National Nuclear Regulator

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Enquiries: S Thugwane
Our Reference: NIL37B0180
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28 March 2023

Group Chief Executive Officer
Necsa
PO Box 582
PRETORIA
0001

FOR THE ATTENTION OF MR. L TYABASHE

Dear Sir

NUCLEAR INSTALLATION LICENCE NIL-37 (VARIATION 1)

(1) The NNR has embarked on a process of reviewing the conditions of authorization for nuclear installations on the Necsa Pelindaba site.

(2) As part of the review process, Necsa was afforded the opportunity to comment on the proposed amendments to the existing conditions of authorisation. The Necsa comments were considered in the NNR finalisation of conditions of authorisation.

(3) The reasons for the amendments are to address –
(a) Alignment with international safety standards and regulatory practices,
(b) Adoption of current edition of IAEA Regulations for Safe Transport of Radioactive Material (i.e., SSR-6),
(c) Additional requirements and wording that provide clarification and prevent ambiguity on the current conditions of authorisations,
(d) Incorporation of the new NNR logo and template for nuclear authorisations.

(4) Please find enclosed one controlled copy of Nuclear Installation Licence No. NIL-37 (Variation 1), being the nuclear authorisation for the P-1600 Laboratories. This document must be controlled in accordance with the Necsa arrangements for controlled documents.

(5) Please note that this original controlled copy together with that maintained by the NNR represent the only two authoritative originals of the nuclear authorisation.

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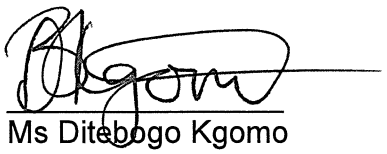
Please address all correspondence to the Programme Manager: NTWP.

Yours faithfully



Ms Ditebogo Kgomo
CHIEF EXECUTIVE OFFICER

Copy: L&SA Records

National Nuclear Regulator

NUCLEAR INSTALLATION LICENCE No. NIL-37 (Variation 1)

Nuclear Installation Licence No. NIL-37 (Variation 1) issued in terms of the provisions of Section 23 of the National Nuclear Regulator Act, Act 47 of 1999 (hereinafter referred to as the Act)

to

THE SOUTH AFRICAN NUCLEAR ENERGY CORPORATION (Necsa)
(hereinafter referred to as the licensee)

for

the operation of the **P-1600 Laboratories** on the farm Weldaba 567 JQ (formerly Welgegund 491 JQ), in the magisterial district of Brits in the North West Province, known as the Pelindaba site. The site referred to in this licence refers to the defined portion of the Pelindaba site on which the P-1600 Laboratories are located (see Figure 1).

The Nuclear Installation Licence is not transferable and is effective from the date of issue, subject to adherence with –

(i) the Conditions of Authorisation in PART A; and
(ii) the Specified NNR Requirements in PART B.

Issued at Centurion on this **28th day of March 2023**

Ms Ditebogo Kgomo
CHIEF EXECUTIVE OFFICER

PART A: CONDITIONS OF AUTHORISATION

(1) General

(a) In these conditions any reference to an agreement, approval, directive, specification, notification, process or any formal communication between the NNR and the licensee, and vice versa, shall be deemed to be a reference to a written document.

(b) In these conditions any reference to processes, procedures or arrangements shall be deemed to be licensee processes, procedures, or arrangements, unless explicitly stated to be otherwise.

(c) In these conditions any reference to the Act, shall be deemed to be a reference to the National Nuclear Regulator Act, Act 47 of 1999, as amended.

(d) The licensee must ensure that once approved or accepted by the NNR, no alteration or amendment to the approved or accepted processes is implemented unless the NNR has approved or accepted the said alteration or amendment.

(e) Where in these conditions, the NNR requires any matter to be approved or to be carried out only with its consent or to be carried out as it directs, the NNR may –
  (i) from time to time modify, revise or withdraw, either wholly or in part, any such approval, directive or consent;
  (ii) approve, either wholly or in part, any modification or revision or any proposed modification or revision to any matter for the period being approved.

(f) The English text of the licence is the official text of the licence.

(2) Facility Description

(a) Building P-1600, in which the **P-1600 Laboratories** are situated, was built in the early 1970's as a research and development facility and was later authorised to include radiological laboratories.

(b) Building P-1600 has dedicated chemistry laboratories with adjacent offices. There is also a lower ground floor with areas used for storage and an alpha spectrometer laboratory. Building P-1600 is situated on the west side of the Necsa Pelindaba site and northeast of Building P-1800 (SAFARI-1).

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(c) Building P-1600 consists of 5 areas, namely A-Wing (northern ground level), B-Wing (connecting passage between A-Wing and C-Wing), C-Wing (Southern ground level), D-Wing (Northern first level), E-Wing basement area).

(d) A, D and E-Wings share a common ventilation system whereas the C-Wing has a dedicated ventilation system.

(e) The facilities in Building P-1600 include:

(i) **P-1600 RadioAnalysis Laboratories** was initially established as chemical and radiological laboratories for general nuclear research and experimental development work. This resulted in the development of radioanalytical techniques for the determination of radioactivity of samples from the radiological surveillance programmes of Necsa, samples from incidents and samples to determine the radioisotope quantity and quality of products developed at Necsa. This radioanalytical service was extended over time to support the needs of both Necsa's and other industries, external to Necsa, to manage their safety, health and environmental control programmes, impact assessment projects, and the quality of their products, where these products contain radioactivity.

[1] The RadioAnalysis laboratories consist of the following areas of use:

[a] **Radioanalysis in A-Wing**

[i] **Laboratories 008, 009, 057, 058, 059, 060, 061, 062** are radiologically controlled laboratories and are used for the preparation of low radioactive environmental samples.

[ii] **Laboratory 010** is a radiologically controlled white laboratory used for preparation of very low radioactive gamma-emission samples, for medium radioactive tritium sample preparation pump outlet into the fume hood, for medium radioactive water preparation work (inside the fume hood), and for very low frequency medium radioactive solid sample preparation on a small table model milling machine.

[iii] **Laboratory 011** is used as general equipment repair and storage room.

[iv] **Laboratories 065 and 066** are used for storage of environmental liquid and solid samples respectively.

[b] **Radioanalysis in B-Wing**:

[i] **Laboratories 014 and 014B** are radiologically controlled areas used for the storage of low radioactive solid samples.

[ii] **Laboratories 015 and 015A** are radiologically controlled areas used for preparation of low radioactive solid samples.

[iii] **Laboratory 048** is used to store environmental water samples.

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[iv] **Laboratory 047** is used for radioanalysis of low and medium radioactive solid-, filter-, sealed liquids-, and irradiated samples for gross alpha-beta and gamma spectrometry. This laboratory is a radiologically controlled blue area.

[c] **Radioanalysis in C-Wing**:

[i] **Laboratories 040 and 041** are Type II Laboratories (radiologically controlled blue areas) used for the storage (small volumes) and preparation of medium to high radioactive samples. The laboratories also house the caged radioactive sources in a lead castle. The development of new preparation and radioanalysis processes for medium to high radioactive samples are done in these laboratories.

[ii] **Laboratories 042, 043, and 044** are Type II Laboratories (radiologically controlled blue areas) laboratories used for the preparation and radioanalysis of radioisotope samples for ^{131}I and ^{99}Mo content.

[iii] **Room 44D** houses the equipment necessary for the analysis of the filters and the sealed liquid samples prepared in laboratories 042, 043 and 0448.

[d] **Radioanalysis in D-wing (upper floor)**:

[i] **Laboratory 105** is a radiologically controlled laboratory used for preparation of low radioactivity samples.

[ii] **Laboratories 124, 124A and 125** are radiologically controlled areas used for radioanalysis of low to high radioactive filtration media- and smear samples.

[iii] **Laboratory 133A** is a walk-in fridge for storage of biological samples.

[e] **Radioanalysis in E-Wing (Basement)**:

[i] **Laboratory and Radioanalysis Room L02** is used for very low radioactivity sample preparation and radioanalysis room for Central Test Ban Treaty Organisation samples (Entry through door 064 on ground floor of A-wing).

[ii] **Radioanalysis Rooms L03, L04 and L13A** are used for gamma- and alpha spectrometry of low radioactive environmental samples.

[iii] **Room L04C** is used for storage of bulky medium radioactive samples (radiologically controlled blue area).

[iv] **Caged area under C-wing** is used for storage of medical isotope samples in lead-lined drawers (radiologically controlled white area).

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(ii) **P-1600 Applied Radiation Laboratories**

[1] The **P-1600 Radioactive Actinide Laboratory**:

[a] The P-1600 Radioactive Actinide Laboratory consists of two laboratories in rooms 038 and 039 and was initially established as a radiological laboratory for plutonium research aimed at understanding the chemistry, handling, separation, recovery and utilisation of alpha emitters such as plutonium, neptunium and americium plutonium. This laboratory was later converted to a Type III laboratory dealing with research on all actinides and consists of two laboratories in rooms 038 and 039 on the southern side of Building P-1600. On the northern side the laboratory is joined to a passageway with a door 034. Typical equipment in the laboratories is glove boxes, experimental hot cells, fume cupboards and work benches.

[b] The laboratory extraction ventilation system is coupled to the C-wing ventilation system. However, the glove box and hot cell connections are joined to P1800 SAFARI-1 stack.

[2] The **P-1600 Radioactive Tracer Laboratory**:

[a] The laboratory was initially established as a radiological laboratory for general research and experimental development work. This laboratory was established as a Type II Radiological laboratory. The Radioactive Tracer Laboratory is a facility established for the purpose of carrying out an experimental programme in radiochemistry which develops technology and expertise in the properties, handling, separation, recovery and utilisation of radioactive tracers and sources. This laboratory consists of the four ground floor laboratories in rooms *034, 035, 036* and *037*. On the northern side the laboratories are joined to a passageway by their respective doors. Entrance into the P-1600 Applied Radiation Radioactive Tracer Laboratory is only allowed through door 034. Typical equipment in the labs is glove boxes, experimental hot cells, fume cupboards and work benches. The laboratory extraction ventilation system is coupled to the C-wing ventilation system. However, the glove box and hot cell connections are joined to P1800 SAFARI-1 stack.

[3] **Other Laboratories operated by Applied Radiation**:

[a] Laboratories 101, 102, 103, 104, 113, 114, 115, 116 and 119, are used for non-radioactive chemical research and development processes and are classified as "White" radiologically controlled areas.

[b] Room 046 is a Necsa Chemical Store, workshop and office and are uncontrolled areas.

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[4] **Laboratories operated by Applied Radiation and regulated by the South African Health Regulatory Authority**:

[a] Laboratory 120 is a chemical storage area.

[b] Laboratories 136, 137 and 138. These are Type II laboratories (Labelling laboratories are commonly referred to as the "Clean Room").

[5] **Interim Radioactive Waste Store**:

[a] An Interim Radioactive Storage Waste Area, which is shared with Radionalysis, is located adjacent to Building P-1600 on the eastern side.

[b] This store is used for temporary storage of solid radioactive waste from Building P-1600 before being transferred to the PELSTORE

(iii) **NOMS Nuclear Forensic Laboratory**

[1] The Nuclear Obligations Management Services (NOMS) department performs nuclear forensics analysis work in Laboratory 015B.

[2] Laboratory 015B is situated on the ground floor of the B-Wing in Building P-1600

(iv) **LUMITEC**

[1] LUMITEC is a facility that produced radioluminescent light sources using Tritium. LUMITEC is situated in the south-eastern corner of Building P-1600 and is separated from the rest of Building P-1600 by permanently locked doors.

[2] The facility is currently under care and maintenance.

[3] LUMITEC has its own ventilation system and is regulated by the South African Health Products Regulatory Authority (SAHPRA).

(3) Scope of Actions that may be undertaken by the Installation

(a) The **P-1600 RadioAnalysis Laboratory** is authorised for the following –

(i) Receipt of:

[1] very low to high radioactivity samples, taken from the natural environment or from operational processes, from Necsa and from external customers.

[2] sealed sources and radioactive tracers for calibration and quality control purposes.

[3] irradiated samples from Necsa.

(ii) Storage of:

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[1] raw and prepared samples.
[2] tracers and sealed sources in the laboratories.
[3] solid radioactive waste from P-1600 in the Interim Radioactive Waste Store

(iii) Temporary storage of liquid and solid non-radioactive and radioactive waste in the laboratories.
(iv) Sample preparation by:
[1] filtration and evaporation.
[2] drying, milling homogenisation and pressing.
[3] chemical separation into constituents of interest.
(v) Radioanalysis of prepared samples by alpha, beta and gamma spectrometry.
(vi) Transfer of liquid waste stored in "carboys" to the P-2400 Liquid Effluent Management Facility for treatment.
(vii) Contracted agreement with customers to collect leftover sample material as waste to their relevant facilities.
(viii) Transfer of non-radioactive waste to facility of origin, or to authorised contracted waste removal agents, including biological samples.

(b) The **P-1600 Applied Radiation Laboratories** is authorised for the following –
(i) Receipt of radioactive samples and sealed sources.
(ii) Alpha, Beta and Gamma spectrometry.
(iii) Coulometry.
(iv) Carry out a variety of processes in the course of the experimental programme, the most important being:
[1] Purification of radioactive tracers from contaminants (e.g. distillation) and
[2] the "Molten Salts" Technique (making of a soluble salt metal from an insoluble metal).
(v) General Chemical Separations (e.g. solvent extraction, extraction chromatography and ion exchange).
(vi) Plutonium recovery.
(vii) Preparation of Plutonium as an oxide.
(viii) Storage of radioactive isotopes and samples.
(ix) Titrations.
(x) Temporary storage of liquid and solid non-radioactive and radioactive waste in the laboratories.
(xi) Temporary storage of drummed solid waste in the Interim Radioactive Storage Waste Area at the east of Building P-1600 in accordance to the Waste Acceptance Requirements.
(xii) Transfer of liquid waste stored in "carboys" to the P-2400 Liquid Effluent Management Facility for treatment.
(xiii) Transfer of solid waste to PELSTORE from the interim storage waste area.

(c) The **NOMS Nuclear Forensic Laboratory** is authorised for the following –

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(i) Receipt of samples.
(ii) Sample preparation.
(iii) Analysis of samples using an ICP Mass Spectrometer.
(iv) Storage of raw and prepared samples.
(v) Transfer of unspent samples to authorised facilities.
(vi) Storage of liquid and solid non-radioactive and radioactive waste in the laboratories.
(vii) Storage of drummed solid waste in the Interim Radioactive Storage Waste Area at the east of Building P-1600 in accordance with the Waste Acceptance Requirements.
(viii) Transfer of liquid waste stored in "carboys" to the P-2400 Liquid Effluent Management Facility for treatment.
(ix) Transfer of solid waste to PELSTORE from the interim storage waste area.

(d) **LUMITEC** is authorised by the South African Health Products Regulatory Authority (SAHPRA).

(4) Demarcation of Site Boundary, Site Plans, Designs and Specifications

(a) The licensee must maintain a plan of the site (hereinafter called the site plan) showing the location of the boundary of the site and every building, plant or facility on the site.

(b) The licensee must demarcate the boundaries of the site by fences or other appropriate means and all such fences or other means used for this purpose must be properly maintained.

(c) Prior to making any change to the site, which impacts or has the potential to impact on health, safety, or the environment as contemplated in the Act, the licensee must submit to the NNR an amended site plan and schedule, for approval.

(d) The licensee must submit, to the NNR, such plans, diagrams, designs, specifications, or other information relating to the buildings, plants or any other facilities on the site as the NNR may specify.

(5) Physical Security

(a) The licensee must ensure the safety and security of the –
(i) site; and
(ii) all installations and persons thereon.

(b) The physical protection system must be designed to protect against the design basis threat, theft or diversion of radioactive material and sabotage.

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(c) The licensee must prevent unauthorised persons from entering the site or any part thereof.

(6) Transport

(a) The transportation of radioactive material, any equipment or objects contaminated with radioactive material must be carried out in compliance with the relevant provisions of the International Atomic Energy Agency's Regulations for the Safe Transport of Radioactive Material, 2018 Edition, IAEA Safety Standard Series No. SSR-6 (Rev. 1), IAEA, Vienna, 2018.

(b) The licensee must ensure that no radioactive material is brought onto the site or conveyed from the site, except in accordance with processes approved by the NNR.

(c) All on site transport of radioactive material or any equipment or objects contaminated with radioactive material must be carried out in compliance with processes approved by the NNR.

(d) The licensee must keep a record of all radioactive material consigned to and from the site. Such record must –
(i) contain particulars of the amount, type and form of such radioactive material, the manner in which it was packaged, the name and address of the person to whom it was consigned to or from and the date when it left or arrived on the site.
(ii) be preserved for a period acceptable to the NNR.

(e) The licensee must not undertake any transport of radioactive material to sites, installations or persons not appropriately authorised to receive such material.

(7) Restrictions on Dealing with the Site

(a) The licensee may not lease, assign, or grant possession to use –
(i) the site, or any portion thereof; or
(ii) any radioactive material,
to any person not in possession of an appropriate nuclear authorisation, where such an authorisation is required.

(b) The licensee must submit an annual confirmation of the inventory of all radioactive material in the facility.

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(c) The licensee shall ensure that no nuclear material is brought onto the site except in accordance with adequate arrangements made by the licensee for this purpose.

(d) The licensee shall submit for NNR approval such part or parts of the said arrangements as the NNR may specify.

(e) The licensee must inform the NNR in writing of such intention and request the revocation or amendment of the relevant part of the authorisation as appropriate.

(f) The licensee remains responsible for compliance with all conditions of authorisation until such time as said conditions are revoked or amended.

(g) The licensee must prevent persons from carrying out any unauthorised actions on the site.

(h) The licensee must ensure that no radioactive material intended for use in connection with any new installation, process or modification to the existing installation is brought onto site for the first time without consent of the NNR.

(i) The licensee must ensure that no radioactive material is stored on the site except in accordance with processes approved by the NNR.

(j) The licensee must ensure that every person authorised to be on the site receives instructions (to the extent that this is necessary having regard to the circumstances of that person being on the site) as regards the risks and hazards associated with the nuclear installations and their operation, the precautions to be observed in connection therewith and the actions to be taken in the event of an accident or emergency on the site.

(k) The licensee must implement approved processes for suitable training of all persons who have responsibilities for any operations which may affect safety.

(l) The licensee must ensure that suitable and sufficient methods are employed on the site for the purposes of informing persons thereon of each of the following matters –
  (i) the meaning of any warning sign used on the site;
  (ii) the location of any exit from any place on the site, where such exit is provided for use in the event of an emergency;
  (iii) the measures to be taken by such persons in the event of any emergency.

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(8) Radiological Protection

(a) The licensee must implement the approved processes for the purposes of ensuring radiological protection of employees, members of the public and the environment, both on the site and off the site, as a consequence of authorised actions.

(b) The normal operational exposure of individuals must be restricted to ensure that neither the effective dose nor the equivalent dose to relevant organs or tissues exceeds any relevant dose limit specified by the NNR.

(c) The licensee's radiological protection processes must, under all operating states of the authorised actions or facilities ensure that–
(i) effective radiation doses, including committed effective doses, to persons;
(ii) the number of people who are exposed; and
(iii) the likelihood of incurring exposures to radiation,
are kept as low as reasonably achievable.

(d) A dose register of every occupationally exposed worker must be established and maintained in a form acceptable to the NNR. The licensee must retain the register for a period of at least fifty (50) years from the date of last entry.

(e) The licensee must implement NNR approved processes for the purposes of control of radioactive sources.

(9) Medical Surveillance and Health Register

(a) A comprehensive medical surveillance programme and health register must be maintained in a form approved by the NNR.

(10) Radioactive Waste Management

(a) The licensee must implement NNR approved processes for the minimisation and safe management of radioactive waste on the site.

(b) The radioactive waste management programme must –
(i) ensure the identification, quantification, characterisation and classification of any radioactive waste generated;
(ii) provide for the necessary steps leading to safe clearance, authorised discharge, disposal, reuse or recycling; and
(iii) provide for the safe storage of radioactive waste between any waste management processes.

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(c) The safety of radioactive waste storage options must be assured for the envisaged period of storage.

(11) Documents, Records, Authorities and Certificates

(a) The licensee must keep adequate records to demonstrate compliance with the conditions of this licence.

(b) The licensee must implement and maintain an approved document management system to ensure that every document required, every record made, every authority, consent or approval granted and every directive or certificate issue in pursuance of these conditions of licence is preserved for thirty (30) years or such other period as the NNR may approve.

(c) Operational reports must be submitted to the NNR at predetermined periods, approved by the NNR, and must contain such information as the NNR may require on the basis of the nuclear installation's safety assessment.

(12) Events (including Incidents or Accidents) on the Site

(a) The licensee must implement NNR approved processes for the notification, classification, recording, investigation and reporting and closeout of events (incidents, accidents, etc.) occurring on the site –
(i) in accordance with requirements specified by the NNR;
(ii) as required by any other condition attached to this licence; or
(iii) as the licensee considers necessary, provided such is not inconsistent with (i) or (ii).

(13) Emergency Planning and Preparedness

(a) The licensee must implement NNR approved processes related to preparedness for and response to any event, (incident, accident, etc) or other emergency arising on the site and their associated impacts.

(b) The licensee must ensure that such processes include procedures to ensure that all persons, in the employ of the licensee, who have duties in connection with such processes are properly trained and instructed in –
(i) the performance of the processes;
(ii) the use of any equipment that may be required; and
(iii) the precautions to be observed.

(c) Where such processes require the assistance or cooperation of, or it is expedient to make use of the services of any person, local authority or any

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other body; the licensee must ensure that such persons, local authority or other body are consulted in the periodic review and update of such processes.

(d) The licensee must ensure that all such processes are exercised and tested at such intervals and at such times and to such extent as the NNR may specify or, where the NNR has not so specified, as the licensee considers necessary to ensure their continued viability.

(14) Environmental Protection

(a) The licensee must implement NNR approved processes for the protection of public health and the environment arising from the nuclear installation's authorised activities.

(b) The licensee must ensure that no radioactive effluent is released from the site except in accordance with procedures and processes approved by the NNR.

(c) The licensee must implement NNR approved processes and procedures for environmental monitoring and surveillance.

(15) Duly Authorised and Suitably Qualified and Experienced Persons

(a) The licensee must implement NNR approved processes and procedures for ensuring that only suitably qualified and experienced persons perform any duties, which may affect the safety or security of operations on the site, or any duties assigned by or under these conditions of licence.

(b) Such processes and procedures must make provision for the appointment, as appropriate, of duly authorised persons to control and supervise operations, which may affect plant or facility safety and security.

(c) The licensee must make and implement adequate arrangements for suitable training for all persons on site who have responsibility for any operations, which may affect safety or security.

(d) The licensee must submit for NNR approval such part or parts of said arrangements as the NNR may specify.

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(16) Safety Committee

(a) The licensee must implement processes and procedures relating to safety committee(s) to oversee and manage its safety responsibilities and to which it refers for consideration and advice –
(i) matters required by or under this licence;
(ii) safety policies, procedures, processes or documents required by these conditions of licence or as the NNR may specify and any subsequent alteration or amendment to said processes or documents;
(iii) any matter affecting safety on or off the site which the NNR may specify; and
(iv) any other matter, which the licensee considers should be referred to a safety committee.

(b) The terms of reference of any such safety committee must be submitted to the NNR.

(c) The licensee must ensure that the members of any such committee are suitably qualified and experienced, so as to enable said committee to consider any matter likely to be referred to it and to advise the licensee authoritatively and, so far as practicable, independently.

(d) The licensee must ensure that a safety committee shall consider or advise only during the course of a properly constituted meeting of that committee. Minutes must be kept of all such meetings

(e) The licensee must within 14 days of any meeting of any such committee, submit to the NNR a full and accurate record of all matters discussed at that meeting including in particular any advice given to the licensee.

(f) The licensee must submit to the NNR copies of any document, or any category of documents considered at any such meetings that NNR may specify.

(g) The licensee shall notify the NNR as soon as practicable if it is intended to reject, in whole or in part, any advice given by any such committee together with the reasons for such rejection.

(h) Notwithstanding paragraph (d), where it becomes necessary to obtain consideration of, or advice on, urgent safety proposals (which would normally be considered by a safety committee) the licensee may do so in accordance with arrangements made for the purpose by the licensee, considered by the relevant safety committee and approved by the NNR.

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(17) Safety Documentation

(a) The licensee must implement NNR approved processes and procedures for the production and assessment of safety cases consisting of documentation to justify safety during the following lifecycle phases of the installation –

(i) Siting;
(ii) Design;
(iii) Manufacture of component parts;
(iv) Construction;
(v) Commissioning;
(vi) Operation;
(vii) Temporary or extended shutdown;
(viii) Termination of operation;
(ix) Decontamination; and
(x) Decommissioning.

(b) The safety case must include a risk assessment and demonstration of compliance with the Regulations on Safety Standards and Regulatory Practices as well as any other requirements and guidance prescribed by the NNR.

(c) The licensee must establish and implement processes for the periodic and systematic review and reassessment of safety cases.

(d) The licensee must if so directed by the NNR, carry out a review and reassessment of safety and submit a report of said review and reassessment to the NNR at such intervals, within such period and for such matters or operations as may be specified in the directive.

(18) Quality, Security and Safety Management

(a) Quality, Security and Safety Management processes and procedures must be established implemented and maintained in respect of all matters that may affect security or safety in order to ensure compliance with the conditions of this licence.

(b) The licensee must comply with all NNR approved or NNR accepted documents contained in the Necsa SHEQ-INS system.

(c) The licensee must submit to the NNR such copies of records or documents made in connection with the aforementioned processes and procedures as the NNR may specify.

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(19) Modification to Design of Existing Plant or Facility

(a) The licensee must comply with NNR approved processes and procedures relating to control of modification to the design of existing plant, facility or system design including modifications that may be of a temporary nature.

(b) The aforesaid processes must provide for the classification of modifications according to their safety significance.

(c) Where appropriate modifications must be divided into stages and where the NNR has so specified the licensee must not commence nor thereafter proceed from one stage to the next of the modification without the prior approval of the NNR.

(d) The processes must include a requirement for the provision of adequate documentation to justify the safety of the proposed modification and shall where appropriate provide for the submission of such documentation to the NNR.

(20) Construction and Commissioning of Plant or Process

(a) The licensee must implement NNR approved processes and procedures relating to the construction and commissioning of any plant, facility or process.

(b) Where appropriate, construction and commissioning of the plant or process may be divided into stages. If so specified by the NNR, the licensee must not commence with any stage nor proceed from one stage of the construction or commissioning to the next without the prior approval of the NNR.

(21) Limits and Conditions on Operations

(a) The licensee must, in respect of any operation that may affect safety, produce a safety case to demonstrate the safety of the operation and identify the limits and conditions necessary in the interest of safety. The limits and conditions of operation must be submitted to the NNR for approval.

(b) The licensee must ensure that operations are controlled and carried out in compliance with NNR approved limits and conditions on operations at all times.

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(c) Where the person appointed in terms of paragraph 15 (a) identifies any matter indicating that the safety of any operation or the safe condition of any plant is compromised, that person must bring it to the attention of the relevant facility management, who must forthwith take appropriate action to ensure that the matter is appropriately notified, recorded, investigated and reported to the NNR.

(d) The NNR may in the interests of safety, at any time revoke, amend or impose any limiting condition on operations.

(22) Examination, Inspection, Maintenance and Testing

(a) The licensee must implement NNR approved processes for the regular, periodic and systematic examination, inspection, maintenance and testing of all plant, systems, structures and components, including software.

(b) The aforesaid processes must provide for the preparation of a plant maintenance schedule for each plant or facility. The licensee must submit to the NNR for its approval, such part or parts of any plant maintenance schedule as the NNR may specify.

(c) The licensee must ensure that a full and accurate report of every examination, inspection, maintenance or test, of any part of a plant, system, structure or component, indicating the date thereof and signed by a suitably qualified and experienced person appointed by the licensee, is made.

(d) The licensee must ensure, in the interests of safety, that examination, inspection, maintenance and test of a plant or any part thereof is carried out –
(i) only by suitably qualified and experienced persons;
(ii) in accordance with written procedures;
(iii) within the intervals specified in the plant maintenance schedule; and
(iv) under the control and general supervision of a suitably qualified and experienced person appointed by the licensee for that purpose.

(e) When any examination, inspection, maintenance or test of any part of a plant reveals any matter indicating that the safe operation or safe condition of that plant may be affected, the suitably qualified and experienced person appointed to control or supervise any such examination, inspection, maintenance or test shall forthwith bring it to the attention of the relevant facility management who shall take appropriate action and ensure the matter is then notified, recorded, investigated and reported in accordance with approved processes.

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(23) Decommissioning

(a) The licensee must implement NNR approved processes for the decommissioning of facilities or any part thereof on the site.

(b) The licensee must submit for approval a decommissioning strategy and an initial decommissioning plan, as early as possible in the life cycle of the activity or facility, but no later than 12 months from the date of issue of this licence.

(c) The decommissioning strategy and initial decommissioning plan should be revisited and updated as necessary.

(d) The initial decommissioning plan must address –
  (i) Quantities and nature of radioactive material arising from decommissioning activities;
  (ii) Envisioned timeframes for the conduct of decommissioning activities; and
  (iii) Assessment of decommissioning cost with basis for the assessment and the means of financial resourcing (actual ring-fenced funds) for decommissioning.

(e) The licensee must, on an annual basis –
  (i) provide a confirmation of the level of financial resourcing (actual ring-fenced funds) available for decommissioning; and
  (ii) the measures being implemented in the event that the financial resourcing (actual ring-fenced funds) is determined as being insufficient.

(f) A detailed decommissioning plan must be submitted to the NNR for approval prior to the commencement of decommissioning activities.

(g) It must be demonstrated to the NNR that sufficient resources will be available from the time of cessation of operations until termination of the period of responsibility.

(h) Where appropriate decommissioning may be divided into stages. If so specified by the NNR, the licensee may not commence with nor proceed from one stage of the decommissioning to the next without the prior approval of the NNR.

(i) The licensee must establish and maintain a list of all contaminated areas on the site, which will require decontamination in the future.

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(24) Funding for Decommissioning and Radioactive Waste

(a) The licensee must, on an annual basis –
  (i) provide a confirmation of the level of financial resourcing (actual ring-fenced funds) available for decommissioning, and management of radioactive waste as well as
  (ii) the measures being implemented in the event that the financial resourcing (actual ring-fenced funds) is determined as being insufficient.

(b) The financial resourcing shall be provided by way of –
  (i) A fund established and accepted by the Regulator; or
  (ii) A financial guarantee issued by duly registered bank, or any other bank or financial institution approved by the regulator; or
  (iii) Any other financial instrument acceptable by the regulator.

(c) The financial resourcing must be reviewed and updated annually or if there are material changes.

(d) The right to use the financial resourcing shall be approved by the regulator upon submission by the authorisation holder.

(25) Organisational Capability and Management of Organisational Change

(a) The licensee has the prime responsibility for safety and security of the authorised facility, activities within the facility and radioactive material on the site.

(b) The licensee must provide and maintain adequate financial and human resources to ensure the safe operation and security of the authorised site.

(c) The licensee must implement NNR approved processes to control any change to its organisational structure or resources that may have a bearing on health, safety, and the environment as contemplated in the Act.

(d) The processes must provide for the classification of changes to the organisational structure or resources according to their safety significance.

(e) The processes must include a requirement for the provision of documentation to justify the safety of the proposed change and shall where appropriate provide for the submission of such documentation to the NNR.

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(26) Financial Security

(a) The licensee must annually provide proof to the NNR that any claim for compensation to an amount contemplated in Section 30(2) of the Act can be met.

(27) Public Safety Information Forum

(a) In order to inform the persons living in the municipal area in respect of which an emergency plan has been established, in terms of Section 38(1) of the Act, on nuclear and radiation safety matters, the licensee must establish a Public Safety Information Forum as prescribed.

(28) Self-Inspection Programme

(a) Pursuant to the provisions of Section 26(2) of the Act, the licensee must implement a self-inspection programme to ensure compliance with all conditions of the nuclear installation licence.

(29) Display of the Nuclear Installation Licence

(a) To ensure public access to the conditions specified in this licence, the licensee must at all times display copies of this Nuclear Installation Licence at the entrance to the installation in the following languages – English, SeTshwana and Afrikaans.

(b) The licensee must provide to the NNR documented proof that the translations into SeTshwana and Afrikaans are true and accurate translations of the original English text.

(30) Implementation of Written Instruction for all Operations that may Affect Nuclear Safety, Radiation safety or Nuclear Security

(a) The licensee must ensure that all operations that may affect nuclear safety, radiation safety or nuclear security are conducted in accordance with written instructions (operating instructions).

(b) The licensee must implement NNR approved processes for the preparation, review, and amendment to all operating instructions.

(c) Said instructions are to be submitted to the NNR for information and whenever any operating instruction is amended or revised said

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amendments or revisions must be submitted to the NNR within 14 days of approval of the amendment.

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PART B-1: SPECIFIED NNR REQUIREMENTS FOR THE P-1600 RADIOANALYSIS LABORATORIES

B-1.1 The laboratories are to be operated according to the latest NNR accepted revision of AC-BPMS-OTS-11002, Operating Technical Specifications for P-1600 Building Laboartories.

B-1.2 **Samples received for the measurement of radioactivity**:
(a) Uranium and Thorium decay products such as ^{238}U, ^{234}U, ^{226}Ra, ^{210}Po, ^{232}Th, etc., are limited to a maximum 1 MBq (estimated for 10 samples of 100g each at 1 kBq/g).

B-1.3 The licensee must comply with the requirements, as per the NNR requirements documents, listed in the table below –

Document number	Description
RD-0014 (Rev 0)	Emergency Preparedness and Response Requirements for Nuclear Installations
RD-0016 (Rev 0)	Requirements for authorisation Submissions Involving Computer Software and Evaluation Models for Safety Calculations
RD-0024 (Rev 0)	Requirements on Risk Assessment and Compliance with Safety Criteria for Nuclear Installations
RD-0026 (Rev 0)	Decommissioning of Nuclear Facilities
RD-0034 (Rev 0)	Quality and Safety Management Requirements for Nuclear Installations
RD-0038 (Rev 0)	Notification of Events at Facilities and Activities Authorised by NNR Nuclear Technology and Waste Projects Department
LD-1079 (Rev 1)	Requirements in Respect of Licence Change Requests to the National Nuclear Regulator

B-1.4 **Samples irradiated for analysis**:
(a) Activation products such as ^{24}Na, ^{46}Sc, ^{60}Co, ^{110m}Ag, ^{140}Ba, ^{152}Eu, etc., are limited to a maximum of 10 MBq (estimated for a batch of 100 samples at 100 kBq each).

B-1.5 **Primary radioisotopes for certification**:
(a) Provision is made for the nuclides listed below:

Nuclide	Required for certification	Maximum Limit	Class
^{99}Mo	800 MBq	4 GBq	F
^{131}I	3 MBq	50 MBq	

DBK

(b) The operations are limited to diluting and sampling of the liquid received, and chemical procedures to separate the impurities to be analysed. Separation is performed in sealed glass vials, using disposable syringes for sample transfer.

(c) Only one batch may be handled at a time in the same laboratory.

B-1.6 **Material for the calibration of facilities and the development of methods:**

(a) Typical radionuclides used for calibration are: ^{3}H, ^{90}Sr, ^{152}Eu, ^{204}Tl, ^{226}Ra, ^{241}Am and neutron sources. These nuclides are limited to a maximum of 10 MBq for β-emitters and to a maximum of 1 MBq for α-emitters. Neutron sources are limited to activities less than 40 MBq (i.e., Americium and Beryllium).

(b) Radionuclide tracers and sources such as ^{90}Sr, ^{226}Ra, ^{241}Am, etc. stored in the lead castles in laboratories 040 and 041 are limited based on the accounting system which takes into account the maximum inventory levels for a Type II Laboratory.

B-1.7 The storage of waste stored in the Interim Radioactive Waste Store in both 160 and 220 litre waste containers is limited to a maximum of:

(a) Four (4) metal drums per room.
(b) Fifty (50) metal drums in the Interim Store .
(c) Two hundred and fourteen (214) in the facility as a whole.

B-1.8 Metal waste containers stored in the Interim Radioactive Waste Store may only be stacked one (1) tier high.

B-1.9 The storage of carboys limited to a maximum of:

(a) Six (6) per room.
(b) Two hundred and forty-six (246) for the facility as a whole.

B-1.10 Transfers of radioactive material or radioactively contaminated equipment from the facility to other facilities must comply with the requirements for on-site and off-site transfer, as appropriate, and may only be undertaken to facilities that are appropriately authorized to receive said equipment and material.

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PART B-2: SPECIFIED NNR REQUIREMENTS FOR P-1600 APPLIED RADIATION LABORATORIES

PART B-2.1: SPECIFIED NNR REQUIREMENTS FOR P-1600 RADIOACTIVE ACTINIDE LABORATORIES

B-2.1.1 The laboratories are to be operated according to the latest NNR accepted revision of AC-BPMS-OTS-11002, Operating Technical Specifications for P-1600 Building Laboartories.

B-2.1.2 The licensee must comply with the requirements, as per the NNR requirements documents, listed in the table below –

Document number	Description
RD-0014 (Rev 0)	Emergency Preparedness and Response Requirements for Nuclear Installations
RD-0016 (Rev 0)	Requirements for authorisation Submissions Involving Computer Software and Evaluation Models for Safety Calculations
RD-0024 (Rev 0)	Requirements on Risk Assessment and Compliance with Safety Criteria for Nuclear Installations
RD-0026 (Rev 0)	Decommissioning of Nuclear Facilities
RD-0034 (Rev 0)	Quality and Safety Management Requirements for Nuclear Installations
RD-0038 (Rev 0)	Notification of Events at Facilities and Activities Authorised by NNR Nuclear Technology and Waste Projects Department
LD-1079 (Rev 1)	Requirements in Respect of Licence Change Requests to the National Nuclear Regulator

B-2.1.3 A maximum of 66g ^{239}Pu may be present in the facility.

B-2.1.4 A maximum of 100 mg ^{237}Np may be present in the facility.

B-2.1.5 A maximum of 100 mg ^{241}Am may be present in the facility.

B-2.1.6 A maximum of 30 g ^{235}U may be present in the facility.

B-2.1.7 A maximum of 7500 g ^{238}U may be present in the facility.

B-2.1.8 No work shall be done in the laboratories if the ventilation is in not fully operable.

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B-2.1.9 All activities in the laboratories shall be halted if the integrity of a glove box is disrupted.

B-2.1.10 Transfers of radioactive material or radioactively contaminated equipment from the facility to other facilities must comply with the requirements for on-site and off-site transfer, as appropriate, and may only be undertaken to facilities that are appropriately authorised to receive said equipment and material.

B-2.1.11 No off-site transfer of radioactive material or radioactively contaminated equipment may be undertaken by the facility without prior NNR approval.

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PART B-2.2: SPECIFIED NNR REQUIREMENTS FOR P-1600 RADIOACTIVE TRACER LABORATORIES

B-2.2.1 The laboratories are to be operated according to the latest NNR accepted revision of AC-BPMS-OTS-11002, Operating Technical Specifications for P-1600 Building Laboratories.

B-2.2.2 The licensee must comply with the requirements, as per the NNR requirements documents, listed in the table below –

Document number	Description
RD-0014 (Rev 0)	Emergency Preparedness and Response Requirements for Nuclear Installations
RD-0016 (Rev 0)	Requirements for authorisation Submissions Involving Computer Software and Evaluation Models for Safety Calculations
RD-0024 (Rev 0)	Requirements on Risk Assessment and Compliance with Safety Criteria for Nuclear Installations
RD-0026 (Rev 0)	Decommissioning of Nuclear Facilities
RD-0034 (Rev 0)	Quality and Safety Management Requirements for Nuclear Installations
RD-0038 (Rev 0)	Notification of Events at Facilities and Activities Authorised by NNR Nuclear Technology and Waste Projects Department
LD-1079 (Rev 1)	Requirements in Respect of Licence Change Requests to the National Nuclear Regulator

B-2.2.3 The allowed activity ranges for radionuclides in the different radiotoxicity groups in these laboratories are as follows:

Radionuclide Group	Activity Range
Very High Radiotoxicity	Max 500 MBq
High Radiotoxicity	Max 5 GBq
Moderate Radiotoxicity	50 GBq
Low Radiotoxicity	500 GBq

B-2.2.4 No work shall be done in the laboratories if the ventilation is in any way not fully operable.

B-2.2.5 All operations in the laboratories shall be halted if the integrity of a glove box is disrupted.

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B-2.2.6 Transfers of radioactive material or radioactively contaminated equipment from the facility to other facilities must comply with the requirements for on-site and off-site transfer, as appropriate, and may only be undertaken to facilities that are appropriately authorised to receive said equipment and material.

B-2.2.7 No off-site transfer of radioactive material or radioactively contaminated equipment may be undertaken by the facility without prior NNR approval.

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PART B-3: SPECIFIED NNR REQUIREMENTS FOR NOMS NUCLEAR FORENSIC LABORATORY

B-3.1 The laboratoy is to be operated according to the latest NNR accepted revision of AC-BPMS-OTS-11002, Operating Technical Specifications for P-1600 Building Laboratories.

B-3.2 The licensee must comply with the requirements, as per the NNR requirements documents, listed in the table below –

Document number	Description
RD-0014 (Rev 0)	Emergency Preparedness and Response Requirements for Nuclear Installations
RD-0016 (Rev 0)	Requirements for authorisation Submissions Involving Computer Software and Evaluation Models for Safety Calculations
RD-0024 (Rev 0)	Requirements on Risk Assessment and Compliance with Safety Criteria for Nuclear Installations
RD-0026 (Rev 0)	Decommissioning of Nuclear Facilities
RD-0034 (Rev 0)	Quality and Safety Management Requirements for Nuclear Installations
RD-0038 (Rev 0)	Notification of Events at Facilities and Activities Authorised by NNR Nuclear Technology and Waste Projects Department
LD-1079 (Rev 1)	Requirements in Respect of Licence Change Requests to the National Nuclear Regulator

B-3.3 No work shall be done in the laboratory if the ventilation is in any way not fully operable.

B-3.4 All operations in the laboratory shall be halted if the integrity of a glove box is disrupted.

B-3.5 Transfers of radioactive material or radioactively contaminated equipment from the facility to other facilities must comply with the requirements for on-site and off-site transfer, as appropriate, and may only be undertaken to facilities that are appropriately authorised to receive said equipment and material.

B-3.6 Off-site transfer of radioactive material is limited to the return of samples to place or facility of origin.

B-3.7. A maximum of 100 radiological samples may be present in the facility.

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B-3.8 A maximum of 100g U_{nat} may be present in the facility.

B-3.9 A maximum of 100g Th_{nat} may be present in the facility.

B-3.10 Uranium enriched to greater than 5% is not permitted in the facility.

B-3.11 No more than 10 samples with enrichment less than 5% may be present in the facility.

B-3.12 No uranium enriched samples larger than 30g may be present in the facility.

B-3.13 The maximum activity for ^{238}U, U_{nat} and ^{235}U is 25GBq.

B-3.14 The maximum activity ^{234}U is 25 MBq

B-3.15 The maximum activity Th_{nat} is 0.25 GBq.

B-3.16 The maximum number of metal waste drums that may be stored in the laboratory are limited to 4

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PART B-4: SPECIFIED NNR REQUIREMENTS FOR LUMITEC

B-4.1 LUMITEC is regulated by the South African Health Products Regulatory Authority (SAHPRA).

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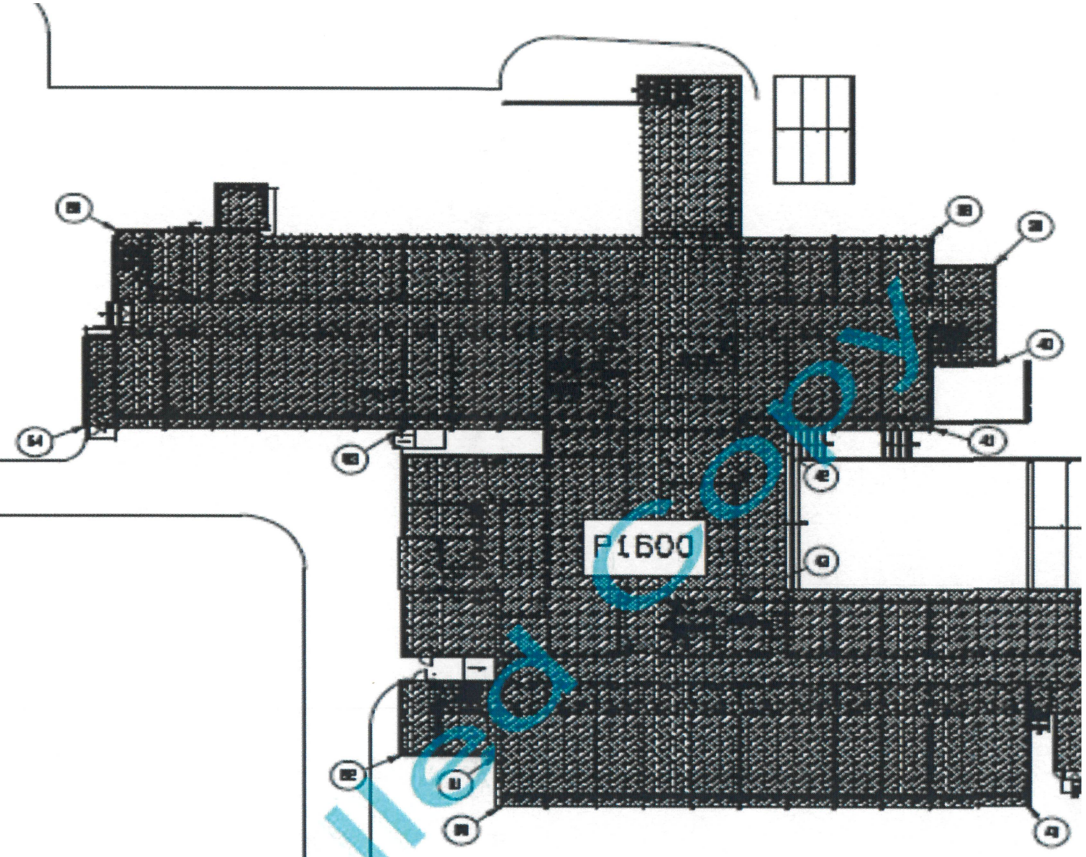
38	25°47' 47.0"S 27°00' 12.8"E	65	25°47' 49.3"S 27°00' 10.8"E
40	25°47' 48.3"S 27°00' 12.8"E		
41	25°47' 48.7"S 27°55' 48.7"E		
42	25°47' 49.2"S 27°55' 12.1"E		
43	25°47' 48.4"S 27°00' 11.7"E		
44	25°47' 48.0"S 27°55' 14.3"E		
45	25°47' 48.5"S 27°55' 14.6"E		
46	25°47' 48.8"S 27°55' 14.9"E		
47	25°47' 48.7"S 27°55' 14.2"E		
48	25°47' 48.7"S 27°55' 14.2"E		
49	25°47' 48.0"S 27°55' 14.0"E		
50	25°47' 00.1"S 27°55' 12.8"E		
51	25°47' 00.2"S 27°55' 12.0"E		
52	25°47' 48.8"S 27°55' 11.8"E		
53	25°47' 48.2"S 27°55' 11.7"E		



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