study* [Ref 9]. At another level, Safe Work Method Statements (SWMS) will be prepared for the decommissioning tasks and the final versions of these will involve the people who will carry out the actual work at site. This process, of involving working staff including contractors in the identification of hazards and the setting of controls, promotes a positive attitude to safety and helps build a good safety culture. During the decommissioning a daily start-up toolbox talk will be held with the workers to discuss safety and operational issues prior to commencing scheduled work. Workers involved in the decommissioning will communicate with the Works Supervisor and the Radiation Protection Services staff and the OH&S Adviser will be available to provide advice on safety issues associated with the work.

The only use of contractors in radiation areas foreseen at this stage are the specialist lifting contractors in the vault. Following normal ANSTO practice, they will participate in the preparing the detailed safety assessments and in the safety toolbox talks. Contractors are selected in accordance with AS-2303 *Contactor Safety* [Ref 10].

Good communication and consultation are central to providing a good safety culture. At the ANSTO organisational level, the CEO holds monthly forums for all staff and promotes a monthly safety theme. ECP Division has a monthly forum at which safety is discussed first.

The ECP Business Management System (BMS) monitors the safety indicators for all projects and implements measures that are required to improve operational and safety performances.

All the decommissioning tasks will be assessed to identify hazards including human errors that could lead to any accidents/incidents. A dedicated Works Coordinator has been appointed for the decommissioning operation at site. Two preliminary SWMS have been prepared and detailed SWMS will be prepared with the involvement of the working staff, Radiation Protection Services staff and Occupational Health & Safety advisers. This process reduces the likelihood and potential consequences of any human errors.

All safety related events/incidents are reported and investigated following AG-2372 *OHSE Management – Event Reporting, Event Response Process* [Ref 11]. This process also captures suggestions for improvements.

Safety inspections of the decommissioning site will be carried out and together with the toolbox talks, these will detect safety concerns. Inspections will include the housekeeping inspections which are conducted by the representatives of ANSTO management.

Safety issues and learning are communicated to staff in several ways. The toolbox talks are the main forum for the decommissioning work itself. Feedback to MPDO and ECP management will occur through the Works Co-ordinator both informally and through project reports. This person is also the Facility Officer who will monitor issues relating to the ARPANSA licence and report to the Nominee who is the General Manager, ECP division.

At the organisation level, ANSTO conducts periodic surveys on safety culture. The most recent was in 2010 by external consultants engaged by the Quality, Safety, Environment and Radiation Protection (QSERP) division. QSERP gave feedback to ECP on the division performance.

# 3 ADMINISTRATIVE ARRANGEMENTS

The safety regime in the strategic directions and the safety policy is expanded principally in the occupational health and safety management arrangements in AG-2389: OHSE Management System. These are supplemented where needed by divisional arrangements.

The decommissioning will be managed by the MPDO following their project management procedures documented in the ECP division Business Management System. For the hazardous activities, specific SWMS will be prepared written which identify the hazards and necessary safety controls. The final version of these SWMS will involve the personnel actually performing the work.

The ECP organisation and administrative arrangements also provide for managing specific engineering hazards. There is a Transport Packages Approvals Officer and procedure ECP P-2640 *Radioactive Material Transport Packages* [Ref 12] and this process will ensure safe transport of active equipment and waste from the decommissioning site.

ANSTO Waste Operations staff who are very experienced in handling contaminated equipment and material will be involved in the decommissioning. This group has their own procedures.

Where contractors are used, they will be managed following the ANSTO procedures. The actual work they perform will be assessed by SWMS which will identify the hazards and specify the safety controls. They will be controlled by the Works Coordinator and supervisors through the permit process AG-2408 *Safe Working Permit (SWP)* [Ref 13].

The safety requirements are disseminated to staff and contractors, principally through the training arrangements discussed later in this plan. This includes appropriate induction training and safety specific training including radiation safety training for radiation workers. During this project the safety requirements will be reinforced by the works supervisors and in the routine toolbox safety talks.

The control of visitors is described later in this plan. General information is given in AG-2384 *Information for Visitors* [Ref 14]and this is supplemented by the ANSTO staff member controlling their access.

The arrangements for radiation safety are given in AS-2310 *Radiation Safety* and its supporting guides. In this licence application, radiation issues are covered in AC-D-LA-E6c *Radiation Protection Plan* [Ref 4]. The ANSTO arrangements relating to young people and pregnant women working in radiation areas are controlled through the dosimetry service and arrangements AG-2521 *Personal Dosimetry* [Ref16].

There are no significant non-ionizing radiation expected. If a hazard is found in the detailed SWMS preparation it will be managed by the ANSTO OHSE arrangements for non-ionising radiation.

The occupational radiation exposure is planned and controlled by the arrangements given in the Radiation Protection Plan. If circumstances were to arise where a person could not continue working on the decommissioning activities, the person will be given other tasks within their work group. In the unlikely circumstance that a more serious injury occurs, these will be managed following the ANSTO arrangements including AG-2485 *Workers Compensation Process* [Ref 17].

# 4 SAFE PREMISES, BUILDING AND EQUIPMENT

The Camperdown building was designed to house the 30 MeV cyclotron and radioisotope production operations. The working areas are classified as red, blue or white for radiological contamination and for radiation following AG-2509 *Classification of Radiation and Contamination Areas* [Ref 18]. These operational classifications will remain in place at the start of the decommissioning. Where the classification of areas needs to be changed for the decommissioning work, this will be controlled by the Radiation Protection Adviser. Local notice boards will be used to inform staff, contractors and visitors of hazards and controls in each area in accordance with AG-2414 *Safety Hazard Notice Board Process* [Ref 19].

There will be a start-up checklist and daily inspections of the work areas by supervisory staff. There will be routine dose and contamination surveys of the radiation areas by Health Physics Surveyors. In addition, ANSTO has a program of housekeeping inspections by management and inspections of the decommissioning site will be scheduled under this program.

The first part of the safety approval for the decommissioning is formal approval by the Safety Assessment Committee (SAC) as set out in AG-2425 *Hazard Identification, Risk Assessment and Approval Process* [Ref 20]. This ensures a thorough assessment and review prior to decommissioning activities at the site. A Radiation Protection Adviser and OH&S Adviser will be involved in the review and assessment under the SAC process. A comprehensive hazard identification and risk assessment ANSTO-T-TN-2010-9 *Safety Assessment for the Decommissioning of ANSTO Camperdown Facility* [Ref 21] has been prepared as part of this SAC approval process. This risk assessment includes all activities and equipment used in the decommissioning.

Where appropriate the Safe Work Permit system will be used to control specific tasks such as hot works and electrical isolations. All electrical equipment is checked and tagged following AG-2458 *Electrical Safety – Inspection and Testing* [Ref 22].

Radioactive waste management and storage issues are discussed in AC-D-LA-E6d *Waste Management Plan* [Ref 23]. The security provisions, including safe entry and exit from the site, are discussed later in this report and in AC-D-LA-E6e *Security Plan* [Ref 24]. The responses required in the event of an emergency during decommissioning are discussed in AC-D-LA-E6f *Emergency Plan* [Ref 25].

# 5 COMPETENCY, TRAINING AND SUPERVISION

ANSTO has comprehensive processes which collectively ensure that potentially hazardous work is performed by and supervised by properly authorised, qualified staff. This starts with the recruitment process for staff and long-term contractors where the selection is based on the technical and personal selection criteria for the role. These criteria include the qualifications, knowledge and experience appropriate for the work.

Radiation Protection Services staff in QSERP division play an important safety role in the decommissioning and their training is extensive. The Radiation Protection Advisors (RPA) are recruited with the necessary knowledge, skills and experience or are trained and authorised within ANSTO. The Health Physics Surveyors (HPS) are given comprehensive theoretical and practical training and are authorised within ANSTO. ANSTO is well recognised for its radiation training capability and the commercial radiation group offer external radiation safety courses.

The QSERP OHSS section provides non-radiation safety training, including induction for staff and contractors and safety training for supervisory staff. An overview is given in AG-2363 *ANSTO OHSE Training* [Ref 26]. The full list of courses and the retraining period requirements is given in AG-2364 *OHSE Courses and Retaining Requirements* [Ref 27]. The training requirements include courses on C1 Contractor Supervisor Training and OHS Risk Management for Supervisors.

The decommissioning Works Coordinator is a C1 Contractor Supervisor. The project coordination and supervisory staff will liaise with the Radiation Protection Adviser and the OHSE Adviser to determine the appropriate scope of the training. The Works Coordinator will carry out induction training following the OHSE contractor safety standard AS 2303. There will be toolbox talks with the work crews to reinforce and update the training.

For the decommissioning project, the safety and radiation training described above is complemented by the practical training given to the Waste Operations group and other ANSTO staff. The purpose of Waste Operations group is to perform tasks involving handling active and contaminated equipment and material and they are experienced in this work. Their general experience will be supplemented, where appropriate, by specific training for the work crews involved in this decommissioning.

The staff involved in the decommissioning have experience in dismantling activities from the Moata Reactor decommissioning project and the activities in HIFAR under the current Possess or Control Licence. Any workers required to do specialised tasks in dismantling the cyclotron will be provided with task-specific training prior to their assignment to the job.

Contractors involved in the decommissioning work will be subject to the training requirements described above. Any necessary task-specific training will be identified in the job planning and SWMS processes. Visitors entering the decommissioning work areas will be escorted by ANSTO staff who will explain the hazards and the controls in place. An Electronic Portable Dosimeter (EPD) will be used to monitor the dose that visitors receive while in the work areas. The safety control of contractors and visitors is discussed further in the next section of this plan.

A record of the training is maintained in the ANSTO Pathlore training management system.

# 6 VISITORS, CONTRACTORS AND OTHER PERSONS

ANSTO understands that it has a duty of care for the safety of non-staff, including contractors and visitors. As noted earlier, long-term contractors are treated as ANSTO staff in terms of safety training and requirements and there are special arrangements for short-term contractors and visitors. The provisions for building access are described here and more fully in the separate Security Plan.

The building access is controlled by the ANSTO security swipe card system and only staff and approved contractors are given unaccompanied access through the front door. Other contractors and visitors must be escorted by ANSTO staff and are signed in at the security desk inside the front door.

Entry further into the work areas is through a radiation / contamination barrier. Only staff and contractors with the appropriate safety and radiation training will be given the access to swipe unaccompanied through this barrier area. All of the general personal protective equipment (PPE) needed for work in radiation areas is available at this barrier. Within the work areas there are hazard notice boards specifying the PPE needed for each area. Any further specific PPE identified in the SWMS and SWP process will be provided.

The radiation safety requirements for the decommissioning are described in AC-D-LA-E6c *Radiation Protection Plan*. The procedures for escorting a visitor through the barrier into the work areas include the requirement to carry an EPD to monitor the dose to the visitors.

As referred to earlier in this plan, there are comprehensive safety training requirements in place for contractors and these are included in AG-2364 *OHSE Courses and Retraining Requirements* [Ref 27]. For short-term contractors this includes contractor induction training and a short radiation safety course. Prior to doing the work, contractors demonstrate their knowledge of the hazards and safety controls by their involvement in the preparation of the SWMS and their sign-off of these documents. Contractors demonstrate their knowledge of the general hazards in the area and the safety controls by their sign-off of the SWP before work.

# 7 CONTROL OF HAZARDS

The ANSTO processes which will apply during this decommissioning for the control of hazards are at several levels; from the SAC process which reviews the overall project safety approach to the SWMS process which identifies hazards and controls for individual tasks.

Radiation is a specific hazard to be managed during the decommissioning. Only an outline of the controls is given here and a full description is given in the *Radiation Protection Plan*. The overall

approach to radiation protection is given in AS-2310 *Radiation Safety* [Ref 8]. General control of access to the radiation work areas will be through the radiation / contamination barrier.

Since the radiopharmaceuticals manufacturing operations have ceased, the radiation hazards in the work areas has greatly decreased. Because the cyclotron is not operating there are no high-energy proton beams with associated gamma and neutron radiation and the activity of the residual radiopharmaceutical products have decayed. The only radiation hazards are long-lived activation products and contaminants. Dose surveys and radiation characterisation work has been carried out to provide the necessary input to planning the dismantling and decommissioning tasks.

The SWMS process ensures that staff and contractors know of the radiation and other hazards and controls. The SWP process ensures that contractors know of and accept the controls for general hazards in the area. This will be reinforced by the daily toolbox safety talks with the work groups.

All of the working level arrangements in this decommissioning project for the control of hazards are assessed and supplemented by the SAC review and approval process. An overview of this process is given in AG-2426 *Submissions to the Safety Assessment Committee* [Ref 28]. For this decommissioning project, the submission to the SAC included the decommissioning plan and schedule, the safety assessment and all documents in this licence application.

The SAC process has several steps. Firstly there is an assessment of the submission documents by radiation and other safety specialists. The safety specialists reviewing the submission ensure that the ANSTO OHSE requirements have been followed including AG-2407 *Hierarchy of Risk Control* [Ref 29]. There is then a formal review by the Safety Assessment Committee which is comprised of relevant senior ANSTO staff and an external consultant. The processes require that any changes to the approved submission must be assessed by the RPA and / or the OHSE specialist and if necessary, resubmitted to the full SAC.

For the decommissioning activities, a comprehensive hazard identification and risk assessment has been carried out with input from project personnel, Radiation Protection Services staff and OH&S Advisors. This risk assessment follows ANSTO's risk assessment guidance process AG-2400 *Conduct of a Risk Study* [Ref 9].

# 8 DEVIATIONS, ANOMALIES, INCIDENTS AND ACCIDENTS

There are a variety of arrangements in place to deal with deviations, incidents and accidents during the decommissioning. These range from the reporting of potentially unsafe work conditions to the emergency response and follow-up for significant accidents.

The risk assessment contained in the decommissioning *Safety Assessment* has identified the potentially foreseeable incidents and the controls given there describe the means for coping with these incidents. During the work, potentially unsafe conditions may be reported or found during safety inspections and these will be managed by the supervisory staff. Minor incidents, including minor contaminations will be managed by the project team and supervisors with support from Health Physics as needed. These arrangements are described in the *Radiation Protection Plan*.

The ANSTO event reporting system described in AG-2372 *Event Response Process* [Ref 30] will operate and this captures safety near misses, deviations, incidents and accidents. The follow-up process involves an initial investigation by supervisory staff and a later review by the line manager or investigator with sign off by the division General Manager. All reports are recorded in the ANSTO system which is managed by the OHSS section in QSERP division. Outstanding even reports are monitored by key performance indicators prepared by the OHSS section and reviewed monthly in an ECP division meeting.

In the worst case of an accident or injury, the emergency arrangements described in the Emergency Plan would be invoked. These provide for the initial response with progressive support by radiation and safety specialists and, if required, the external emergency services. The reporting and follow-up is through the event response process.

During the decommissioning, the normal process for reporting to ARPANSA described in AG-2376 *Reporting to ARPANSA* [Ref 31] will operate. This requires reporting of any accidents involving a significant failure in the safety provisions within 24 hours and a written investigation report within 14 days. For the decommissioning, rapid reporting and follow-up will be facilitated because the

decommissioning Works Coordinator is the Facility Officer and the ECP Division General Manager is the Facility Nominee.

The arrangements described here to deal with deviations, accidents and incidents during the decommissioning are implemented in the ANSTO OHSE Management System which is maintained under an ISO 9001 certification.

# 9 AUDITS AND REVIEW

There are arrangements in place to audit and review both the safety system and the implementation of the system in the work areas. The safety requirements, including those for radiation safety, are in the OHSE Management System. The RPS section in QSERP division, which provides the specialist radiation support through the RPA and HPS, have their operating procedures in the division QA system certified to ISO 9001 and these procedures are reviewed and audited in the division audit program.

The radiation protection arrangements for the decommissioning are described in the Radiation Protection Plan. The effectiveness of this plan will be monitored by the RPA and the Works Co-ordinator, taking into account dose and contamination, survey results, dosimetry results, workplace inspections and any incident reports.

The plan will be reviewed and revised if necessary to maintain the required level of safety.

# 10 RECORDS AND REPORTING

The ANSTO safety arrangements are within the ANSTO certified ISO 9001 systems and ISO 14001 system and this is important to ensuring there is appropriate reporting and storage of records. The requirements for safety records and reporting are described in the QSERP document S-QM *Quality Manual* [Ref 32] and supporting documents. General requirements for safety records are given in S-P-003 *Control of Records* [Ref 33] which details the storage locations, retention periods and responsibilities for maintaining the records. The specific requirements for radiation safety records are given in S-ROH-G-002 *Radiation Protection Services Records Management* [Ref 34]. This includes the requirements for dosimetry records, including retention for the required periods and for Health Physics records, including survey results, log books and stack sampling results. For radiation workers, dose records are available on termination of employment.

The safety assessments for the decommissioning including the submission to SAC and the supporting Safety Assessment report will be stored in the ANSO SAC file for the project and in project records.

The safety training arrangements are described earlier in this plan. The training records are maintained by the OHSE Training Officer following AG-2363 *ANSTO OHSE Training* [Ref 35]. These are maintained in a database management system called Pathlore and this facilitates record retrieval and usage.

The event reporting arrangements are described earlier in this plan. Event reports and records are maintained by the OHSS section in QSERP division. These records contain information on the incident, the follow-up investigation reports and summary information on any injuries. Summary information on each incident is entered into a database to facilitate retrieval of details, follow-up and closure.

Medical records associated with any injuries are maintained confidentially by the Occupational Health Nurse and Workers Compensation Officer in ANSTO Medical Services. The requirements for more severe injuries are given in S-MED-P-002 *Workers Compensation and Rehabilitation* [Ref 36] and include reporting to the OHS regulator Comcare.

# 11 REFERENCES

1. Australian Radiation Protection and Nuclear Safety (ARPANS) Act 1998

2. Australian Radiation Protection and Nuclear Safety (ARPANS) Regulations 1999

3. ARPANSA RB-STD-15-03 *Regulatory Guideline on Review of Plans and Arrangements*, August 2003

4. ANSTO Camperdown Decommissioning Licence Application AC-D-LA-E6c *Radiation Protection Plan*, June 2010

5. ANSTO Camperdown Decommissioning Licence Application AC-D-LA-E6f *Emergency Plan*, June 2010

6. ANSTO APOL 2.1 *Occupational Health, Safety and Environment Policy* - APOL 2.1, March 2010

7. ANSTO OHSE AG-2389 *Occupational Health and Environment Management Arrangements*, October 2008

8. ANSTO OHSE AS-2310 *Radiation Safety,* August 2009

9. ANSTO OHSE AG-2400 *Conduct of a Risk Study,* September 2006

10. ANSTO OHSE AS-2303 *Contactor Safety*, August 2009

11. *ANSTO* OHSE AG-2372 *OHSE Management – Event Reporting, Event Response Process,* September 2006

12. ANSTO ECP P-2640 *Radioactive Material Transport Packages.* March 2010

13. ANSTO OHSE AG-2408 *Safe Working Permit (SWP)*, January 2010

14. ANSTO .OHSE AG-2384 *Information for Visitors*, May 2010

15. ANSTO .OHSE AS-2310 *Radiation Safety*, August 2009

16. ANSTO .OHSE AG-2521 *Personal Dosimetry*, September 2006

17. ANSTO OHSE AG-2485 *Workers Compensation Process,* September 2006

18. ANSTO OHSE AG-2509 *Classification of Radiation and Contamination Areas,* September 2006

19. ANSTO OHSE AG-2414 *Safety Hazard Notice Board Process*, November 2009

20. ANSTO OHSE AG-2425 *Hazard Identification, Risk Assessment and Approval Process*, September 2006

21. ANSTO-T-TN-2010-9 rev 0 *Safety Assessment for the Decommissioning of ANSTO Camperdown Facility*, June 2010

22. ANSTO OHSE AG-2458 *Electrical Safety – Inspection and Testing*, September 2006

23. ANSTO Camperdown Decommissioning Licence Application AC-D-LA-E6d *Waste Management Plan*, June 2010

24. ANSTO Camperdown Decommissioning Licence Application AC-D-LA-E6e *Security Plan*, June 2010

25. ANSTO Camperdown Decommissioning Licence Application AC-D-LA-E6f *Emergency Plan*, June 2010

26. ANSTO OHSE AG-2363 *ANSTO OHSE Training*, September 2006

27. ANSTO OHSE AG-2364 *OHSE Courses and Retaining Requirements*, January 2010

28. ANSTO OHSE AG-2426 *Submissions to the Safety Assessment Committee*, December 2009

29. ANSTO OHSE AG-2407 *Hierarchy of Risk Control*, September 2006

30. ANSTO OHSE AG 2372 *Event Response Process*, September 2006

31. ANSTO OHSE AG-2376 *Reporting to ARPANSA*, September 2006

32. ANSTO QSERP S-QM *Quality Manual*, August 2009

33. ANSTO QSERP S-P-003 *Control of Records,* August 2009

34. ANSTO QSERP S-ROH-G-002 *Radiation Protection Services Records Management,* February 2008

35. ANSTO OHSE AG-2363 *ANSTO OHSE Training,* September 2006

36. ANSTO QSERP S-MED-P-002 *Workers Compensation and Rehabilitation*, April 2005