

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

## STATEMENT OF WORK

### REMOVAL OF DISUSED SEALED RADIOACTIVE SOURCES FROM Jordan

#### 1. Scope of Work

This Statement of Work (hereinafter referred to as the “SoW”) describes the requirements for the removal of Disused Sealed Radioactive Sources (hereinafter referred to as the “Material” as defined in Article 1 of the contract) from the End-User(s) described in Appendix 1 (hereinafter referred to as the “End-User”). Removal encompasses all activities involved inter alia with the dismantling, packaging transport, and acceptance of the Material at an authorized recipient.

#### 2. Applicable Documents

The Work shall be carried out in accordance with the International Atomic Energy Agency’s Code of Conduct on the Safety and Security of Radioactive Sources<sup>1</sup> and its implementing Guidance documents (Guidance on the Management of Disused Radioactive Sources<sup>2</sup>, Guidance on the Import and Export of Radioactive Sources<sup>3</sup>), the relevant IAEA Safety Standards, and IAEA Nuclear Security Series guidance, inter alia the following:

- 2.1 International Atomic Energy Agency, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, No. GSR Part 3, IAEA, Vienna (2014);<sup>4</sup>
- 2.2 International Atomic Energy Agency, Regulations for the Safe Transport of Radioactive Material, 2018 Edition, IAEA Safety Standards Series No. SSR-6 (Rev 1), IAEA, Vienna (2018);<sup>5</sup>
- 2.3 Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, No. SSG-26, IAEA, Vienna (2012)<sup>6</sup>
- 2.4 International Atomic Energy Agency, Categorization of Radioactive Sources, IAEA Safety Standards Series, No RS-G-1.9, IAEA, Vienna (2005);<sup>7</sup>
- 2.5 International Atomic Energy Agency, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015);

<sup>1</sup> [https://www-pub.iaea.org/MTCD/publications/PDF/Code-2004\\_web.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/Code-2004_web.pdf)

<sup>2</sup> [https://www-pub.iaea.org/MTCD/Publications/PDF/Guidance\\_on\\_the\\_Management\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/Guidance_on_the_Management_web.pdf)

<sup>3</sup> [https://www-pub.iaea.org/MTCD/Publications/PDF/8901\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/8901_web.pdf)

<sup>4</sup> [https://www-pub.iaea.org/MTCD/publications/PDF/Pub1578\\_web-57265295.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/Pub1578_web-57265295.pdf)

<sup>5</sup> [https://www-pub.iaea.org/MTCD/publications/PDF/Pub1570\\_web.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/Pub1570_web.pdf)

<sup>6</sup> <https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1586web-99435183.pdf>

<sup>7</sup> [https://www-pub.iaea.org/MTCD/publications/PDF/Pub1227\\_web.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/Pub1227_web.pdf)

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

- 2.6** International Atomic Energy Agency, Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2007);<sup>8</sup>
- 2.7** International Atomic Energy Agency, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011);
- 2.8** International Atomic Energy Agency, Arrangements for the Termination of a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018);
- 2.9** International Atomic Energy Agency, Security in the Transport of Radioactive Material, IAEA Nuclear Security Series 9 (Rev. 1), IAEA, Vienna (2020);<sup>9</sup>
- 2.10** Security of Radioactive Material in Use and Storage and of Associated Facilities, IAEA Nuclear Security Series No. 11-G (Rev.1), 2019<sup>10</sup>;
- 2.11** International Atomic Energy Agency, Nuclear Security Recommendations on Radioactive Material and Associated Facilities Nuclear Security Series No. 14 (2011).<sup>11</sup>

### **3. Requirements**

The Contractor shall carry out all the activities listed here below and provide the specified deliverables.

- 3.1** Establish an agreement with an Authorized Recipient for acceptance of the Material;
- 3.2** Prepare a detailed plan, for the packaging and transport operation as delineated in Section 4.1 “Removal Plan”;
- 3.3** Obtain the necessary licenses and authorizations from the Regulatory Body to conduct the Material preparation, removing, packaging, and transport operation from the location in Appendix 1;
- 3.4** Arrange for all customs clearances, including import and export permits, as necessary;
- 3.5** Obtain all clearances required from the applicable port or airport authorities in the countries through which the consignment will pass;

<sup>8</sup> <https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1265web.pdf>

<sup>9</sup> [https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1348\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1348_web.pdf)

<sup>10</sup> [https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1840\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1840_web.pdf)

<sup>11</sup> [https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1487\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1487_web.pdf)

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

- 3.6** Carry out the operation of Material preparation, removing and packaging the Material into a certified transport package that is approved for international transport of this content;
- 3.7** Prepare, with End-User, and sign the title transfer documentation prior to transport;
- 3.8** Carry out the transport including loading and transport of the Material in shipping package(s) from the location in Appendix 1 to the Authorized Recipient;
- 3.9** Prepare the Material for further management, if necessary, according to the Authorized Recipient's acceptance criteria;
- 3.10** Deposit and handover Material to the Authorized Recipient for final management;
- 3.11** Provide proof to the IAEA of transfer to the Authorized Recipient including both photographic proof of end location of the Material and written acceptance; and
- 3.12** Conduct the Work in accordance with the relevant IAEA Safety Standards and IAEA Nuclear Security Series guidance, as well as any applicable national laws and regulations in the countries in which packaging, transport or transfer occurs.

#### **4 Deliverable Data Items**

The Contractor shall provide the following Deliverable Data Items in electronic format to the IAEA and the End-User:

Note: The Security Plan is confidential between the End User, Regulatory Body, and the Contractor. The IAEA shall receive a statement in the Removal Plan indicating the existence of the Security Plan.

##### **4.1 Removal Plan**

- 4.1.1 The Removal Plan shall be submitted for approval to the Regulatory Body and the IAEA. The Contractor shall only proceed once a written "Notice to Proceed" is received from the IAEA.
- 4.1.2 The Removal Plan shall include:
  - 4.1.2.1 The type of transport package(s) that are proposed;
  - 4.1.2.2 The certification status of the transport package(s); the transport package's authorization shall be current and shall cover the type Material that will be shipped;
  - 4.1.2.3 Indication as to whether or not a special form certificate for transport is required;
  - 4.1.2.4 The transport packages' current availability;

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

- 4.1.2.5 Arrangements for receipt of the Material at the Authorized Recipient;
- 4.1.2.6 Proposed dates of the removal, taking into consideration potential travel for IAEA oversight requiring three (3) weeks of notice;
- 4.1.2.7 Any changes to the proposed dates for the removal (specified at Section 4.1.2.6 above) shall be notified in writing to IAEA and confirmed as acceptable by IAEA before the Contractor travels to the site;
- 4.1.2.8 Radiation protection requirements for all staff while actively conducting the Work, for local staff in the immediate vicinity (local facility), and the radiation protection measures for the public during Material preparation, transit, and transport;
- 4.1.2.9 Staff and subcontractor qualifications required to conduct the Work;
- 4.1.2.10 Decontamination capability or other methodology for dealing with leaking or contaminated Material;
- 4.1.2.11 Any engineering controls to prevent accidental exposures during packaging and transportation, and;
- 4.1.2.12 A statement indicating the existence of the Security Plan.

## **4.2 Security Plan**

- 4.2.1 The Security Plan shall be kept confidential between the End User, Regulatory Body, and the Contractor;
- 4.2.2 The Security Plan shall include:
  - 4.2.2.1 Clear roles and responsibilities;
  - 4.2.2.2 Contingency and Emergency preparedness arrangements;
  - 4.2.2.3 Detailed description of arrangements for security of the Material during operations and in transit, and;
  - 4.2.2.4 Details on the arrangements and points of transfer.

## **4.3 Emergency Response Plan covering the applicable requirements in GSR Part 7 (2.8 above).**

## **4.4 On-going Notifications**

Following the respective Regulatory Body's and IAEA's approval of the Removal Plan, the IAEA shall be notified upon completion of the following steps:

- 4.4.1 The Contractor obtaining necessary clearance from relevant Authorities including transport license and certification for the transport package from the relevant Authorities (a copy of such clearances shall be provided to the IAEA);
- 4.4.2 Packaging of Material has been arranged;
- 4.4.3 Transport of Material has been arranged and scheduled;
- 4.4.4 Shipment departure;

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

4.4.5 Shipment arrival at the Authorized Recipient, and;

4.4.6 Additionally, the Contractor shall notify the IAEA Emergency Response Manager of any nuclear or radiological emergency during the operations covered under this SOW. This notification shall be made immediately after any required notifications to emergency response organizations to activate the emergency response.

#### **4.5 Final Report of Operation**

The Contractor shall prepare and submit a report after the Work has been completed and the Material has been handed over to, and accepted by, the Authorized Recipient, as described in this SoW (hereinafter referred to as the “Final Report of Operation”). The Final Report of Operation shall be submitted to the IAEA within four (4) weeks after the Material has been accepted by the Authorized Recipient. The Final Report of Operation shall include inter alia:

4.5.1 A summary of work activities and lessons learned;

4.5.2 Shipping documentation, to include leak test data, survey data, instrument calibration records, special form certificate, and any additional relevant documentation;

4.5.3 A detailed source inventory describing which Material was delivered to the Authorized Recipient and any Material-specific data obtained during the operation;

4.5.4 A description of all anomalies, issues of non-compliance, or abnormal occurrences associated with the Work, as well as any corrective actions that were undertaken; and

4.5.5 Written confirmation that the Material has been accepted by the Authorized Recipient.

The Final Report of Operation shall comply with the Final Report template (Appendix 3) and provide information including, but not limited to, the content as set out in the template.

### **5 Required Timeline and Acceptance**

Unless otherwise agreed by the IAEA, the Contractor shall complete the Work no later than six (6) months after the entry into force of the Contract. Any deviation from the agreed timeline shall be notified to the IAEA with reasons for approval and be approved by the IAEA Contracting Officer in written by email.

The completion of Work is marked by the acceptance by the IAEA of the Final Report of Operation. In the event that the IAEA is not satisfied with the submitted Final Report of Operation, it can instruct the Contractor to carry out remedial action pursuant to the latter’s commitments under this Contract. The Contractor shall remedy the defects and re-submit the revised Final Report of Operation within one (1) month of reported deficiencies.

### **6 Reporting**

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

All reports and communications shall be in English and shall be submitted in electronic format. The IAEA will review and accept these reports in written form in order to consider the Work completed.

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

#### Appendix 1: Member State and End-User

Member State	Location of Storage	End-User
Jordan	[REDACTED]	[REDACTED]

#### Appendix 2: Source/Device Information

Source/Device Id.	Device Manf.	Isotope	Initial Activity	Current Activity	Source Manf. Source Origin
S-4631/Phoenix #009	MDS Nordion	Co60 DU 137kg	[REDACTED]	[REDACTED]	MDS Nordion Canada
S-5102/T780C #057	MDS Nordion	Co60 DU 137kg	[REDACTED]	[REDACTED]	MDS Nordion Canada

Removal of Disused Sealed  
Radioactive Sources



**IAEA**

International Atomic Energy Agency

IAEA Statement of Work

THERATRONICS International Limited		CERTIFICATE OF ACCEPTANCE	
THIS CERTIFICATE IS AUTHORIZED BY THERATRONICS, AND SHALL BE DEEMED AS THE OFFICIAL RECORD OF ACCEPTANCE AND ACQUISITION OF A TELETHERAPY SOURCE AND/OR TELETHERAPY UNIT OR TELETHERAPY TREATMENT PLANNING SYSTEM DESCRIBED HEREIN.			
P&S <u>46831</u>			
Teletherapy Unit Model	<u>PHOENIX</u>	Serial No.	<u>009</u>
Source Serial No.	<u>54631</u>	Diameter	<u>2.0</u> cm
		T <sub>90</sub>	<u>257.7</u>
		Curies	<u>6.968.1</u>
Therapy Unit Output		Measurement Date	<u>13 DEC 98 BY CALCULATIONS</u>
Theraplan Plus	System No.		
I, _____ (full name & title) being a duly appointed representative of,			
Organization Name <u>AL-BASHEER HOSPITAL</u>			
Organization Address <u>AMMAN JORDAN</u>			
hereinafter referred to as the "Customer" do hereby receive and accept the			
TELETHERAPY SOURCE <input checked="" type="checkbox"/> and/or TELETHERAPY UNIT <input type="checkbox"/> or TELETHERAPY TREATMENT PLANNING SYSTEM <input type="checkbox"/>			
installed by Theratronics or its authorized representative.			
Date Installed <u>SOURCE CASCADED</u> <u>FROM T780C SN. 057</u>		Date Accepted <u>13 DEC 98</u>	
TELETHERAPY UNIT INSTALLATIONS ONLY			
Having accepted the said equipment as completed and operational, I do hereby acknowledge receipt of the operating keys from the THERATRONICS representative. If there are any outstanding items as specified on the Customer Acceptance Document, THERATRONICS shall ensure completion during the warranty period.			
THERATRONICS Service Representative		Customer	
Name	<u>KEVIN MORRIS</u>	Name	<u>Dr. Sameer AL-Kayed</u>
Signature	<u>[Signature]</u>	Signature	<u>[Signature]</u>
Date	<u>13 DEC 98</u>	Date	<u>13 DEC. 98</u>
Theratronics International Limited • 413 March Road • PO Box 13140 • Kanata Ontario K2K 2B7 (613) 891-2100 • Fax (613) 592-3815			

White - Customer Yellow - Theratronics Inc. Pink - Agent  
Delivered to Patient and Used for Therapy

507-45 (Rev. 12/97) (Page 2 of 2)



Removal of Disused Sealed  
Radioactive Sources



**IAEA**  
International Atomic Energy Agency

IAEA Statement of Work

THERATRONICS	
FIELD RADIATION SURVEY REPORT	
Teletherapy Head - Beam Off	P&S <u>46831</u>
CUSTOMER <u>AL-BASHER HOSPITAL</u>	
LOCATION <u>AMMAN JORDAN</u>	
TELETHERAPY UNIT MODEL <u>T780C</u>	SERIAL NUMBER <u>057</u>
SOURCE & SURVEY DATA	
Source Serial No. <u>S-5102</u>	Diameter <u>2.0</u> cm. TBq <u>389.1</u> Curies <u>10515</u>
Measured Output <u>200.5</u> Rmm(ICRU)	Measurement Date <u>10 Nov 98</u>
Maximum Unit Output _____ Rmm	Rated Capacity _____ Rmm(ICRU)
Survey Meter Type <u>BERTHOLD</u>	Model <u>RAT01F</u>
Survey Meter Serial No.: <u>1716</u>	Calibration Due Date: <u>22 Jul 98</u>
Head Survey Performed By: <u>KM RAE</u>	Date <u>10 Dec 98</u>
Theratronics Service Representative: (Please print)	
<p><b>PROCEDURE</b></p> <p>To be performed at completion of source exchange.</p> <ol style="list-style-type: none"><li>1. Perform all measurements at 1 meter from the source.</li><li>2. Average each measurement over 100 cm<sup>2</sup> area.</li><li>3. Highest reading: <u>2.0</u> mR/h (shall not exceed 10 mR/h)</li><li>4. Average of 18 readings: <u>0.55</u> mR/h (shall not exceed 2 mR/h).</li></ol> <p>NOTE: This survey is performed in accordance with the USNRC 10 CFR 35.641</p>	
Theratronics International Limited • 413 March Road • PO Box 13140 • Kanata Ontario K2K 2B7 (613) 591-2100 • Fax (613) 591-0518 • Telex 053-4416	

100-84      Model - Customer    Yellow - Owner/Unit History File    Pink - U.S. Service Agent      507 0.04 AA-06    5/98/0001

Removal of Disused Sealed  
Radioactive Sources



**IAEA**

International Atomic Energy Agency

IAEA Statement of Work

	
<b>CERTIFICATE OF MEASUREMENT</b>	
of	
<u>TELETHERAPY SOURCE S-5102</u>	
for	
Customer	S. SABBAGH WHOLESALE DRUGGIST AMMAN , JORDAN
Order No.	P&S 46831
Therapy Unit Output	When installed in THERATRON T80 C #57 (at maximum field size) the exposure rate will be 200.5 Rmm (+5%) based on the source measurement (below) , and the equipment conversion ratio described on sheet 251A.
Measurement of Source	Source S-5102 is a 2.0 cm diameter standard source type C-146 containing 389.1 TBq (10515 Curies) of cobalt 60. The source exposure rate was 175.5 Rmm (+3%) at the one meter position of the measurement cell.
Date of Measurement	1998 November 10
Measurement Method	The source exposure rate was measured in the cell described on Form 263 "Measurement Cell for Teletherapy Sources". The exposure rate was measured with an air wall cavity ionization chamber having a volume of 0.8 cm <sup>3</sup> and fitted with a 4.5 mm lucite equilibrium cap. The instrument is calibrated in a cobalt-60 exposure rate certified by the national Research Council of Canada.
Accuracy	The uncertainty in the source exposure rate applies only to measurement of this source in the Measurement Cell. It represents the maximum total uncertainty due to all causes including the calibration of the Council's primary exposure rate, the calibration of their instrumentation and the precision of measurement in the Measurement Cell. Additional uncertainty due to the comparative measurements involved has been included in the statement of unit output.
EXCERPT FROM THE RECOMMENDATIONS OF THE INTERNATIONAL COMMISSION ON RADIATION UNITS & MEASUREMENTS, REPORT ICRU-18, OCTOBER 1970. "It must be emphasized that the measurement of exposure rate and/or absorbed dose for treatment purposes should be made locally by the user. The statement of equipment conversion ratio by the manufacturer should not be regarded as a substitute for this."	
*Rmm (Roentgens per Minute at one Meter)	
Issued	1998 November 17
Approved	 E.M. Linn Measurement
	 P. Alexopoulos Authorization
Theratronics International Limited • 413 March Road • PO Box 13140 • Kanata Ontario K2K 2B7 (613) 591-2100 • Fax (613) 592-3918	

Removal of Disused Sealed Radioactive Sources	 <b>IAEA</b> International Atomic Energy Agency	IAEA Statement of Work
--	---	------------------------

### Appendix 3: Final Report Template

<b>REPORT No.:</b>	<b>XXX</b>
<b>DATE:</b>	<b>Date / Month / Year</b>
<b>TITLE:</b>	

	<b>NAME</b>	<b>SIGNED</b>	<b>DATE</b>
<b>PREPARED</b>	Mr/Ms [ABC]		
<b>REVIEWED</b>	Mr/Ms [ABC]		
<b>APPROVED</b>	Mr/Ms [ABC]		

### **CONTENT**

1. Brief overview of the Scope.
2. Background of recovery and facility.
3. Details of the removal operations from initiation to completion to include:
  - a. Description of all activities (preparation, import/export procedures/permits, safety analysis, authorizations, Material unloading, packaging and transport operations).
  - b. Any issues encountered.
  - c. Details about Material in conflict with the SoW.
  - d. Documentation from the Material and all logistical (shipping, import, export, handover to Authorized Recipient) documentation.
4. Lessons Learned.
5. Conclusions.
6. References.
7. Appendices:
  - a. Inventory of radioactive sources (description of the sources, devices/units).
  - b. Photographs taken during operations.