

RTGs in Antarctica

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Information about RTGs in Antarctica as of April 09, 2008

This information as a result of a preliminary work performed by the Radioactive Materials Inventory Commission is based on list No 36 prepared by the Accounts Department of AARDI, scientific & technical reports and cables sent by chiefs of the Antarctic stations and letters received from other organizations.

The radioactive sources known to us are radioisotope thermoelectric generators (RTGs) based on radioactive strontium-90, which were delivered to Antarctica in the end of the 1970s as a component of unattended automatic geophysical stations.

Designer of the RTGs – FSUE VNIITFA, former A-3430 “Mail Box”. Its postal address: VNIITFA, 46, Varshavsky Road, Moscow, 115230, Russia.

According to IZMIRAN (letter No 11203/2872-11 of November 17, 1988), the RTGs were delivered to Antarctica by employees of IZMIRAN (approximately 30 units) and VNIIGMP (approximately 10 units). The RTGs were installed at the Antarctic stations, Zavadsky Summit, along the following routes: Mirny – Vostok, Mirny – C Summit. It is known that some RTGs had been removed from Antarctica.

Russian Antarctic Expedition (RAE) has no official information about recovery of the RTGs by their owners.

According to lists prepared by the 34th Soviet Antarctic Expedition (SAE) in 1989 (with consideration for the RTGs recovered in the USSR in 1990) RTGs installed in Antarctica belonged to the following organizations:

KMIP – 5 units;

IZMIRAN – 8 units.

The Commission did not find any later information about transfer of the RTGs in the documents of AARDI.

As a result of the work performed it was determined that AARDI had on its balance sheet as of August 31, 2000 the following:

1. Beta-M RTG, year of manufacture - 1978, serial number – 240, nomenclature number - 1380516, taken from NIIP of Hydromet and included into the balance sheet of Novolazarevskaya station in 1986 (located in the area adjacent to VPP of Novolazarevskaya station)
2. Beta-C RTG, year of manufacture – 1974, serial number - 116, nomenclature number - 1372015, on the balance sheet of Molodezhnaya station.
3. Beta-M RTG, year of manufacture – 1978, serial number - 251, nomenclature number - 1300057, on the balance sheet of Mirny station (located on the B Summit).
4. Beta-M or C RTG, nomenclature number – 1300072, on the balance sheet of Mirny station.

During the 45th and 46th seasons RAE acknowledged presence of the following three RTGs:

- 2 RTGs No 116 and 253 (components of M-107 unattended automatic meteorological stations, according to archival documents) are placed into a transport container at Molodezhnaya station (see the attached figure) near the petroleum storage depot;
- 1 RTG (Beta-M, No 240, 1978) at Novolazarevskaya station, near the airdrome.

According to earlier received information, one RTG belonging to AARDI is on the B summit of the glacier, 1000 km distant from Mirny station along Mirny-Vostok route.

Now the Commission continues collecting information about radioactive sources and their location in Antarctica.

Information about radioactive sources used by SAE

No	Type	Serial number	Year of manufacture	Nomenclature number	Location	Technical state	Note	Source of information
1	2	3	4	5	6	7	8	9
1	Beta-C	251	1978	1300057	Broken hoisting crane at the end of the moraine, Mirny station. Sent to B summit	Operable	Belongs to KMIP, on the balance sheet of Mirny station	/1/; /4/; /5/; /6/; /9/; /11/ - /13/; /15/
2	Beta-M	246	1978	Unknown	Broken hoisting crane at the end of the moraine, Mirny station	Operable	Belongs to KMIP	/1/; /5/
3	Beta-C	4/074	1971	unknown	Recovered and passed to Izotop June 28, 1990	To be recovered	-	/1/
4	Pinguin	5	1978	unknown	Container at the moraine, Mirny station	to be recovered	Belongs to KMIP	/1/
5	Beta-M	253	1978	unknown	Molodezhnaya	Inoperable	Belongs to KMIP, is not on the balance sheet of AARDI	/1/
6	Beta-C	114	1971	unknown	Zavadsky Summit	Examined by the 30 th SAE	Belongs to IZMIRAN	/1/; /5/; /6/
7	Beta-M	135	1976	unknown	Broken hoisting crane at the end of the moraine, Mirny station	Operable	Belongs to IZMIRAN	/2/; /5/
8	Beta-M	137	1976	unknown	Broken hoisting crane at the end of the moraine, Mirny station	Operable	Belongs to IZMIRAN	/2/; /5/
9	Beta-M	138	1976	unknown	Broken hoisting crane at the end of the moraine, Mirny station	Operable	Belongs to IZMIRAN	/2/
10	Beta-M	140	1976	unknown	Broken hoisting crane at the end of the moraine, Mirny station	Operable	Belongs to IZMIRAN	/2/; /5/
11	Beta-M	189	1977	unknown	Broken hoisting crane at the end of the moraine, Mirny station	Operable	Belongs to IZMIRAN	/2/; /5/
12	Beta-M	133	1976	unknown	2 km from Mirny station behind the airplane landing area	Operable	Belongs to IZMIRAN	/2/; /5/; /6/
13	Beta-M	222	1978	unknown	Near Komsomolskaya station	Operable	Belongs to IZMIRAN	/2/; /5/; /6/
14	Beta-M	190	1977	unknown	Container at the moraine, Mirny station	To be recovered	Belongs to IZMIRAN	/2/
15	Beta-M	212	1978	unknown	Recovered and passed to Izotop June 28, 1990	To be recovered	-	/2/
16	Beta-C	116	1974	1372015	Molodezhnaya station, Vecherniya mountain (near the petroleum storage depot)	Operable	On the balance sheet of Molodezhnaia station	/3/; /4/; /7/; /9/ - /13/; /15/
17	unknown	unknown	unknown	Unknown	Molodezhnaya station	unknown.	-	/3/
18	Beta-C	unknown	unknown	1341542	Recovered in 1990	-	-	/10/
19	Beta-M	240	1978	1380516	Near VPP of Lazarevskaya station	unknown.	Taken from NIIP of Hydromet and included into the balance sheet of SAE of AARDI in 1986	/4/; /8/; /9/; /11/ - /14/; /15/
20	Beta-M (C)	unknown	unknown	1300072	Mirny station	unknown.	On the balance sheet of Mirny station	/4/; /9/; /11/ - /13/; /15/

Note: sources highlighted with grey were examined during the 45th and 46th RAEs (/7/-/9/; /11/-/15/)

References:

1. List of Antarctica RTGs belonging to KMIP (made up during the 34th SAE in 1989)
2. List of Antarctica RTGs, belonging to IZMIRAN (made up during the 34th SAE in 1989)
3. Radiogram No 0132 35 of December 11, 1988
4. Letter from VNIITFA Ref. No 16-23-147 of May 21, 2003
5. Radiogram No 0149 112 of March 03,1989
6. Radiogram No 037 49 of December 6,1988
7. Beta-M RTG examination report of April 21, 2001
8. Information about radioactive sources located in Antarctica (according to data available on August 23, 2000)
9. Information about radioactive sources located in Antarctica (according to data available on September 27, 2001)
10. Materials and equipment acceptance report of February 13, 1990 prepared by the 34th SAE
11. Information about radioactive sources located in Antarctica (according to data available on September 04, 2000)
12. Information about radioactive sources located in Antarctica (according to data available on August 31, 2000)
13. Information about radioactive sources located in Antarctica (according to data available on October 22, 2001)
14. Informational note for Head of Roshydromet
15. Explanatory note on radioactive sources located in Antarctica (according to data available on August 30, 2000)

Proposal for recovery of RTGs and ionizing radiation sources (IRSes) from Antarctica

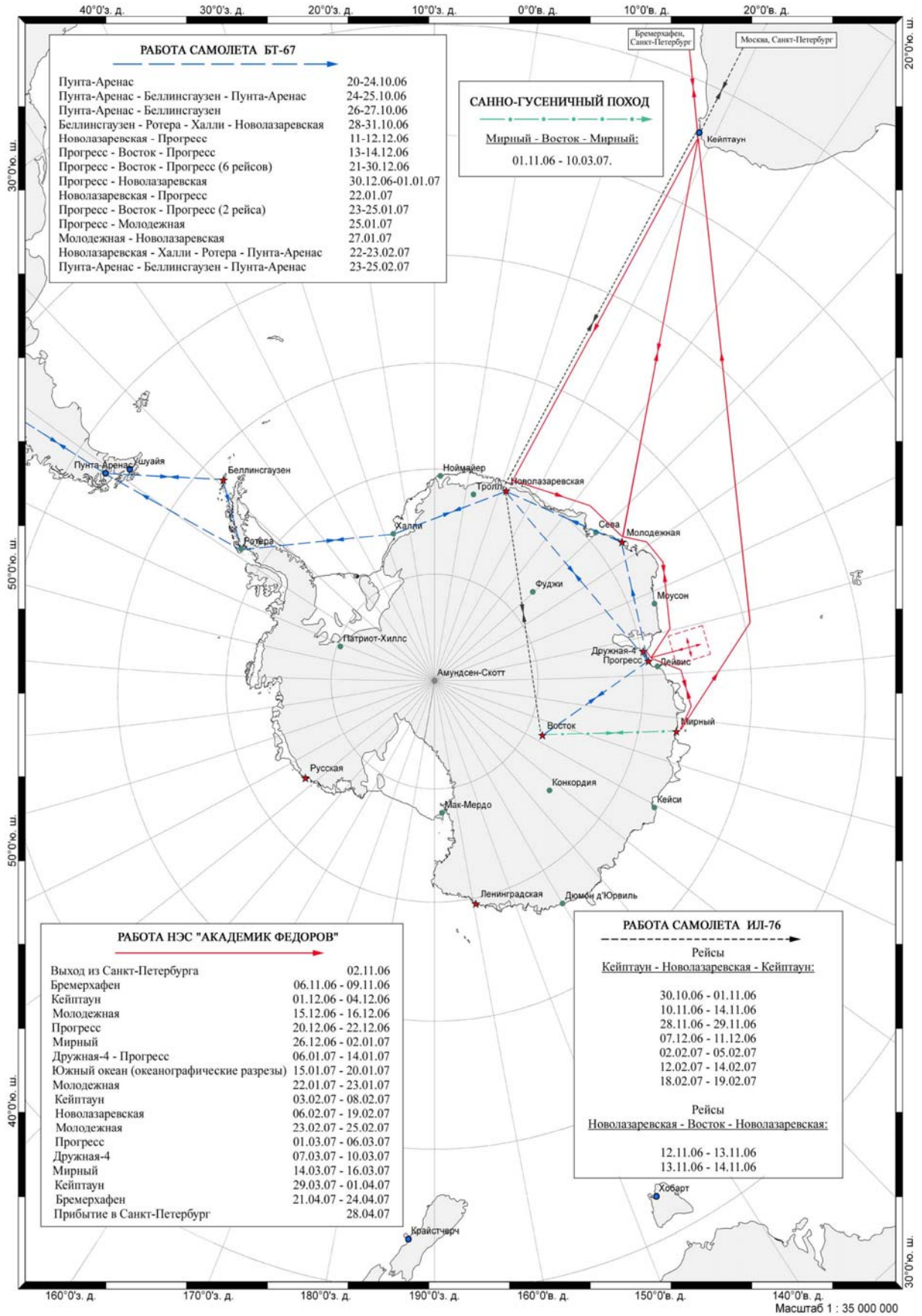
Technical aspect of RTG and IRS recovery from Antarctica incorporates the following activities:

1. Advice of experts of the organization engaged in the IRS recovery based on the available reports. Coordination of working conditions at the stations, ways of transportation, load positioning on board ship. Action plan coordination and approval.
2. Delivery of experts and equipment by Academician Fedorov scientific expedition ship to Antarctica in season 2007/2008 or 2008/2009 depending on the approved action plan.
3. Work at Molodezhnaya station. Loading 2 RTGs into a special container. Delivery of the container up to the scientific expedition ship.
4. Work at Novolazarevskaya station. Loading 1 RTG into a special container. Delivery of the container up to the scientific expedition ship.
5. Unloading special containers at Mirny station. Examination of the container with IRSes. Loading the IRSes into a special container. Arrangement of a storage site for the RTGs and IRSes outside the station area. Mounting warning signs.
6. Loading special containers with the RTGs and IRSes on board of Academician Fedorov scientific expedition ship in 2009, transportation to Saint Petersburg.

Draft Action Plan to Recover Antarctic RTGs and IRSes

No	Action	Time period	Responsible organization
1.	Obtaining a permit to prepare Antarctic RTGs and IRSes for recovery	2007-2008	RAE
2.	Obtaining a permit for a scientific expedition vessel with RTGs and IRSes on board to call at a foreign port	2008	Ministry of Foreign Affairs
3.	Obtaining a permit to bring RTGs and IRSes in Russia	2007-2008	Roshydromet
4.	Concluding a contract for recovery of RTGs and IRSes	March-August, 2007	RAE
5.	Delivery of experts and required equipment to Molodezhnaya station. Loading a special container on board ship.	2008-2009	RAE
6.	Delivery of experts and required equipment to Novolazarevskaya station. Loading a special container on board ship.	2008-2009	RAE
7.	Delivery of experts and special containers from Molodezhnaya and Novolazarevskaya stations, as well as equipment required to clean containers, to Mirny station	2008-2009	RAE
8.	Arrangement of a site to store special containers	2008-2009	RAE
9.	Preparing special containers for loading on board ship	2008-2009	RAE
10.	Delivery of special containers to Saint Petersburg	May 2009	RAE

ПЛАН РАБОТ ТРАНСПОРТНЫХ СРЕДСТВ 52 РАЭ В СЕЗОННЫЙ ПЕРИОД



52 RAE Seasonal Transportation Plan

Blue dotted lines – BT-67 airplane flights

Punta Arenas	20-24.10.06
Punta Arenas – Bellingshausen - Punta Arenas	24-25.10.06
Punta Arenas – Bellingshausen	26-27.10.06
Bellingshausen – Rothera – Halley – Novolazarevskaya	28-31.10.06
Novolazarevskaya – Progress	11-12.12.06
Progress – Vostok - Progress	13-14.12.06
Progress – Vostok – Progress (6 flights)	21-30.12.06
Progress – Novolazarevskaya	30.12.06 –01.01.07
Novolazarevskaya – Progress	22.01.07
Progress – Vostok – Progress (2 flights)	23-25.01.07
Progress – Molodezhnaya	25.01.07
Molodezhnaya – Novolazarevskaya	27.01.07
Novolazarevskaya – Halley – Rothera - Punta Arenas	22-23.02.07
Punta Arenas – Bellingshausen - Punta Arenas	23-25.02.07

Green dotted line – sled & tracked vehicle expedition

Mirny – Vostok – Mirny

01.11.06 – 10.03.07

Red arrows – Academician Fedorov expedition ship navigation

Departing from Saint Petersburg	02.11.06
Bremerhaven	06.11.06 – 09.11.06
Capetown	01.12.06 – 04.12.06
Molodezhnaya	15.12.06 – 16.12.06
Progress	20.12.06 – 22.12.06
Mirny	26.12.06 – 02.01.07
Druzhnaya-4 – Progress	06.01.07 – 14.01.07
Southern Ocean (oceanographic sections)	15.01.07 – 20.01.07
Molodezhnaya	22.01.07 – 23.01.07
Capetown	03.02.07 – 08.02.07
Novolazarevskaya	06.02.07 – 19.02.07
Molodezhnaya	23.02.07 – 25.02.07
Progress	01.03.07 – 06.03.07
Druzhnaya-4	07.03.07 – 10.03.07
Mirny	14.03.07 – 16.03.07
Capetown	29.03.07 – 01.04.07
Bremerhaven	21.04.07 – 24.04.07
Arrival in Saint Petersburg	28.04.07

Black dotted lines – Il-76 airplane flights

Flights

Capetown – Novolazarevskaya – Capetown:

30.10.06 – 01.11.06
10.11.06 – 14.11.06
28.11.06 – 29.11.06
07.12.06 – 11.12.06
02.02.07 – 05.02.07
12.02.07 – 14.02.07
18.02.07 – 19.02.07

Flights

Novolazarevskaya – Vostok – Novolazarevskaya

12.11.06 – 13.11.06
13.11.06 – 14.11.06