

1. PURPOSE

This document contains the policies regarding utilization of the reactor.

2. CURRENT SCOPE

The experimental programs conducted at the reactor are under the direct control of Reactor Supervision and the Nuclear Facilities Control Committee (NFCC) as detailed in Section 6 of this Operating Manual. Programs are presently being carried out by universities, institutions and industries.

2.1. GENERAL AREAS OF INVESTIGATION

The general areas of investigation include the following:

- 2.1.1 Neutron diffraction
- 2.1.2 Cross-section measurements
- 2.1.3 Production of short-lived isotopes
- 2.1.4 Determination of material composition by Activation Analysis
- 2.1.5 Promotion of chemical reactions by radiation
- 2.1.6 Radiation damage studies
- 2.1.7 Biological and medical research
- 2.1.8 Bulk shielding experiments
- 2.1.9 Neutron radiography
- 2.1.10 Neutron and gamma scattering.

In addition to fundamental and applied research, the reactor is used as a teaching tool in nuclear science and engineering courses by this and other institutions.

Radioisotopes are produced for use on campus in fundamental and applied research as well as for off-campus research, medical and industrial uses. Irradiation and activation analysis programs are also conducted for research institutions, other universities, government agencies and industries.

3. RADIOACTIVITY PRODUCTION

Any researcher desiring to conduct an experiment at the McMaster Nuclear Reactor (MNR) expressly designed to produce radioactive material which will be handled within the Reactor Building or in campus laboratories must obtain prior approval of the Health Physics Advisory Committee (HPAC) for the procurement and use of the radioactive material. Approval for the production of the radioactive material in the MNR must also be obtained from the Nuclear Facilities Control Committee (NFCC). This approval may come from Reactor Supervision alone if the material involved falls within the criteria of Subsection 4, below. Normally all such approvals will be considered simultaneously by the NFCC and the HPAC to expedite matters for the applicant.

Researchers outside of McMaster University will contact reactor@mcmaster.ca and describe in an email the isotope of interest with a brief outline project description including scope, quantities and timelines. Researchers may be trained to work within the facility or request the expertise of staff research scientists.

4. OTHER USAGE

Any researcher desiring to conduct an experiment within the Reactor Building, in which radioactive material is produced incidental to the purpose of the experiment (e.g., activation of material within beam ports), need only obtain approval of the program from the NFCC. To obtain such approval, a detailed presentation must be made to the NFCC through its Secretary, outlining the safety precautions and waste disposal procedures for the proposed program. Amounts and types of radioactive material expected should be clearly stated. Reactor Supervision may be called upon to discuss the proposed program informally in order to expedite the preparation of the formal application.

5. SCHEDULING

The MNR and nuclear facilities have open access with priority given to Canadian Academic researchers. When the program has been approved as described above, Reactor Supervision shall approve and schedule any irradiation or use of reactor facilities required to carry out the program.

6. EXTERNAL USERS

In the case where other institutions or organizations desire to carry out work in MNR, Nuclear licensed University laboratories and/or use other MNR facilities, they must appoint project coordinator for the program to communicate with the Director of Nuclear Operations at the University.

7. HEALTH PHYSICS

The Health Physicist shall inspect the work in each program at regular intervals and advise on any additional safety measures required. If the Health Physicist finds that safety measures approved by the Nuclear Facilities Control Committee or the Health Physics Advisory Committee are not being adhered to, all work on the program shall be halted and the matter referred to the appropriate committee.

8. SHIPPING REGULATIONS

MNR may undertake to carry out irradiations to produce radioisotopes or other special irradiations for shipment to outside organizations. Such irradiations shall be carried out only if the outside organization can produce authorization from the appropriate government agencies to obtain the specified material from MNR. Shipments of radioactive materials off campus must be in compliance with the appropriate regulations.

9. TEACHING PURPOSES

The reactor may be used as an instructional tool in graduate or undergraduate courses. The program for these courses shall be approved by the Nuclear Facilities Control Committee. In general, the same type of work is carried out as during low power testing, i.e., critical mass determinations for various lattices, flux measurements, control rod calibrations, reactivity effects of beam tubes and samples, power level calibration, etc. The same procedures are used as during the low power testing. All work is supervised by the Director, Nuclear Operations and Facilities and/or the Manager, Reactor Operations. All handling of fuel is carried out by the reactor operating staff.

10. SPECIAL EXPERIMENTS

Applications for experimental work not falling into the above categories shall be considered by the Nuclear Facilities Control Committee. A common experiment of this type is the irradiation of large objects. The irradiation of such samples requires the provision of suitable containers to prevent contamination of the pool water and a study of the effect of the sample on reactor reactivity.