I) LICENCE NUMBER: [redacted]

II) LICENSEE

Pursuant to section 24 of the Nuclear Safety and Control Act, this licence is issued to:

The University of Western Ontario
1151 Richmond Street
London, ON
N6A 3K7
Canada

This licence replaces licence [redacted]

III) LICENCE PERIOD

This licence is valid from: January 4, 2013 to February 28, 2017 unless otherwise suspended, amended, revoked or replaced.

IV) LICENSED ACTIVITIES

This licence authorizes the licensee to:

(a) possess, transfer, import, export, use and store the nuclear substances and the prescribed equipment listed in the Appendix: Nuclear Substances and Radiation Devices of this licence.

(b) conduct licensed activities in the location(s) specified in the Appendix: Locations of Licensed Activities of this licence.

This licence is issued for: consolidated uses of nuclear substances (815).

V) CONDITIONS

The contents of the appendices attached to this licence form part of the licence.

1. Prohibition of Human Use
   This licence does not authorize the use of nuclear substances in or on human beings.
   (2696-0)

2. Laboratory Lists
   The licensee shall maintain a list of all areas, rooms and enclosures in which more than one exemption quantity of a nuclear substance is used or stored.
   (2569-1)

3. Laboratory Procedures
   The licensee shall post and keep posted, in a readily visible location in areas, rooms or enclosures where nuclear
substances are handled, a radioisotope safety poster approved by the Commission or a person authorized by the Commission, which corresponds to the classification of the area, room or enclosure.

(2570-3)

4. Storage
The licensee shall:
(a) ensure that when in storage radioactive nuclear substances or radiation devices are accessible only to persons authorized by the licensee;
(b) ensure that the dose rate at any occupied location outside the storage area, room or enclosure resulting from the substances or devices in storage does not exceed 2.5 microSv/h; and
(c) have measures in place to ensure that the dose limits in the Radiation Protection Regulations are not exceeded as a result of the substances or devices in storage.

(2575-2)

5. Area Classification
The licensee shall classify each room, area or enclosure where more than one exemption quantity of an unsealed nuclear substance is used at a single time as:
(a) basic-level if the quantity does not exceed 5 ALI,
(b) intermediate-level if the quantity used does not exceed 50 ALI,
(c) high-level if the quantity does not exceed 500 ALI,
(d) containment-level if the quantity exceeds 500 ALI; or
(e) special purpose if approved in writing by the Commission or a person authorized by the Commission.
Except for the basic-level classification, the licensee shall not use unsealed nuclear substances in these rooms, areas or enclosures without written approval of the Commission or a person authorized by the Commission.

(2108-3)

6. Contamination Meter Requirements
The licensee shall make available to workers at all times at the site of the licensed activity a properly functioning portable contamination meter.

(2572-1)

7. Survey Meter Requirements
The licensee shall provide at all times where nuclear substances, except for Hydrogen-3 and Nickel-63, are handled or stored a radiation survey meter.

(2058-1)

8. Contamination Criteria
The licensee shall ensure that for nuclear substances listed in the Appendix: Classes of Radionuclides, attached to this licence:
(a) non-fixed contamination in all areas, rooms or enclosures where unsealed nuclear substances are used or stored does not exceed:
   (i) 3 becquerels per square centimetre for all Class A radionuclides;
   (ii) 30 becquerels per square centimetre for all Class B radionuclides; or
   (iii) 300 becquerels per square centimetre for all Class C radionuclides; averaged over an area not exceeding 100 square centimetres; and
(b) non-fixed contamination in all other areas does not exceed:
   (i) 0.3 becquerels per square centimetre for all Class A radionuclides;
   (ii) 3 becquerels per square centimetre for all Class B radionuclides; or
(iii) 30 becquerels per square centimetre for all Class C radionuclides; averaged over an area not exceeding 100 square centimetres.

(2642-9)

9. Thyroid Monitoring
Every person shall undergo thyroid screening within five days who:
(a) uses in a 24-hour period a quantity of Iodine-125 or Iodine-131 exceeding;
(i) 2 MBq in an open room;
(ii) 200 MBq in a fume hood;
(iii) 20 000 MBq in a glove box;
(iv) any other quantity in other containment approved in writing by the Commission or a person authorized by the Commission; or
(b) is involved in a spill of greater than 2 MBq of Iodine-125 or Iodine-131; or
(c) on whom Iodine-125 or Iodine-131 external contamination is detected.
(2046-14)

10. Thyroid Screening
Screening for internal Iodine-125 and Iodine-131 shall be performed using:
(a) a direct measurement of the thyroid with an instrument that can detect 1 kBq of Iodine-125 or Iodine-131; or
(b) a bioassay procedure approved by the Commission or a person authorized by the Commission.
(2600-3)

11. Thyroid Bioassay
If thyroid screening detects more than 10 kBq of Iodine-125 or Iodine-131 in the thyroid, the licensee shall immediately make a preliminary report to the Commission or a person authorized by the Commission and have bioassay performed within 24 hours by a person licensed by the Commission to provide internal dosimetry.
(2601-6)

12. Extremity Dosimetry - Beta Emitters
The licensee shall ensure that any person who handles a container which contains more than 50 MBq of phosphorus 32, strontium 89, yttrium 90, samarium 153 or rhenium 186 wears a ring dosimeter. The dosimeters must be supplied and read by a dosimetry service licensed by the Commission.
(2578-1)

13. Internal Authorization
The licensee shall ensure that:
(a) internal authorizations are issued in accordance with the licensee’s internal authorization policies and procedures approved by the Commission or a person authorized by the Commission; and
(b) internal authorization forms are posted in a readily visible location in or near each room, area or enclosure where nuclear substances and radiation devices are used or stored.
(c) the licensed activity is conducted in accordance with the terms and conditions of the internal authorization.
(2215-4)

14. Project Approval
The licensee shall obtain written approval from the Commission or a person authorized by the Commission before starting any work requiring the use of more than 10,000 exemption quantities of a nuclear substance at a single time.
(2214-0)
15. Disposal (General)

When disposing of unsealed nuclear substances set out in column 1 of the Appendix: Disposal Limits to municipal waste, to sewer systems or to atmosphere, the licensee shall ensure that the concentration limit set out for each nuclear substance is not exceeded.

(a) The concentration limits set out in column 2 apply to quantities of solid waste of less than three tonnes per building per year. Nuclear substances released to the municipal garbage system must be in solid form and uniformly distributed in the waste with a concentration that is less than the limits in column 2. Where more than one nuclear substance is disposed of at one time, the sum of the quotients obtained by dividing the quantity of each substance by its corresponding limit in column 2 shall not exceed one.

(b) The limits set out in Column 3 apply to the water soluble liquid form of each nuclear substance which may be disposed of per building per year. Where more than one nuclear substance is disposed of at one time, the sum of the quotients obtained by dividing the quantity of each substance by its corresponding limit in column 3 shall not exceed one.

(c) The concentration limits set out in Column 4 may be averaged over a one-week period and apply to releases of less than 3 million cubic metres per year. Where more than one nuclear substance is disposed of at one time, the sum of the quotients obtained by dividing the quantity of each substance by its corresponding limit in column 4 shall not exceed one.

(2160-12)

16. Import and Export Restrictions

This licence does not authorize the licensee to import or export the following items as described in the schedule, Parts A and B, to the Nuclear Non-proliferation Import and Export Control Regulations, subject to any restrictions or exemptions as noted in each paragraph of the schedule:

(1) Special fissile material, as described in paragraph A.1.1:

(i) Plutonium;
(ii) Uranium 233;
(iii) Uranium enriched in Uranium 233 or Uranium 235.

(2) Source material, as described in paragraph A.1.2:

(i) Uranium, containing the mixture of isotopes that occurs in nature;
(ii) Uranium, depleted in the isotope Uranium 235;
(iii) Thorium.

(3) Deuterium and heavy water, as described in paragraph A.1.3.

(4) Tritium, as described in paragraph A.1.5.

(5) Alpha-emitting nuclear substances, as described in paragraph B.1.1.1, including but not limited to:

(i) Actinium 225, 227;
(ii) Californium 248, 250, 252, 253, 254;
(iii) Curium 240, 241, 242, 243, 244;
(iv) Einsteinium 252, 253, 254, 255;
(v) Fermium 257;
(vi) Gadolinium 148;
(vii) Mendeleievium 258, 260;
(viii) Neptunium 235;
(ix) Polonium 208, 209, 210;
(x) Radium 223.

(6) Radium-226, as described in paragraph B.1.1.16.
17. Decommissioning
The licensee shall ensure that prior to decommissioning any area, room or enclosure where the licensed activity has been conducted:

(a) the non-fixed contamination for nuclear substances listed in the licence application guide table titled "Classification of Radionuclides" does not exceed:
   (i) 0.3 becquerels per square centimetre for all Class A radionuclides;
   (ii) 3 becquerels per square centimetre for all Class B radionuclides; and
   (iii) 30 becquerels per square centimetre for all Class C radionuclides; averaged over an area not exceeding 100 square centimetres;

(b) the release of any area, room or enclosure containing fixed contamination, is approved in writing by the Commission or person authorized by the Commission;

(c) all nuclear substances and radiation devices have been transferred in accordance with the conditions of this licence; and

(d) all radiation warning signs have been removed or defaced.

(2571-4)

18. Export Limitations - Sealed Sources
This licence does not authorize the licensee, in respect of a radioactive nuclear substance set out in column 1 of the table below, to export a sealed source whose corresponding activity is equal to or greater than the value set out in column 2 of the table:

<table>
<thead>
<tr>
<th>Column 1 Nuclear Substance</th>
<th>Column 2 (TBq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americium 241</td>
<td>0.6</td>
</tr>
<tr>
<td>Americium 241/Beryllium</td>
<td>0.6</td>
</tr>
<tr>
<td>Californium 252</td>
<td>0.2</td>
</tr>
<tr>
<td>Curium 244</td>
<td>0.5</td>
</tr>
<tr>
<td>Cobalt 60</td>
<td>0.3</td>
</tr>
<tr>
<td>Cesium 137</td>
<td>1</td>
</tr>
<tr>
<td>Gadolinium 153</td>
<td>10</td>
</tr>
<tr>
<td>Iridium 192</td>
<td>0.8</td>
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<tr>
<td>Promethium 147</td>
<td>400</td>
</tr>
<tr>
<td>Plutonium 238</td>
<td>0.6</td>
</tr>
<tr>
<td>Plutonium 239/Beryllium</td>
<td>0.6</td>
</tr>
<tr>
<td>Radium 226</td>
<td>0.4</td>
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<tr>
<td>Selenium 75</td>
<td>2</td>
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<tr>
<td>Strontium 90 (Yttrium 90)</td>
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</tr>
<tr>
<td>Thulium 170</td>
<td>200</td>
</tr>
<tr>
<td>Ytterbium 169</td>
<td>3</td>
</tr>
</tbody>
</table>
19. Annual Compliance Report
The licensee shall, by December 31 of each year, submit to the Commission a written annual compliance report in the form specified in the Appendix: Annual Compliance Reporting Form to this licence.
(2916-10)

20. Device Use Restrictions 07139
The licensee shall not transfer the University of Western Ontario Variable-Energy Positron Beam, listed in Appendix of Nuclear Substances and Radiation Devices of this licence, without prior written consent of the Commission or a person authorized by the Commission. Disposal to a licensed nuclear waste facility is authorized.
(2000-8)

21. Sealed Source Tracking (General)
Unless otherwise permitted by the prior written approval of the Commission or a person authorized by the Commission the licensee shall, in respect of a radioactive nuclear substance set out in column 1 of the table below, report in writing to the Commission or a person authorized by the Commission any transfer, receipt, export or import of a sealed source whose corresponding activity is equal to or greater than the value set out in column 2 of the table:
(A) at least 7 days before any transfer or export, and
(B) within 48 hours of any receipt of a transfer or import.

<table>
<thead>
<tr>
<th>Nuclear Substance</th>
<th>Activity (TBq)</th>
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<tbody>
<tr>
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</tr>
</tbody>
</table>

The written report shall be in a form acceptable to the Commission that includes:
(a) on transfer or export of a sealed source(s),
   (i) the date of transfer or export,
   (ii) the export licence number (where applicable),
   (iii) the name of the recipient and licence number or the name of the importer,
   (iv) the address of the recipient's or importer's authorized location,
   (v) the nuclear substance (radionuclide),
   (vi) activity (radioactivity) (Bq) per sealed source on the reference date,
   (vii) the reference date,
(viii) the number of sealed source(s),
(ix) the aggregate activity (Bq),
(x) the sealed source unique identifiers (if available), and
(xi) where the sealed source is incorporated in a prescribed equipment,
   (1) the name and model number of the equipment, and
   (2) the equipment serial number (if available)

(b) on receipt or import of a sealed source(s),
   (i) the date of receipt of a transfer or import,
   (ii) the name of the shipper and licence number or the name of the exporter,
   (iii) the address of the shipper's or exporter's authorized location,
   (iv) the nuclear substance (radionuclide),
   (v) activity (radioactivity) (Bq) per sealed source on the reference date,
   (vi) the reference date,
   (vii) the number of sealed source(s),
   (viii) the aggregate activity (Bq),
   (ix) sealed source unique identifiers (if available), and
   (x) where the sealed source is incorporated in a prescribed equipment,
      (1) the name and model number of the equipment, and
      (2) the equipment serial number (if available)

(2406-16)

22. Operation Limitations
Subject to any other condition of this licence and unless otherwise permitted by the prior written approval of the Commission or a person authorized by the Commission, the licensee shall carry out the licensed activities in accordance with the documents or parts thereof referred to in the Appendix: Licence Document(s).
(2917-7)

23. Inaccuracies Notification
The licensee shall report to the Commission or a person authorized by the Commission, as soon as is practicable, the discovery of any inaccuracy or incompleteness in the documents referred to in the Appendix: Licence Document(s).
(2920-6)

Designated Officer pursuant to paragraph 37(2)(c) of the Nuclear Safety and Control Act