



**Federal Atomic  
Energy Agency**



**Government of the  
Murmansk Region**



**Energy Safety Analysis Centre  
of IBRAE RAN**

## **ENHANCEMENT OF THE RADIATION MONITORING AND EMERGENCY RESPONSE SYSTEM IN THE MURMANSK REGION**

The Project is realized in the framework of the Agreement  
“On multilateral nuclear and environmental program in the Russian Federation”

Funded by the “Northern Dimension” Environmental Partnership Fund.

The European Bank for Reconstruction and Development is the Administrator of the Fund

## BENEFICIARIES



Government  
of the Murmansk Region



State Regional Agency for  
Civil Defence, Emergency  
Situations and Fire Safety



FSUE "Northern Federal Facility  
for Radioactive  
Waste Management"  
("SevRAO")



FSUE "Nerpa" Shipyard



State Agency "Murmansk Department of  
Hydrometeorology  
and Environment Monitoring"



*“The developed system of emergency response is based on state-of-the-art technology for radiation safety and population protection. We will undoubtedly plan the extension of its infrastructure for response to other events of natural and man-caused origin”*

*Governor of the Murmansk Region Yu.A.Evdokimov*



*“Rosatom is interested in the high level of preparedness and effectiveness of the regional system of response to emergency situations and supports the realization of the Project in the framework of the Agreement with the Government of the Murmansk Region”*

*Deputy Head of the Federal Atomic Energy Agency A.B.Malyshev*



*The Project offers a comprehensive solution to the problem of population protection in case of radiological emergencies by enhancing the elements of the response system at facility, local, regional and federal levels”*

*Director of IBRAE RAN, Corresponding Member of RAN L.A.Bolshov*



## INTRODUCTION

Large scale activities aimed at decommissioning of a large number of radiation-hazardous facilities of the Navy are being implemented in the North-West Region of Russia throughout the last decade. An important part of these activities is nuclear, radiation, and environmental safety assurance. One of the key elements of the system for safe decommissioning of radiation-hazardous facilities is preparedness to response to possible radiological accidents. Therefore, a modern response system in the Murmansk Region is a necessary factor ensuring protection of population and territories in case of radiological accidents at facilities involved in nuclear submarine decommissioning, spent nuclear fuel and radioactive waste management.

The Project of development of radiation monitoring and emergency response system in the Murmansk Region was included in the top priority projects according to the Strategic Master-Plan for decommissioning of NS and other radiation-hazardous facilities of the North-West Region of Russia, which was developed on the behalf of the “Northern Dimension Environmental Partnership Fund”. The Project was launched in November of 2005. The Employer of the works is the Government of the Murmansk Region. The project is implemented by the Energy Safety Analysis Centre of IBRAE RAN. The Project duration is expected to be 2 years.

The main objective of the Project is overall enhancement of the system for radiation monitoring and emergency response to potential accidents at radiation-hazardous facilities involved in NS decommissioning and management of SNF and RW in the Murmansk Region.

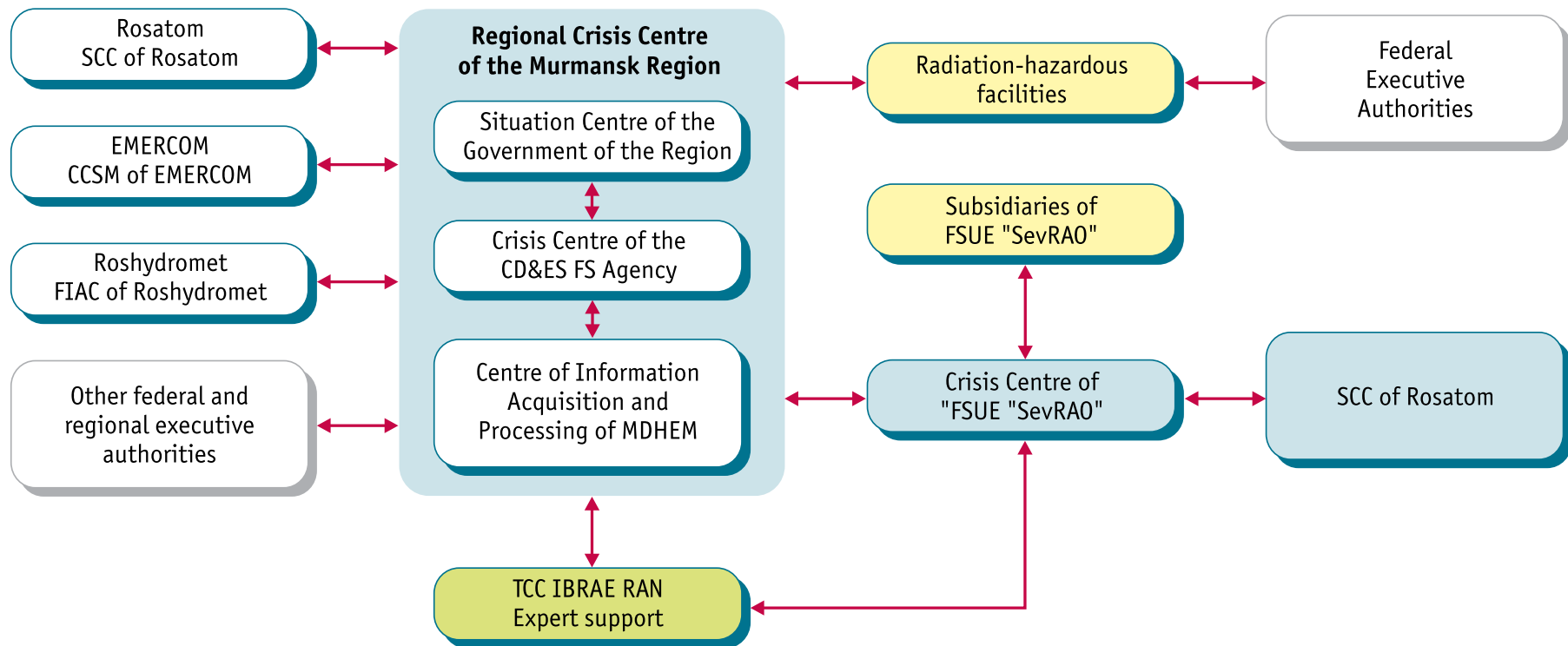
The Project is aimed at enhancing the preparedness of the emergency response forces, minimization of the consequences of possible radiological accidents, increasing the effectiveness and efficiency of decision-making and realization of population and environment protection measures.

### **The main directions of activities:**

- modernization of the existing and creating automated radiation monitoring systems (ARMS) for facilities and territories, including mobile radiation surveillance laboratories;
- establishment of the Regional Crisis Centre (RCC) of the Murmansk Region and the Crisis Centre of FSUE “SevRAO” (CC of FSUE “SevRAO”);
- setting up communication systems for transfer, acquisition, processing, storage and presentation of data for participants of emergency response at the facility, regional and federal levels;
- development of software and hardware systems for expert support of decision-making on personnel, population and environment protection activities;
- establishment of a system for expert support of the RCC of the Murmansk Region and CC of FSUE “SevRAO” by Technical Crisis Centre of IBRAE RAN (TCC IBRAE RAN).

The Project is unmatched in Russia in terms of the covered territory, the number of radiation hazardous facilities and facilities participating in the international and Russian programs aimed at NS decommissioning and management of SNF and RW.

The implementation of the Project will provide Murmansk Region with an up-to-date systems of radiation monitoring, informational, analytical and real-time expert support of executive authorities in planning and implementation of adequate protection measures in case of radiation accidents.

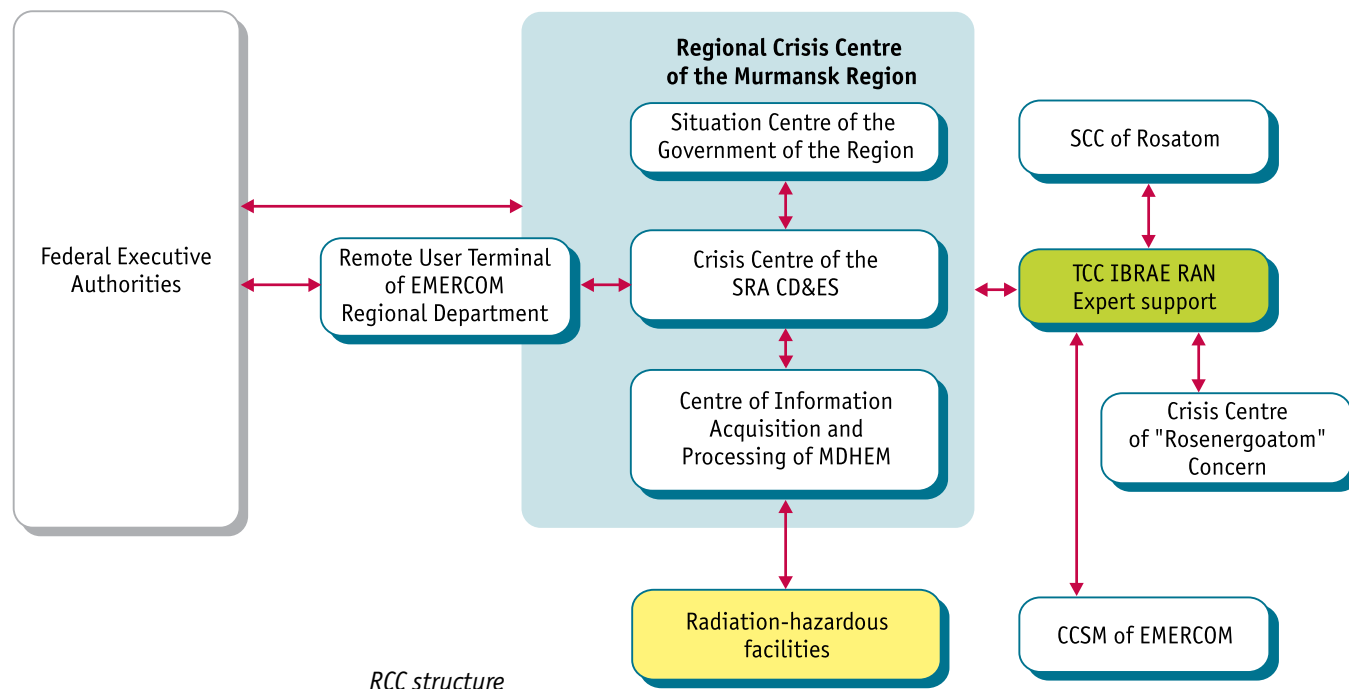


*Functional diagram of emergency response system of the Murmansk Region*

## REGIONAL CRISIS CENTRE OF THE MURMANSK REGION

Regional Crisis Centre (RCC) was established to provide informational and technical support for decision-making on protection of population and territories in case of emergency situations at nuclear and radiation-hazardous facilities. Everyday activities of RCC include on-line monitoring of the radiation situation in the territory of the region, planning and verification of actions aimed at prevention of ES in the territory of the region.

RCC includes three elements: the Situation Crisis Centre (SCC) of the Government of the Murmansk Region, Crisis Centre of the State Regional (Murmansk) Agency for Civil Defence, Emergency Situations and Fire Safety (SRA CD&ES) and the Centre of Information Acquisition and Processing of MDHEM.



RCC structure

The Centres are equipped with up-to-date communication systems providing informational interaction with the facilities of the region and regional and federal executive authorities.

### Main tasks of RCC:

- informational and technical support of the administration of the region and administrative agencies in decision-making on mitigation of the consequences of radiation accidents;
- planning and verification of emergency response activities in the region;
- real-time monitoring of the main parameters of radiation situation in the territory of the region;
- provision of interaction between the participants of emergency response at local regional and federal levels;
- informational, methodological and technical support of measures aimed at provision of emergency preparedness of the emergency response forces in the Murmansk Region.



Location of RCC elements:

1. SCC of the Government of the Murmansk
2. CC of SRA CD&ES
3. Centre of Information Acquisition and Processing of MDHEM

# SITUATION CENTRE OF THE GOVERNMENT OF THE MURMANSK REGION

## Main tasks of the Centre:

- provision of the administration of the region with on-line information about the current situation in the territories affected by ES, online interaction with the ES commission of the region, regional and federal executive authorities, and facilities;
- provision of the administration of the region with everyday information on implementation of measures on ES prevention, observation and monitoring of the condition of the potentially hazardous facilities and the environment in the territory of the region;
- carrying out measures aimed at informing the population.

- *staff – 4 specialists;*
- *software – programs providing display and analysis of the data of radiation monitoring, data bases, library of electronic maps and informational reference systems providing access to the data on the condition of the radiation hazardous facilities and information on assessment of ES consequences and realization of counter-emergency measures;*
- *hardware – videoconferencing equipment, audio and video presentation equipment, modern operator workstations, server and communication equipment, uninterrupted power supply system.*



*Situation Crisis Centre*



*Expert workplace*



*Meeting of the Governor with the media*



# CRISIS CENTRE OF SRA CD&ES

## Main tasks of the Centre:

- informational and technical support of the regional ES commission of the Government of Murmansk Region in everyday activities and in case of an emergency situation;
- planning and verification of implementation of emergency response activities in the region;
- on-line monitoring of the radiation situation parameters in the territory of the region, including the use of mobile radiation surveillance laboratories;
- maintenance and development of informational, software and hardware resources, maintenance of communications and data exchange systems.

- *staff – 12 specialists;*
- *software – programs providing display and analysis of the data of radiation monitoring, data bases and informational reference systems providing information on the condition of the radiation hazardous facilities and works on NS decommissioning, scenarios of possible accidents, plans for protection of population and territories, library of electronic maps, calculation and simulation software for assessment and forecasting ES consequences;*
- *hardware – videoconferencing equipment, audio and video presentation equipment, modern operator workstations, server and communication equipment, uninterrupted power supply system;*
- *two mobile radiation surveillance laboratories.*



*ES commission hall*



*Operator Workstation*



*Expert workplace*



# CENTRE OF INFORMATION ACQUISITION AND PROCESSING OF MDHEM

## Main tasks of the Centre:

- acquisition, accumulation, analysis, presentation and transfer of radiation situation data of territorial ARMS;
- acquisition and processing of data on weather situation in the region and provision of weather forecasts (in case of regional-scale ES);
- technical support and development of territorial ARMS;
- assessment and forecast of air and water transport of radionuclides, including transboundary transport (in cooperation with FIAC of Roshydromet).

- *staff – 5 specialists;*
- *software – programs providing acquisition, display and analysis of the data of radiation monitoring, data acquisition control software, programs for drawing up regional weather reports, library of electronic maps, calculation and simulation software;*
- *hardware – videoconferencing equipment, audio and video presentation equipment, modern operator workstations, server and communication equipment, uninterrupted power supply system.*



Meeting hall



Server and communication equipment of Murmansk ARMS



Diesel Generator Container

## FSUE “SEVRAO” CRISIS CENTRE

FSUE “Northern Federal Facility for Radioactive Waste Management” (FSUE “SevRAO”) was established to provide infrastructure for NS decommissioning, management of radioactive waste and spent nuclear fuel, and remediation of radiation-hazardous facilities in the north of Russia.

The facility controls three subsidiaries – the former naval coastal maintenance bases in Andreeva Bay and in Gremikha, and reactor compartment long-term storage facility in Saida Bay.

Crisis Centre of FSUE “SevRAO” is located at the administration of the facility in Murmansk.

### Main tasks of the Centre:

- on-line monitoring of the main parameters of radiation situation in the territory of subsidiaries of the facility;
- planning and verification of implementation of emergency response actions at the subsidiaries of the facility;
- assessment of the situation, development of recommendations and technical support of ES commissions of FSUE “SevRAO” and its subsidiaries in a crisis situation;
- informational interaction with Rosatom;
- exchange of information between the participants of emergency response, including interaction with RCC of the Murmansk Region, Situation Crisis Centre of Rosatom and Technical Crisis Centre of IBRAE RAN.

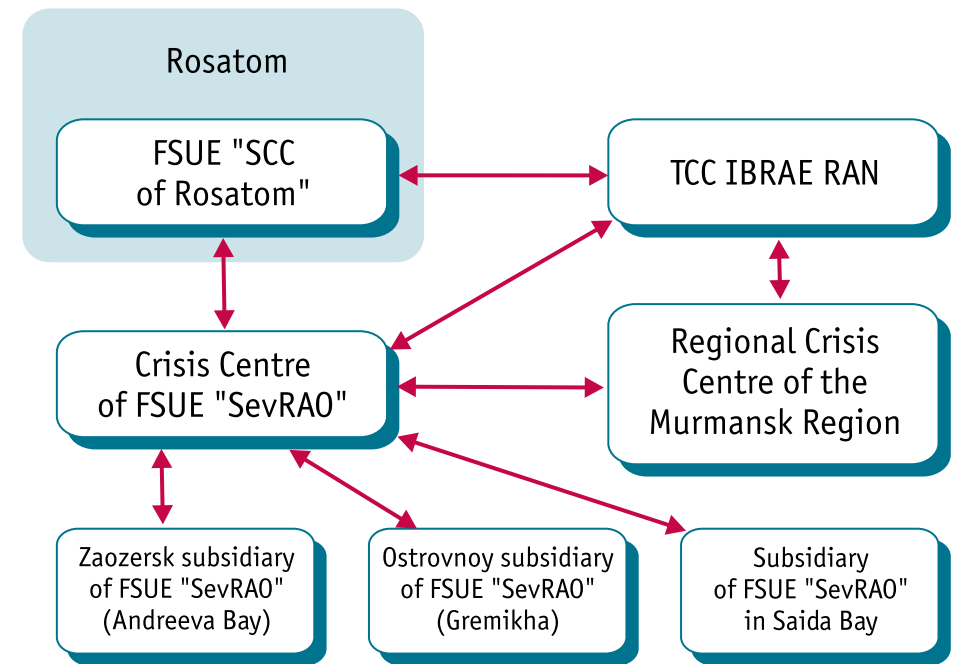


*Specialist workplace*



*Meeting hall*

- staff – 3 specialists;
- software – data bases and informational reference systems providing information on the condition of the radiation hazardous facilities and works on NS decommissioning, scenarios of possible accidents, plans for protection of population and territories, library of electronic maps, calculation and simulation software - express system for forecasting of radiological situation in case of atmospheric releases of radioactivity, system for monitoring of water contamination (coastal waters), engineering applied programs for assessment of exposure doses and contamination, software for display of radiation monitoring data;
- hardware – videoconferencing equipment, audio and video presentation equipment, modern operator workstations, server and communication equipment, uninterrupted power supply system;
- communications – facility telephone network, automatic notification system, fibre optic lines for communication with the Regional Crisis Centre of the Murmansk Region, connection to the satellite data transfer system of Rosatom, reserve communication lines;
- two mobile radiation surveillance laboratories.



*Interaction diagram of FSUE "SevRAO" CC*



*Satellite antenna of Rosatom communication system*

# SITUATION CRISIS CENTRE OF ROSATOM

Situation Crisis Centre of Rosatom carries out informational and technical support of the branch ES commission of Rosatom.

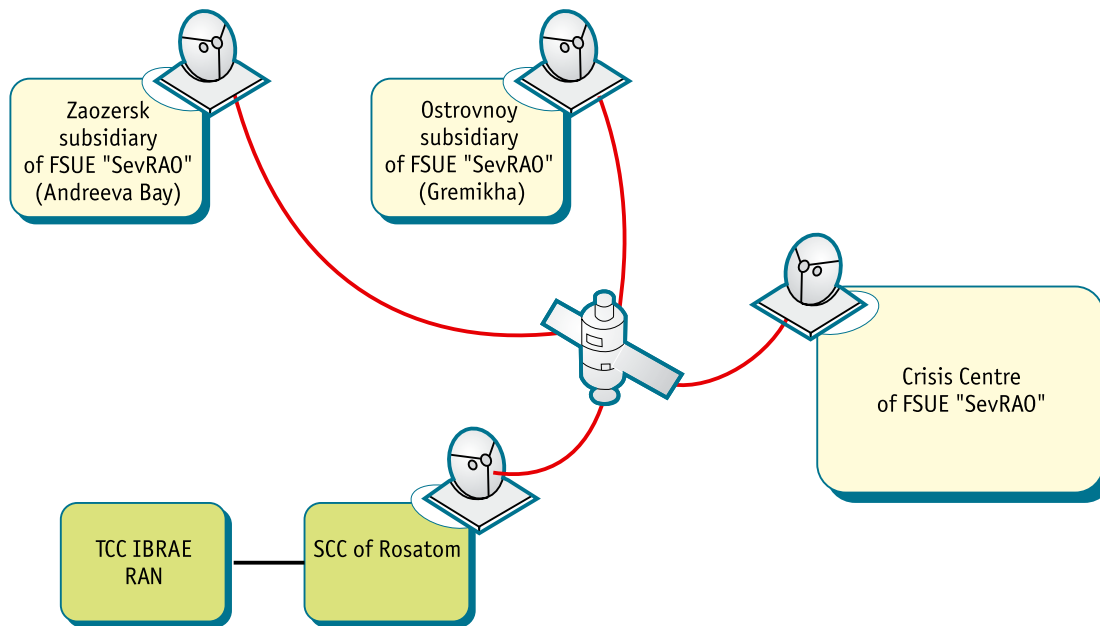
## Main tasks of the Centre:

- acquisition and analysis of data of branch ARMS;
- provision of communication with all of the facilities controlled by Rosatom;
- notification and coordination of actions in case of incidents at the facilities of the branch;
- provision of BESC experts with the required information;
- execution of obligations on notification of IAEA and neighbouring countries as a National communication centre.



### *In the framework of the Project, SCC of Rosatom provides:*

- satellite communication between management of FSUE "SevRAO", Zaozersk and Ostrovnoy subsidiaries;
- satellite communication of crisis centres in Murmansk Region with crisis centres in Moscow;
- analysis of data of radiation monitoring at subsidiaries of FSUE "SevRAO".



*Diagram of Satellite communications within the Project*

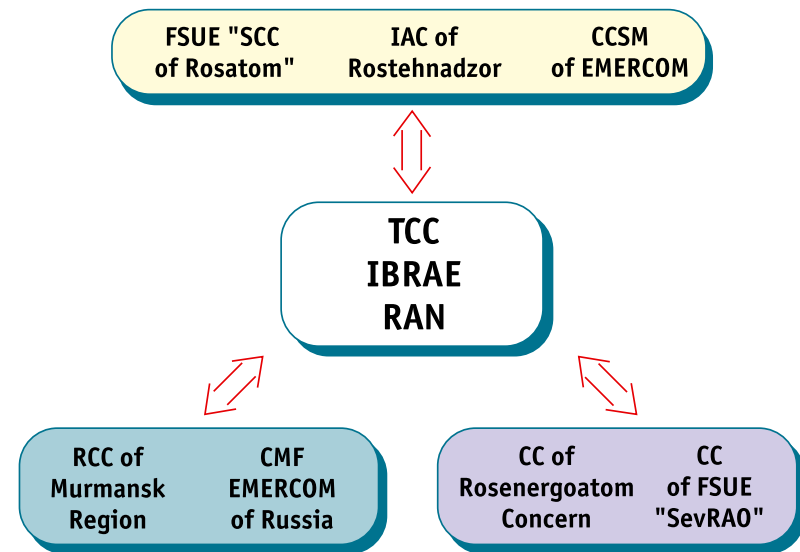


## TECHNICAL CRISIS CENTRE IBRAE RAN

Technical Crisis Centre IBRAE RAN (TCC IBRAE RAN) carries out scientific, technical, and expert support of the Situation Crisis Centre of Rosatom, Centre for Crisis Situations Management of EMERCOM of Russia (CCSM of EMERCOM), Crisis Centre of "Rosenergoatom" Concern (CC of Rosenergoatom Concern), Information and Analytical Centre of Rostehnadzor (IAC of Rostehnadzor), facilities, and local agencies for prevention and mitigation of ES.

### Main functions in the framework of the Project:

- expert support of the personnel of crisis centres and development of recommendations on minimization of the consequences of radiological ES for personnel, population and territories of the region;
- scientific, methodical, and technical support of actions aimed at assuring preparedness of emergency response forces, including participation in exercises and training;
- scientific, informational, methodical and technical support of design, development, and introduction of new software and hardware for support of decision-making on protection of personnel, population and territories.



*Scientific and technical expert support of the participants of emergency response system by IBRAE RAN*



## SOFTWARE AND INFORMATION SYSTEMS OF THE CRISIS CENTRES

Information systems and software of the facilities are required for decision-making on protection measures for the personnel, population, and territories in case of a radiological ES.

This software includes data bases, informational and geoinformational systems, simulation systems, computer manuals and engineering programs providing assessment and forecast of the consequences of radiation accidents, as well as systems providing access to reference and on-line information.



---

### *Data bases and informational reference systems include information:*

- on the facilities involved in NS decommissioning, SNF and RW management;
- on the progress of works on NS decommissioning, SNF and RW management;
- on the territories of location of facilities and their subsidiaries (region, neighbouring districts, controlled areas);
- on the current radiation and environmental situation in the territory of the Murmansk Region, control areas of the facilities involved in NS decommissioning, SNF and RW management;
- possible scenarios of radiation accidents, characteristics of possible releases/discharges and the consequences for the population and environment;
- on the plans for protection of personnel and population, emergency teams, forces and assets in the Murmansk Region, federal agencies and facilities;
- regulatory and technical documentation in the field of ES, use of nuclear energy, protection of personnel and population, radiation safety, environment protection.

### *Library of electronic maps:*

- bitmap and vector maps of various scales, including maps of control areas of the facilities involved in NS decommissioning, SNF and RW management
-





---

***Geoinformational systems containing maps and reference information about the region, and territories of location of radiation-hazardous facilities***

***Simulation systems:***

- systems for express assessment of the radiation situation;
- computer systems for assessment and forecast of spreading of radionuclides in atmosphere and water;
- systems for assessment and forecast of contamination of territories and environment;
- systems for assessment of population exposure doses.

***Computer manuals and engineering programs for assessment of radiation accident consequences and taking protection measures***

---

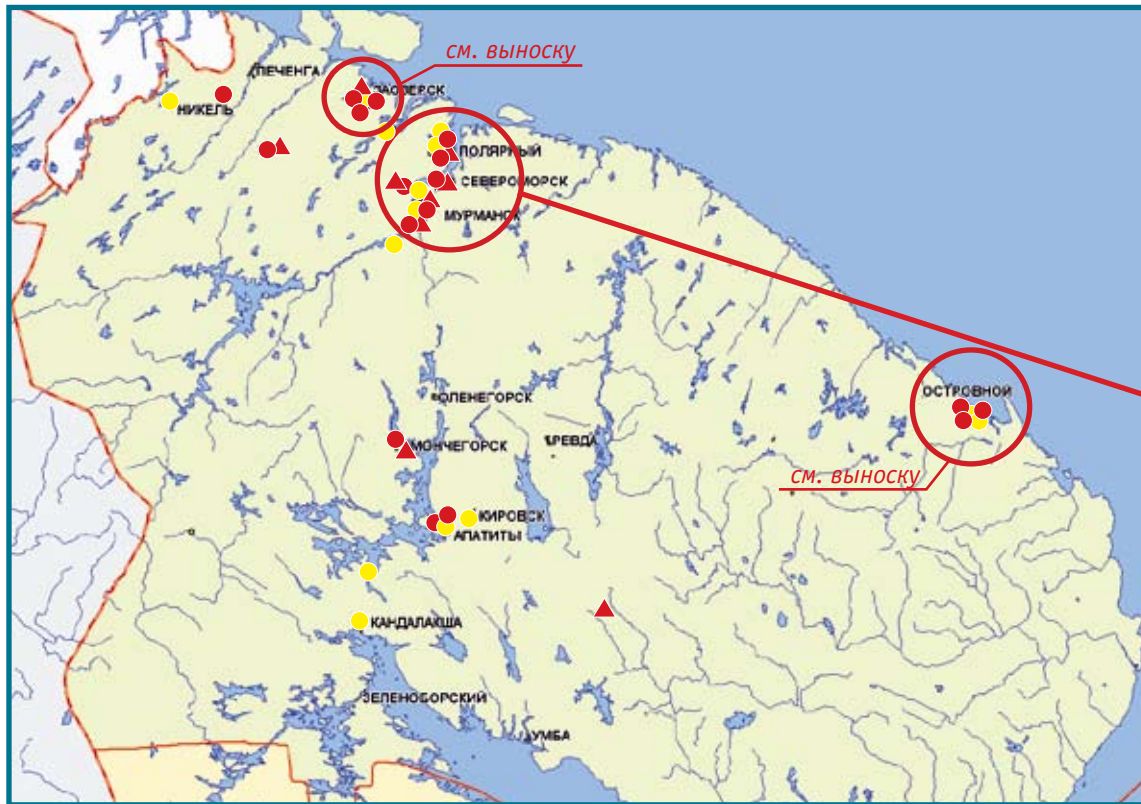
*A specific set of software and informational resources is used at the crisis centres depending on the functions of the centre. For example, FSUE "SevRAO" CC is provided with simulation systems for assessment and forecast of the consequences of accidents for the personnel, at the site and within the control area. The software installed at the Centre of Information Acquisition and Processing of MDHEM provides on-line processing of the data of radiation monitoring and forecasting of atmospheric and water transboundary transport of radioactivity. The software systems of CC of Agency of CD&ES and FS provide support of decision-making on protection of population and territories.*

---

# MURMANSK TERRITORIAL AUTOMATED SYSTEM FOR RADIATION MONITORING

Establishment of the system for acquisition of information on the radiation situation was started under the Decree of the Administration of the Murmansk Region of 23.03.96 "On establishment of a single state system for monitoring of radiation situation within the territory of the Murmansk Region".

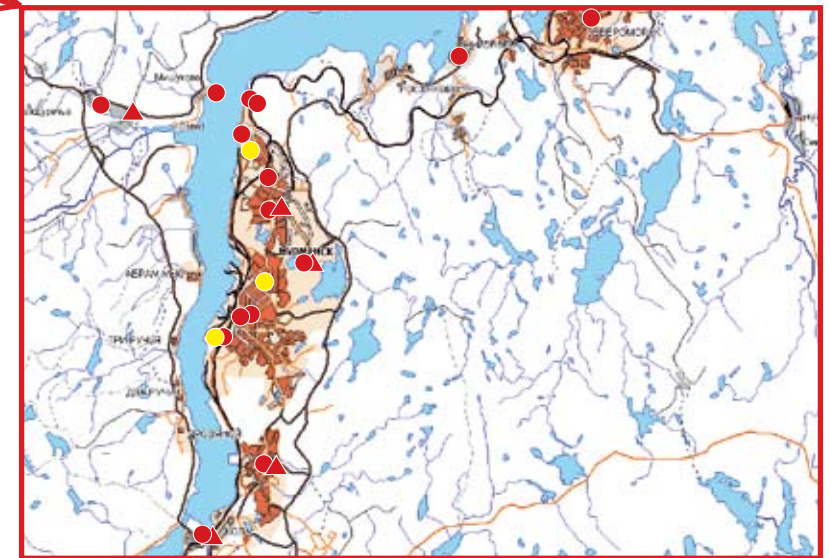
The first phase of the Murmansk territorial ARMS was commissioned in 2000. Radiation situation data are received from 18 monitoring stations (including stations in ZATO) automatically; data from the other stations are taken and transmitted manually. Information on the radiation situation is accumulated in MDHEM and is available through the Internet.

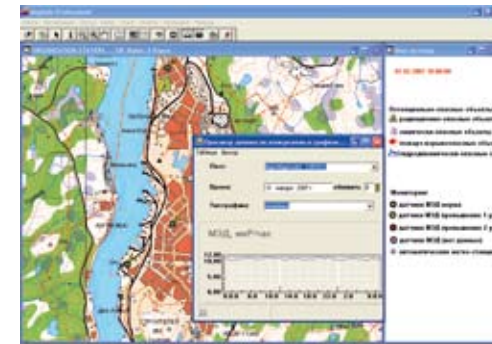
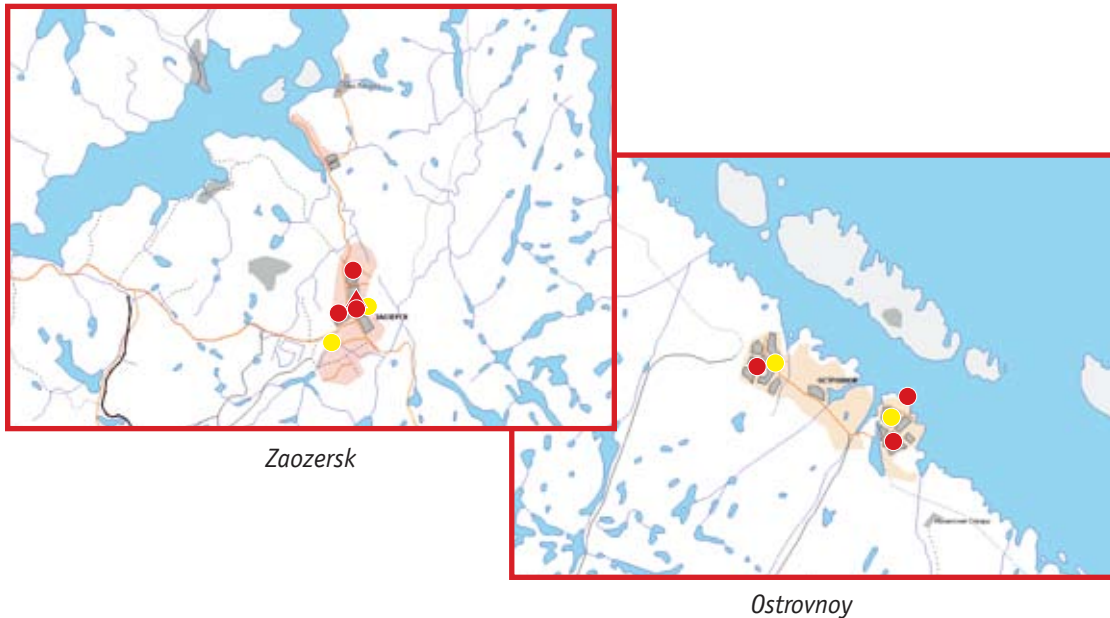


Location of ARMS monitoring stations in the Murmansk Region

- Old RM sensors
- New RM sensors
- ▲ New weather stations

Murmansk territorial ARMS provides on-line information about the radiation situation in the Murmansk Region, and provides information for regional and federal authorities, and for the population. Murmansk Department for Hydrometeorology and Environment Monitoring was appointed as the centre for acquisition, storage and primary analysis of monitoring information by the corresponding legal acts.





Display of radiation monitoring data by a special geoinformation system

## Works in the framework of the Project:

- installation of 23 automated stations for gamma-radiation dose rate monitoring in the territory of the region;
- installation of 9 automatic weather stations;
- installation of modern computer and communication equipment at MDHEM and at the local data acquisition centres of ZATO;
- development of the new and updating of the existing software of the system;
- integration of the two sensors at the boundary of FSUE "Atomflot" site into the system;
- integration of three sensors in closed administrative and territorial district (ZATO) Ostrovnoy into the system.

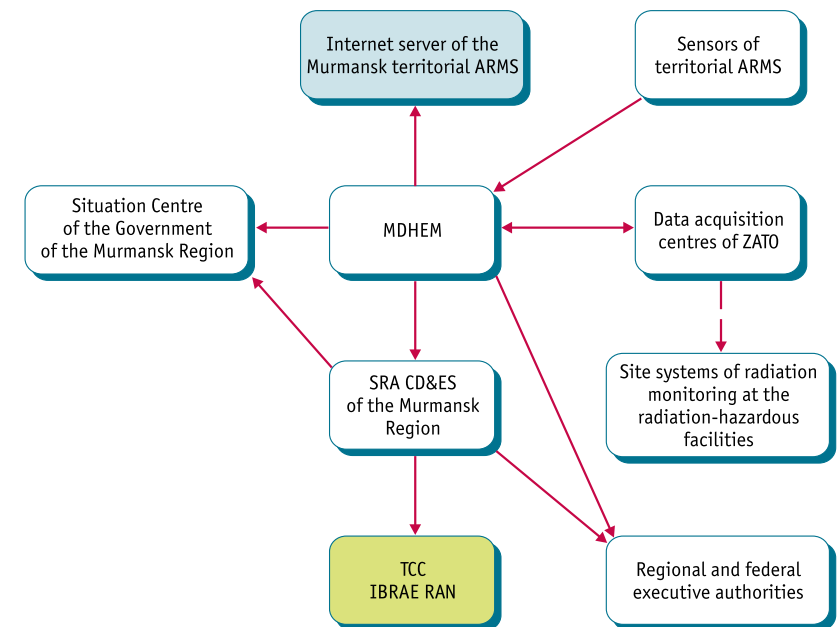


Diagram of data transfer within the territorial ARMS



# SITE RADIATION MONITORING SYSTEMS

## “NERPA” Shipyard



“Nerpa” Shipyard

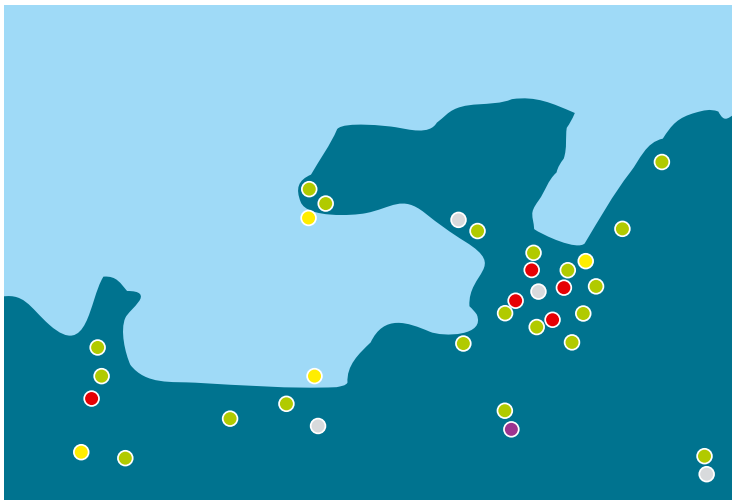


Diagram of location of the system sensors

---

Since 1995, “Nerpa” shipyard has been involved in scrapping of nuclear-powered naval ships.

The site radiation monitoring system is being created to monitor the radiation situation at FSUE “Nerpa” SY to ensure timely personnel protection in emergency in the areas of radiation hazardous activity conduct.

---

### *The system consists of the following elements:*

- 22 gamma-radiation dose rate sensors (●);
  - 2 sensors for detection of seawater radioactivity (●);
  - 2 sensors for detection of discharges radioactivity (●);
  - 5 units for detection of radioactive aerosols in special ventilation system (●);
  - 4 units for detection of content of radioactive materials in the air (●);
  - 1 automatic weather station (●);
  - computing system;
  - communication lines and local network.
-

## Reactor Compartment Temporary Storage Facility "Saida"



*Pier at the temporary storage facility of reactor compartments "Saida"*



*Diagram of location of the system sensors*

---

Reactor Compartment Temporary Storage Facility in Saida Bay (TSF RC "Saida") is used for floating storage of reactor compartments moored at four floating piers. There are 50 floating reactor compartments of decommissioned submarines of various types stored at TSF RC "Saida".

Currently a coastal site (long-term storage facility) for ground storage of one-compartment reactor units is under construction.

In the framework of the Project, the radiation monitoring system is being set up at the TSF.

---

### *The system consists of the following elements:*

- 4 gamma-radiation dose rate sensors (●);
  - 3 sensors for detection of seawater radioactivity (●);
  - 1 automatic weather station (●);
  - computing system;
  - communication lines and local network.
-

## Ostrovnoy Subsidiary of FSUE "SevRAO"



ZATO Ostrovnoy

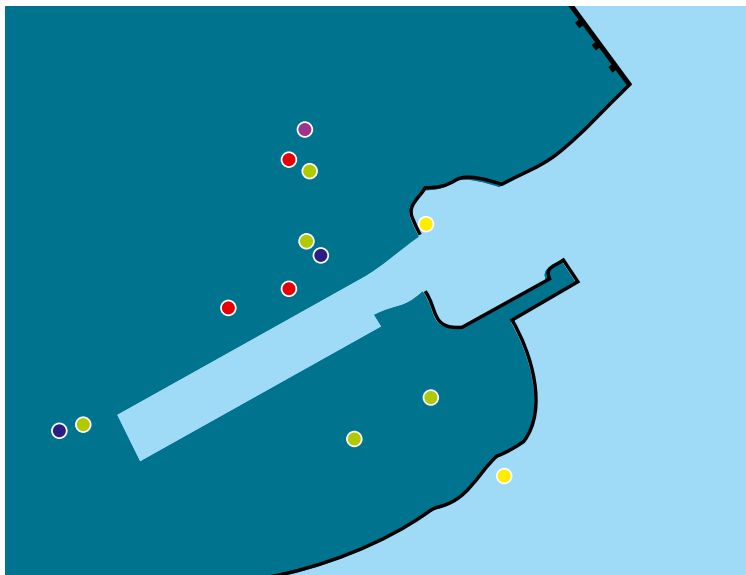


Diagram of location of the system sensors

---

Technical territory (the former naval coastal maintenance base in Gremikha) was constructed for maintenance of Russian nuclear submarines, unloading and storage of spent nuclear fuel, and storage of solid and liquid radioactive waste.

The constructed radiation monitoring system is an evolution of the existing site system.

The data from the radiation monitoring system will be transmitted to the Crisis Centre of FSUE "SevRAO" and to the Situation Crisis Centre of Rosatom.

---

### *The modernized system includes the following elements:*

- 5 gamma-radiation dose rate sensors (●);
  - 2 sensors for neutron radiation detection (●);
  - 2 sensors for detection of seawater radioactivity (●);
  - 3 units for detection of alpha- and beta-radioactive aerosols in special ventilation system (●);
  - 1 automatic weather station (●);
  - computing system;
  - communication lines and local network.
-



## Vicinity of Zaozersk Subsidiary of FSUE “SevRAO” System of Radiation Monitoring of ZATO Zaozersk



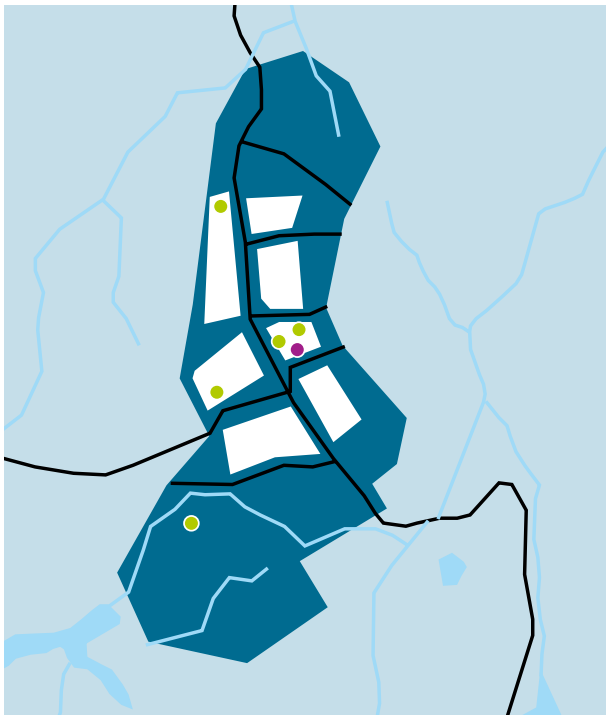
---

Zaozersk subsidiary of FSUE “SevRAO” is the former naval coastal maintenance base in Andreeva Bay, located in the Kola Peninsula in the Motovskoy Gulf of the Barents Sea. The base was used for storage of SNF and RW generated in process of NS operation. At the current time, the base is under the jurisdiction of Rosatom of Russia.

The site radiation monitoring system for this facility will be constructed in the framework of a separate Project.

ARMS Zaozersk is modernized in the framework of the current Project.

---



*Diagram of location of the system sensors*

---

### *The following additional elements will be installed:*

- 5 gamma-radiation dose rate sensors (●);
  - 1 automatic weather station (●);
  - computing system;
  - communication lines and local network.
-

## FSUE “Atomflot”

FSUE “Atomflot” was established in 1960 for maintenance and repair of civil nuclear fleet of Russia.

The facility carries out repair of reactor equipment, unloading, temporary storage and processing of LRW and SRW, storage and transportation of fresh and spent nuclear fuel; repair and storage of special rigging.

The site radiation monitoring system of the facility currently includes 8 gamma-radiation dose rate sensors (●), two units for monitoring of alpha- and beta-radioactive aerosols (●), two units for monitoring of air contamination (●), spectrometric sensor for monitoring of discharge waters contamination (●), and an automatic weather station (●). The system was set up in 2002-2004 in the framework of International AMEC program.

No new sensors will be installed in the framework of the current Project, but transmission of data from the sensors at the boundary of the site to the Centre of Information Acquisition and Processing of MDHEM will be organized in order to enhance the characteristics of territorial ARMS of the Murmansk Region.



FSUE “Atomflot”

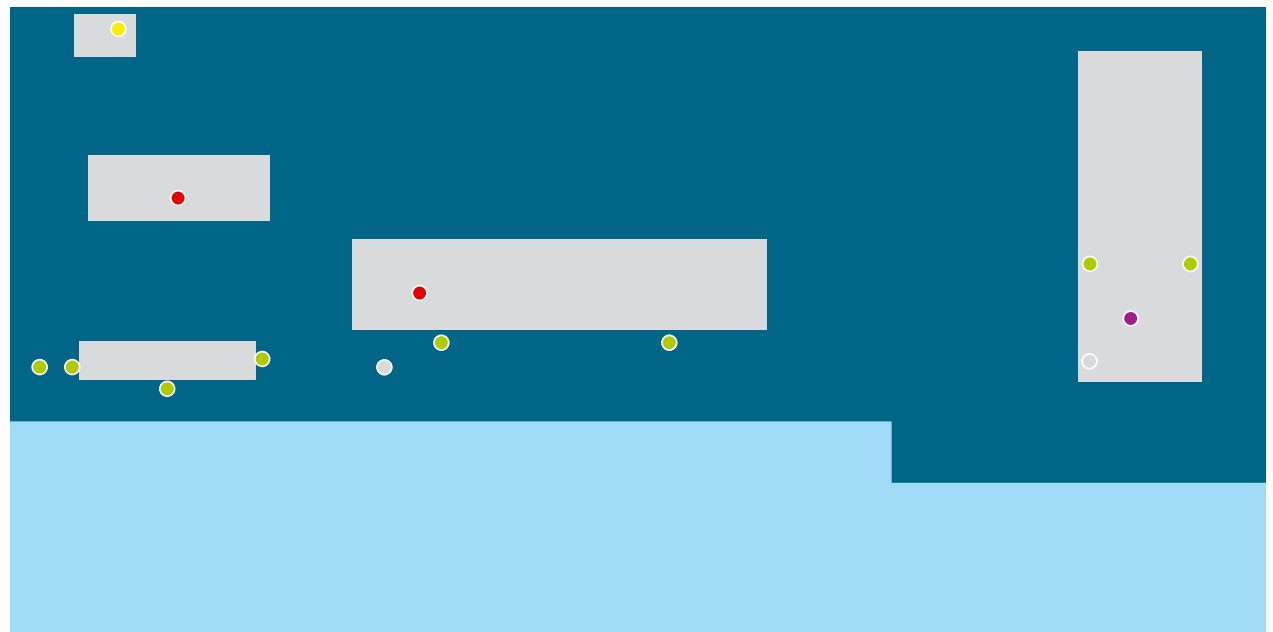


Diagram of location of the system sensors

## INTEGRATION OF ARMS OF KOLA NPP



*Kola NPP*



*Diagram of location of the system sensors*

25 gamma-radiation dose rate sensors of the Kola NPP ARMS are located in the 30-km control area. The measurement data are transmitted on-line to the Crisis Centre of “Rosenergoatom” Concern, SCC of Rosatom, and TCC of IBRAE RAN.

In 2006, in the light of implementation of the current Project, “Rosenergoatom” Concern proposed to organize exchange of radiation monitoring data between the Kola NPP and the Regional Crisis Centre.

This work is implemented separately from the Project.

It will include organization of transmission of data of Kola NPP ARMS to the Regional Crisis Centre. The data will be transmitted to the Centre of Information Acquisition and Processing of MDHEM.

At the same time, the personnel of NPP Crisis Centre will receive access to the measurement data of territorial ARMS of the Murmansk Region.

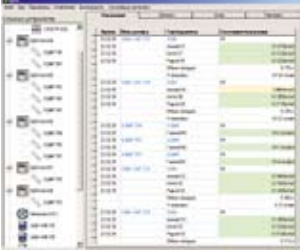
The current initiative is one of the possible directions of further development of the emergency response system in the Murmansk Region.

# SOFTWARE OF SITE RADIATION MONITORING SYSTEMS



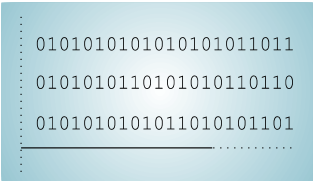
**Level of information presentation**

Display and analysis of data



**Data acquisition and storage level**

Acquisition of data, primary analysis, control of measurement equipment, storage of data in a data base. Export of data to other systems.



**Interface software level**

Interface software of measurement equipment



---

Software of site systems of radiation and environmental monitoring developed by ESAC IBRAE RAN includes programs of three levels. This division is used to separate various levels of information processing and location of program modules.

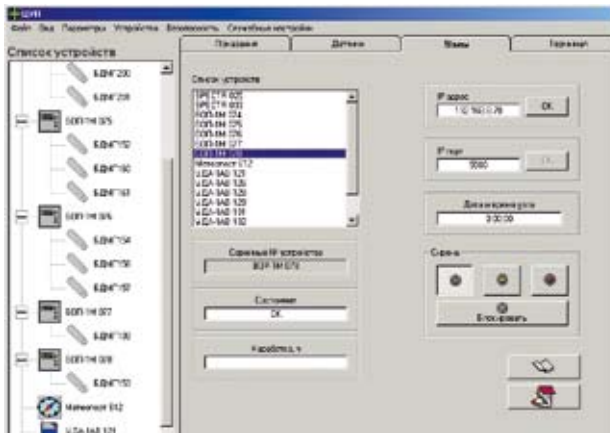
---

The software to display information is designed for the end users of the system: personnel of radiation safety services, management of the facilities, personnel of the on-duty dispatcher services, on-duty personnel of radiation monitoring stations.

## *Main functions:*

---

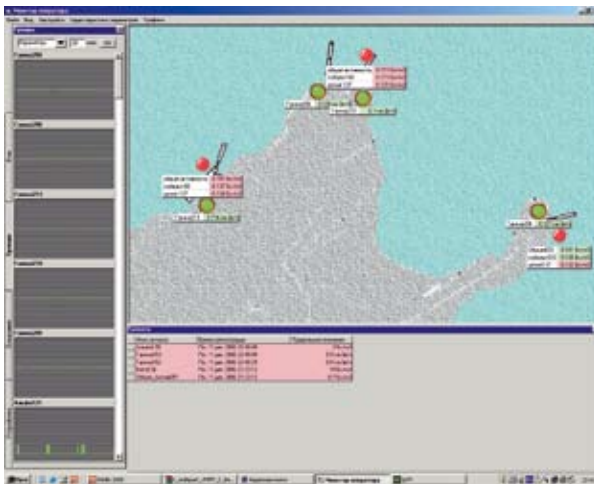
- display of the data of radiation monitoring at the facility in a real-time mode;
  - analysis of data, including display of dynamics of sensor readings;
  - alarms indicating out of range sensor readings.
-



Changing sensor settings

Level of interface software includes program modules used with specific types and models of measurement equipment. Generally, program modules are developed by the manufacturers of the equipment and are used with special controllers.

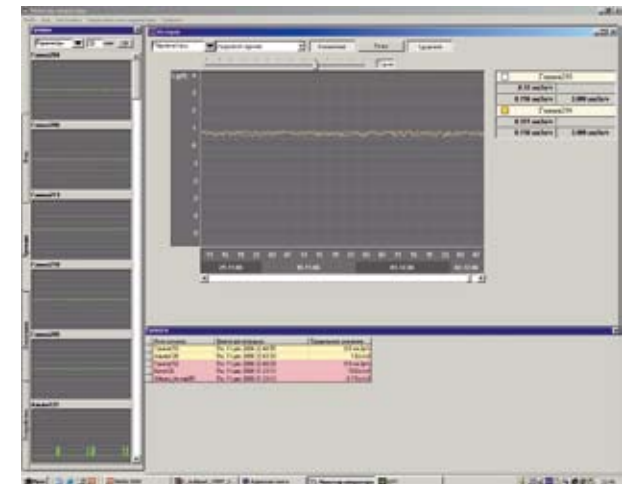
Intermediate level software is used for acquisition and storage of radiation monitoring data. It also includes the tools for setup of measurement equipment and export of data to other systems. The data is stored in a single database.



Viewing on-line data of the system

Время	Имя устройства	Панель/команда	Состояние/результат	Счетчик/результат
00:23:40	МДМ-118-121	Авария	OK	0107 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0108 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0109 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0110 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0111 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0112 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0113 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0114 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0115 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0116 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0117 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0118 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0119 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0120 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0121 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0122 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0123 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0124 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0125 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0126 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0127 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0128 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0129 S-4-S
00:23:40	МДМ-118-121	Авария	OK	0130 S-4-S

Sensor data report



Viewing measurement history of one of the sensors



# MOBILE RADIATION SURVEILLANCE LABORATORIES



---

Mobile radiation surveillance laboratories (MRL) are designed for operative radiation surveillance duties in case of radiological emergencies.

---

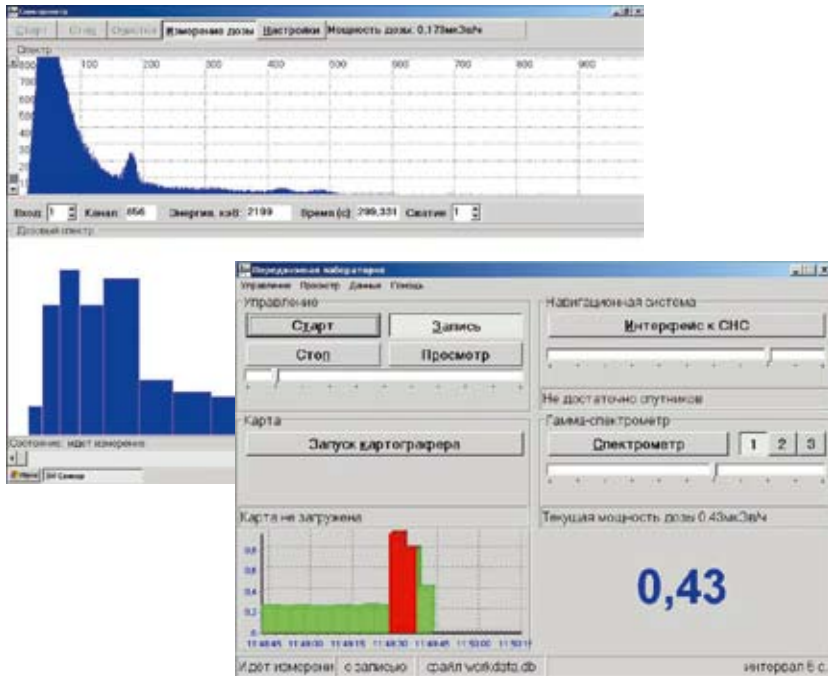
## Capabilities:

- detection and localization of radioactivity sources and contamination;
- sampling and express-analysis of soil, air and water samples;
- determination of the characteristics of contamination;
- mapping of the boundaries of contaminated areas;
- transmission of measurement data to crisis centres in a real-time mode.

*Two mobile laboratories are supplied to FSUE "SevRAO", and two more to the Regional Crisis Centre of the Murmansk Region.*

---

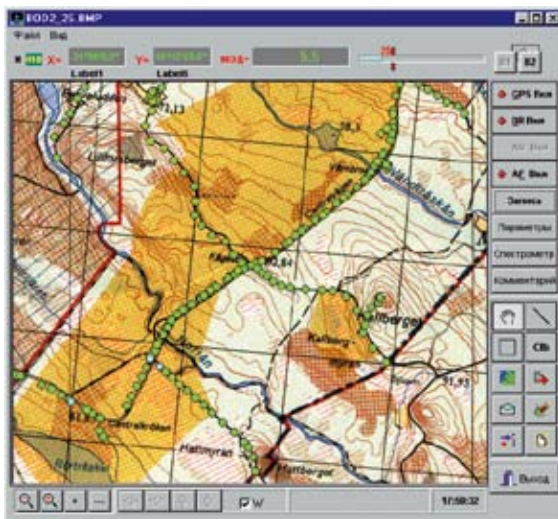




Display of measurement data

**MRL equipment includes:**

- measurement equipment – stationary and portable gamma-spectrometer installations, dosimeters, alpha-, beta-, and gamma-radiometers, sampling equipment;
- computer and communication equipment – Inmarsat satellite terminal, cellular telephone communications, VHF radiostation, GPS satellite navigation system, industrial computer and an auxiliary laptop, photo and video equipment;
- specialized software;
- auxiliary equipment – vehicle power supply system, including petrol generator, and adaptation of the equipment to climatic conditions;
- working clothes and deactivation equipment.



Display of dose rate measurements along the route



Back compartment



Operator workstation. Measurement and communication equipment

# PERSONNEL TRAINING

## Directions of activities:

- advanced training of the management and personnel of crisis centres in emergency response to radiation accidents;
  - training of the personnel of the crisis centres to act in case of emergency taking into account the system established in the framework of the current Project;
  - training of experts in working with information and software supporting decision-making on emergency response actions;
  - training of technical personnel in operation of the equipment.
- 



## Forms of training:

- holding specialized lecture courses;
  - practical training in the use of equipment;
  - practical application of separate elements of emergency response activities using computer simulators;
  - holding situation trainings;
  - organization of a comprehensive emergency response exercise.
-

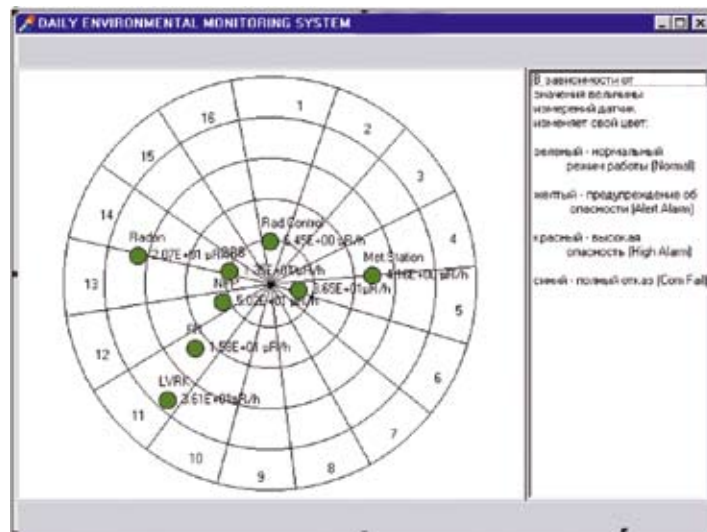
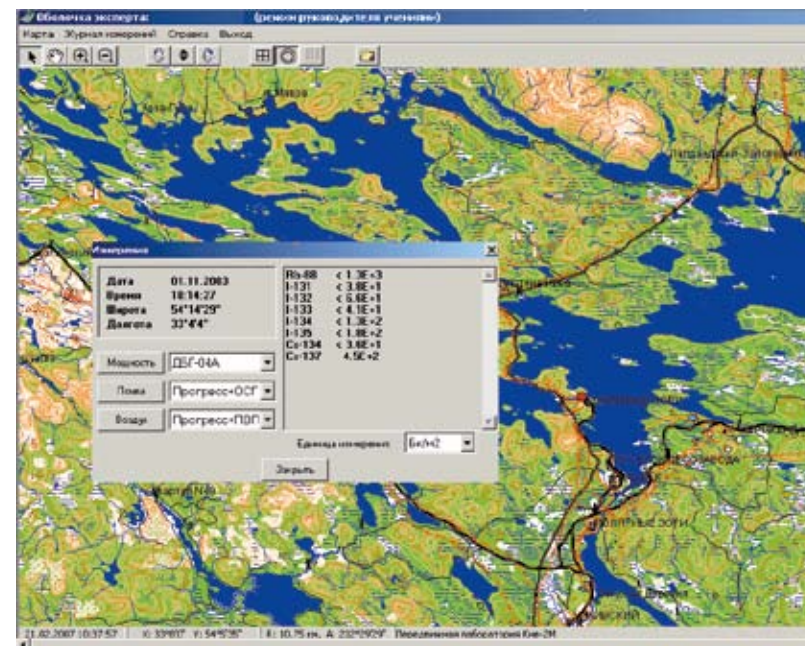
## Emergency response exercise:

### Goals:

- working out of the procedures of notification, interaction, information exchange, assessment of the accident consequences, development of recommendations on population protection and provision of scientific and technical support from SCC of Rosatom and TCC IBRAE RAN;
- testing of the system established in the framework of the Project.

### Participants:

Government of the Murmansk Region, FSUE "SevRAO", SRA CD&ES FS of Murmansk Region, MDHEM, MD of EMERCOM of Russia, SCC of Rosatom, TCC IBRAE RAN, SPA "Typhoon".



### Computer systems for training and exercises:

- computer simulator of radiation situation assessment by mobile radiation surveillance teams;
- computer simulator to train ERT field teams in following the instructions in case of emergency related to radioactive materials transportation;
- computer simulator of ARMS data in case of radiological accidents.



## PROJECT PARTICIPANTS



*SJSC SPF "Doza"*



*CJSC "Altair"*



*"TechnoSentr service" Ltd*



*FSUE "Atomflot"*



*SPC "Aspect"*



*FSUE "Emergency Technical Centre  
of Rosatom" (St.-Petersburg)*



*SPA "Taphoon"*



*STC "RION"*



*FSUE "SCC of Rosatom"*



*CJSC "PeterStar"*



*"Hited" Ltd*



*Murmansk Subsidiary of  
"Mobile TeleSystems" OJSC*



*Murmansk Subsidiary of  
OJSC "North-West Telecom"*



*"Information Centre  
"Telecom Service" Ltd*



*CJSC "Souztechnoproekt"*



*"AvtoLIK" Ltd*



*CJSC "RIEM-division"*

*"Construction Company  
"Vek" Ltd*



*FSUE FCGS "Ecology"*

District administrations of the Murmansk Region and local authorities of Zaozersk, Ostrovnoy, Snezhnogorsk and Severomorsk ZATO assist in the Project realization