Supply and transport of Co-60 by JSC Isotope

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March, 2015
ROSATOM overview

Nuclear icebreakers

Nuclear and radiation safety

Nuclear weapons complex

Nuclear energy complex

Civil nuclear applications — International business department

Uranium production

Uranium enrichment

Fuel fabrication

Power equipment manufacturing

NPP design, engineering and construction

Electricity generation

Services and modernization
Nearly 90% of the Russian scientific and technical potential in the sphere of isotope products manufacturing is concentrated within ROSATOM State Corporation.

ROSATOM isotope complex is considered to be the largest in the world. It includes 13 enterprises that produce almost all existing radioactive and stable isotopes.

According to expert opinion, the share of ROSATOM isotope complex at the international isotope market can reach:
- 40% in stable isotopes segment (electromagnetic & gas centrifugal methods),
- 15% in radiochemicals segment (35% without Mo-99),
- 10% in sealed radioactive sources segment.

Isotope products manufactured within ROSATOM are being exported to over 30 countries by Joint Stock Company Isotope (JSC Isotope) which is their sole supplier to foreign markets.
**JSC Isotope . History of development**

1958 – JSC Isotope was founded as a transregional office under the USSR Council of Ministers for Chemistry.

1961 – the company was reorganized into Isotope All-Union Association with 7 offices in: Moscow, St.Peterburg, Kiev, Minsk, Tashkent, Ekaterinburg and Khabarovsk.

1965 – JSC Isotope started supplies of sealed radioactive sources to various industries.

1976 – the company began supplying clinics with Tc-99 generators.

2009 – JSC Techsnabexport, Rosatom`s subsidiary responsible for export of all isotope products made in Russia (up to 2009), transferred this business to JSC Isotope.

2014 – JSC Isotope has entered the international market with Co-60 sealed radioactive sources of the Russian design.
Global Distribution:
100 customers from over 30 countries

Fission, Cyclotron, EM, GC, production capability

Full range of isotope products incl. Co-60, Mo-99, Tc-99m and stable isotopes

Global logistics and nuclear safety expertise: over 1000 shipments annually
Cobalt-60 for gamma sterilization
Supplies of Co-60 sealed sources produced by «PA «MAYAK»

In 1992 PA MAYAK and Amersham International plc. founded a new enterprise called REVISS Services Ltd.

X-2089 sources
Since 1992

RSL-2089 sources
since 1996

GİK-A6 sources
since 2014

Nowadays JSC Isotope is the sole supplier of Co-60 sealed sources produced by «PA «MAYAK».
JSC Isotope Co-60 business overview

JSC Isotope is a wholly owned subsidiary of ROSATOM State Corporation, responsible for distribution of isotope products produced by ROSATOM plants.
PA MAYAK
GIK-A6 Co-60 sealed sources manufacturing

- FSUE «PA «MAYAK» - one of the world’s largest isotope products manufacturers working on radioactive materials market.
- The products portfolio contains more than 200 types of sealed radioactive sources with Co-60, Cs-137, Ir-192, etc.
- Co-60 sealed sources are producer by «PA «MAYAK» since 1963.
- Key sources type is GIK-A6.

Producer

FSUE «PA «MAYAK» - one of the world’s largest isotope products manufacturers working on radioactive materials market.

GIK-A6 Co-60 source characteristics:

- Complies with the absolute majority of irradiation centers;
- Meets the following standards:
  1. ISO 9978: 1992,
  2. ISO 2919: 65546,
  3. IAEA regulations for the safe transport of radioactive materials.
- Certified as special form material;
- Leak tested (vacuum bubble and helium pressurization tests);
- 20-years recommended working life.

<table>
<thead>
<tr>
<th>Source type</th>
<th>GIK-A6, encapsulated steel pencil</th>
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<tbody>
<tr>
<td>Producer</td>
<td>FSUE «PA «MAYAK»</td>
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<tr>
<td>Activity range</td>
<td>8000 – 12000 Ci per pencil</td>
</tr>
<tr>
<td>Dimensions</td>
<td>11,1 mm in diameter; 451,6 mm in length</td>
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<tr>
<td>Material</td>
<td>Stainless steel (equivalent to 304 L)</td>
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Co-60 production on RBMK-reactors

- Since 2001 Cobalt-60 has been produced on the facilities (RBMK-reactor) of Leningrad Nuclear Power Plant.
- Due to design features of RBMK-1000, nuclear and physical characteristics of the reactor core production of radioactive isotopes is organized without affecting economic factors of electric and thermal energy generation.
- Currently there are 3 nuclear power plants with 11 reactors of this type operating in Russia (Leningrad, Smolensk and Kursk).
- In future Cobalt-60 can also be manufactured on other plants.
Worldwide multimodal delivery

Large fleet of the following container types:

- 150000/4100 (depleted uranium shielded containers)
- 160000/4300 (lead shielded containers)
Service

- Full scope of services:
  - source installation,
  - source rack optimization,
  - emergency response.

- Returning of used Co-60 sealed sources **produced in Russia** incl.:
  - GIK-A6 sources,
  - RSL-2089 sources.

To identify Russian made sources we need to know its serial number.

**JSC Isotope guarantees radiation safety throughout product deliveries and rendering services**

ISO 9001 certified
- Developing of international distribution
- Increasing of production capacities
- Developing of recycling programs
Namaste