

**Plan of activities and budget of the Radioactive Waste Repository
Authority for 2009 and three-year and long-term plans**

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1. INTRODUCTION

1.1. Mission and principles of the Radioactive Waste Repository Authority

According to Article 26 of the Act No.18/1997 Coll., on the peaceful uses of nuclear energy and ionizing radiation (the Atomic Act) and on amendments to further legislation, the Radioactive Waste Repository Authority (RAWRA) was established by the Ministry of Industry and Trade (MIT) as a State organization. Since 1 January 2001, according to the Act No. 219/200 Coll., on the property of the Czech Republic and on its acting as a legal entity, as amended, RAWRA is an organizational part of the State. RAWRA's mission is to provide for the safe disposal of radioactive waste originated so far, in compliance with requirements of nuclear safety and the protection of the general public and the environment¹.

Annual, three-year and long-term plans are submitted for approval to the Government through the Ministry of Industry and Trade (MIT), in compliance with the provisions of Article 30, paragraph 1a) and 1b) of the Atomic Act. RAWRA's Supervisory Board (the Board) recommends the minister to submit the aforementioned plans to the Government according to Article 29, paragraph 5b) of the Atomic Act. RAWRA's activities are supervised by the Board, the members of which are nominated by the Ministries of Industry and Trade, Finance and Environment, the principal generators of radioactive waste, the municipalities in which repositories are located as well as by the general public. The Board supervises RAWRA's economical and efficient utilization of funds for activities organized and carried out by RAWRA. RAWRA is funded from the nuclear account, which consists of compulsory contributions from radioactive waste generators which is part of the State budget.

1.2. Current situation in the area of radioactive waste (RW) disposal

Short-lived, low level waste (LLW) and intermediate level waste (ILW) represent the vastest class by volume. They are produced in both liquid and solid form during the operation and decommissioning of nuclear reactors and as a result of the various uses of ionizing radiation sources. Their radioactivity decreases within a period of a few hundred years and, therefore, they can be disposed of in near-surface repositories. In the Czech Republic, the waste treatment and conditioning technologies, prior to the final disposal, are sufficiently elaborated and successfully implemented.

LLW from the nuclear power industry is disposed of in a near surface repository located in the area of the Nuclear Power Plant (NPP) Dukovany. The total disposal volume amounts to 55 000m³ (approximately 180 000 drums) and is large enough for the disposal of all waste from both the Dukovany and Temelín NPPs, even in the event that the operation of those plants were extended to 40 years.

LLW generated by industry, research and medicine is disposed of at the Richard (near Litoměřice) and Bratrství (near Jáchymov) repositories. If required, the Dukovany repository could also be utilized for such waste.

The Richard repository is located in the former limestone mine known as Richard II (under the Bídnice hill). Institutional waste has been disposed of at this site since 1964. The total volume of the underground chambers exceeds 17 000 m³, the waste disposal capacity making up roughly half this volume (the remaining space is taken up by service corridors). Based on knowledge obtained by hydrogeological, geo-engineering, geotechnical and seismic monitoring, construction expert opinions, and the present condition of the waste packages, it can be stated that in the long

¹ Article 25 of the Act No.18/1997: Under the conditions stipulated by this Act the State vouches for the safe disposal of all radioactive waste, including the monitoring and inspection of repositories after their closure

term all the various requirements concerning radiation protection and nuclear safety have been fulfilled in their entirety.

The Bratrství repository is devoted exclusively to the disposal of waste containing natural radionuclides. Reconstruction of the haulage tunnel of the former uranium mine provided 5 chambers, with a total volume of approximately 1 200 m³, suitable for disposal. The repository, put into operation in 1974, is situated in saturated crystalline rock which required the construction of an efficient drainage system. Water from the repository is constantly monitored. Safety analyses have consistently confirmed the long-term safety of the repository.

RAWRA is responsible for the operation and monitoring of all the Czech Republic's repositories, including the recently closed Hostim repository, in compliance with respective SÚJB (the State Office for Nuclear Safety) permits and mining permits where relevant. At the present RW accumulation rate, the repository capacity should be sufficient for the next several decades. Construction of new repositories is not foreseen; rather the capacity of existing repositories will be maximized and the Richard repository extended if deemed necessary.

A limited amount of LLW and ILW is produced which is not acceptable for disposal in near surface repositories. Requirements for methods and quality of conditioning such waste are specified to comply with requirements for storage and subsequent disposal into deep geological repository (DGR). This waste is presently stored either by the generator or by RAWRA.

High-level waste (HLW) and spent nuclear fuel (SNF), after it has been declared as waste, cannot be disposed of in existing repositories and, it is assumed that such waste will also finally be disposed of in a DGR. Prior to the commissioning of a DGR, such waste is stored by the generator. The Concept of Radioactive Waste and Spent Nuclear Fuel Management in the Czech Republic (the Concept) requires that two candidate sites for the construction of a DGR be included in regional plans by 2015. In the past, following a thorough assessment of the whole of the Czech Republic, 6 sites have been selected and preliminary characterization studies conducted. However, at all 6 sites public opinion is opposed to DGR construction and consequently geological exploration at these sites has been suspended until at least 2009. Nevertheless, these sites have been included into the Regional Development Policy approved by the Government (Government Decision No. 561 of May 2006, updated in 2008). Further geological studies are possible only on the basis of specification of relevant investigated areas. Communities from the Lubenec area agreed tentatively with in-situ studies.

2. LLW/ILW DISPOSAL

2.1. Operation of the Dukovany radioactive waste repository

The repository is operated by RAWRA on the basis of a contract with ČEZ (the Czech Power Company), in compliance with Article 26 of the Atomic Act. The receipt of waste, as well as certain inspection activities, is provided directly by RAWRA. RAWRA expects that in 2009 approximately 500 m³ of processed LLW/ILW from the Dukovany and Temelín NPPs will be received for disposal. The repository will be operated in such a way that it will be possible to receive RW for disposal on a continuous basis. As a part of common operation, buildings and equipment are inspected annually and the operational maintenance of buildings, land, machinery and electrical equipment carried out when required. Radiation protection, security, emergency preparedness, and nuclear safety are secured constantly.

2.2. Operation of the Richard and Bratrství repositories

Both the Richard and Bratrství radioactive waste repositories are operated by RAWRA in compliance with the respective permits issued by the SÚJB and ČBÚ (the Czech Mining Office). In 2009, RAWRA will accept a total of approximately 90 m³ of processed LLW/ILW at the two

repositories. In 2009, it is foreseen to perform works to secure safe management of radioactive waste disposed in these repositories. The works will consist of common operation and maintenance in both repositories, provision of radiation protection, physical security, emergency preparedness, and nuclear safety. Furthermore, completed will be restoration and repairs in the Richard access area. Similarly to the past practice, monitoring of the closed repository Hostim will continue in 2009. In addition, based on approved plans, refurbishment of the gatehouse and workshops will start.

3. DEVELOPMENT OF A HLW AND SNF DEEP GEOLOGICAL REPOSITORY (DGR)

3.1. DGR site selection

The Concept requires that two candidate sites be included in regional plans by 2015. A general outline of the project (not taking into consideration the specific requirements of individual sites) has already been proposed and expertly assessed. The choice of potential sites for a deep geological repository was made according to a comprehensive assessment of all the relevant technical criteria and requirements. Detailed information about site selection has been a part of previous Authority's documents. Currently, public opinion at all the prospective sites is predominantly against the deep repository construction. For this largely negative public attitude, RAWRA has suspended geological work at all the sites until 2009. It was expected that this delay would provide place to find mutually acceptable conditions between the State and the communities, which will allow the continuation of geological exploration. At the Lubenec site, provided that other requirements are fulfilled, RAWRA has obtained a preliminary approval for later investigative works. In May 2006, the Government approved, by means of Decision No. 561, the Regional Development Policy of the Czech Republic which should have been updated in 2008. Potential sites for a deep geological repository are included in this document.

3.2. Assessment of military domains

From the standpoint of deep repository siting, RAWRA will examine sites where geological criteria will be fulfilled and where, simultaneously, more favorable conditions may exist in view of repository implementation and the relative public attitude. In this context areas of military domains will be evaluated. In the Czech Republic, the Ministry of Defense operates military domains in Hradiště, Brdy, Boletice, Březina and Libavá. Studies of selected sites will include search of existing geological information, analyses of satellite and aerial images, re-interpretation of existing geophysical data, and in-situ verification of several geophysical profiles. In the case of acceptable geological conditions, suitable site for location of repository surface area will be defined and a preliminary study of construction feasibility prepared. Completion of these studies is expected by 2011 (see Appendix).

3.3. Design and research activities

The DGR program comprises preparation of a general design, including proposals for, and the verification of, the long-term behavior of engineered barriers (disposal containers, sealing and backfilling materials). Despite the expected maximum use of international experience, necessary knowledge is obtained from domestic research. Thanks to the participation of Czech institutions in projects of the 6th and 7th EC general plan for science and research and thanks to various bilateral contacts and international cooperation, the effective gathering of knowledge is enabled and the development of domestic research firmly established. It is intended that international cooperation will be maintained in future, as well.

In addition to a geological repository development program, RAWRA supports, in compliance with Article 26, paragraph 3g) of the Atomic Act, ongoing research and development connected with radioactive waste disposal. In compliance with specific aims set out in the Concept, RAWRA supports the involvement of research institutions in the development and application of new technologies for handling RW and reprocessing of spent nuclear fuel.

4. MANAGEMENT, TECHNICAL, LEGAL, AND ADMINISTRATIVE ACTIVITIES

In addition to the responsibilities outlined above, RAWRA also provides for a number of other activities either directly connected with RAWRA's objectives or as a consequence of binding regulatory requirements. Concerned is, above all evidence of received radioactive waste and nuclear materials, assurance of relevant SÚJB permits, administration of payments to the nuclear account, supervision of licensee reserve funds for the decommissioning of their facilities, public relations, international cooperation, and duality assurance.

In 2008 RAWRA has a total of 38 employees including those involved in physical security at the Richard and Bratrství repositories. In 2009 planned is reinforcement by two employees in the IT area (presently only one employee) and the area of communication and international cooperation.

Since the end of 2000, RAWRA's headquarters have occupied one floor and part of the ground floor and basement of the Ministry of the Interior building in Dlážděná Street, Prague 1, No.1004. For its activities, RAWRA is provided with office equipment and transportation means.

5. RAWRA BUDGET FOR 2009

The under mentioned budget is proposed such as to cover RAWRA's 2009 expenditures. Detailed budget has been debated at the 56th Authority Board meeting.

Budget item	Item	Budget 2009 (thousands CZK)
	EXPENDITURES	
5	CURRENT EXPENDITURES	73 900
501	Salaries	14 860
502	Other payments for work done	1 700
503	Mandatary insurance paid by the employer	5 797
5342	Transfer of own funds	208
6	CAPITAL EXPENDITURES	38 600
61	Investments acquisition and related expenditures	38 600
	total expenditures	112 500
	INCOME	
411	Non-investment subsidies obtained from the public budget at central level - income from the nuclear account	63 400
421	Investment subsidies obtained from the public budget at central level - income from the nuclear account	38 600
	Funding from the state budget, through the MIT section (section 322)	10 500
	total income	112 500

Expenditure distribution into individual Authority's activities is given below. Current expenditures include above all repository operation costs inclusive a subsidy for nearby communities according to Article I, paragraph 54 of Act 13/2002 and in compliance with

Government Decrees No. 416/2002 and 46/2005, with a projection of increase for 2009. In addition, covered are Authority's expenditures for administrative managerial activities. Capital expenditures are intended for repository refurbishment and for research and development works in relation to development of a deep geological repository.

Item	Current expenditures (thousands CZK)	Capital expenditures (thousands CZK)
RW repository Dukovany	19 700	3 100
RW repositories Richard and Bratrství	26 250	4 200
DGR development	3 850	30 500
Administrative managing expenditures	24 100	800

6. FULFILMENT OF GOVERNMENT DECISIONS

RAWRA's budget for 2008 and its plan of activities were approved by Government Decision No. 1430 of 7 November 2007. RAWRA's 2008 performance will be presented in the Annual Report to be submitted to the Government for approval in the first half of 2009.

7. THREE-YEAR PLAN

7.1. LLW/ILW disposal

The plan for the period 2009 - 2011 is based on the current situation vis-à-vis the operation of repositories presented above and on the long-term plan outlined in Chapter 9. This chapter provides summary information and assumed income and expenditure for the period 2009 - 2011.

7.1.1. Radioactive waste repository Dukovany

The repository will continue to be operated by ČEZ. RAWRA's activities involve the receipt of radioactive waste at the repository (the fulfillment of acceptance criteria) and planning of repository repairs and maintenance so that it conforms to the requirements of respective legislation. Repository operation is seen as stable and safe in the long term. RAWRA does not foresee any unduly high extent of repair or reconstruction in the immediate future. Expenditure required for providing the safe operation of the Dukovany repository, including partial repairs, is expected to amount to approximately CZK 19 million per year.

7.1.2. Radioactive waste repositories Richard and Bratrství

The operation of these repositories will be provided by both, RAWRA and sub-contractors. Activities necessary for repository safe operation will continue as planned and besides, foreseen is completion of the entrance hall reconstruction at the Richard repository. With regard to existing mining legislation and ongoing geotechnical monitoring, no serious difficulties are foreseen in the operation of these underground works. For repositories Richard and Bratrství, design, preparatory and realization works will continue on final closure of individual filled repository chambers. Expenditure on the current operation of these repositories, including work on the disposal chambers, is expected to be CZK 20 million per year; the cost of completing reconstruction work and repairs is estimated at CZK 12 million over the next three years.

7.2. HLW/SNF disposal

Studies on new sites in military domains, started in 2008, will continue.

The geological exploration required for the detailed characterization of potential DGR sites was suspended in 2005 due to the predominantly negative attitude of the general public to future DGR construction. Such work is likely to resume after 2009 only at those sites where RAWRA would obtain the approval from the local communities involved, and the necessary survey permits (investigation area).

The aim of design and technical activities will be to obtain other information about the behavior of engineered barriers in order to provide background for more detailed specification of the disposal system proposed in the deep repository reference design. Further work will take place on the safety assessments and analyses, including feasibility studies of a deep repository.

Associated research and development studies will concentrate on development of new technologies, possibly on implementation of new technological procedures for conditioning of existing waste. To this group of studies belongs development of transmutation technologies.

The financing necessary for the geological exploration involved in the selection of a suitable site will be finally determined as work progresses; budgets for the various activities are presented in the respective documentation.

7.3. Anticipated nuclear account income and RAWRA's expenditure for 2009 - 2011

7.3.1. Anticipated nuclear account income

Nuclear account income is made up of mandatory contributions from ČEZ and other waste generators stipulated in Government Decree No. 416/2002, as well as revenue accruing from the investment of nuclear account assets in the financial market. Investments are administered by the Ministry of Finance.

Item	2009 (thousands CZK)	2010 (thousands CZK)	2011 (thousands CZK)
ČEZ delivery	1 355 000	1 355 000	1 355 000
Other deliveries	5 000	5 000	5 000
Revenue from investments	325 000	345 000	365 000
Total	1 685 000	1 705 000	1 725 000

7.3.2 RAWRA's anticipated expenditure

Year	Item No.	Item	Total (thousands CZK)
2009	5	Current expenditure	73900
	6	Capital expenditure	38600
		TOTAL EXPENDITURE	112500
2010	5	Current expenditure	77000
	6	Capital expenditure	42500
		TOTAL EXPENDITURE	119500
2011	5	Current expenditure	79000
	6	Capital expenditure	44500
		TOTAL EXPENDITURE	123500

8. THE LONG-TERM PLAN

The long-term plan is based on the Concept of radioactive waste and spent nuclear fuel management in the Czech Republic, which sets out more precisely the milestones involved in the development of a deep geological repository in the Czech Republic. This repository should be put into operation in 2065 and should be capable to accept all categories of radioactive waste.

8.1. LLW/ILW disposal

RAWRA will continue to provide for the operation of all the Czech Republic's LW repositories (Dukovany, Richard and Bratrství) as well as for the monitoring of the recently closed Hostim repository in conformance with respective SÚJB permits and, in the case of underground works, also mining permits. At the present rate of RW production, the capacity of these repositories is sufficient for the next several decades. The construction of new LLW/ILW repositories is not anticipated because of optimum utilization of existing capacities. The gradual closure of disposal chambers at the Richard and Bratrství repositories will continue; following closure of all the chambers, future operational strategy will depend on an overall assessment of LLW/ILW waste disposal system and on the anticipated production of RW.

Repository operational costs are expected to amount to approximately CZK 40 million per year and will be specified more precisely on a year-by-year basis. A state subsidy is expected to finance the safe operation of the Richard and Bratrství repositories in compliance with the Atomic Act.

8.2. HLW/SNF disposal

In order to fulfill the aims of the Concept that two potential sites must be included in regional plans by 2015, the only limiting factor is the approval of the general public at the relevant sites. . Provided that geological survey work is allowed to commence after 2009, there should be enough time to collect sufficient data in order to allow the identification of a suitable site by 2015 and more precise characterization of geological setting at these sites. Detailed characterization should start after 2015. Before geological exploration can commence, it is essential to identify the survey areas (agreed by the Ministry of the Environment). Completion of site investigation studies at more than two sites enables to optimize site selection in view of technical criteria.

8.2.1. Site characterization stage (2010 - 2018)

Geological studies in this stage will be carried out at specified survey areas. In order to fulfill the aims of the Concept of radioactive waste and spent nuclear fuel management, the suitability of two potential DGR sites has to be verified, while the work will be appropriately optimized. Geological studies include verification of the depth capacity of the granite body, geological mapping, areal geophysical investigations, drilling, logging, detailed geophysical investigations, and so on.

Design activities will include design studies of DGR dislocation at investigated sites (incl. its surface area and access routes). Selection of materials for engineered barriers will consist of development of methodologies and experimental equipment for testing, possibly of sample preparation for testing. By 2012 RAWRA will fix an actualized plan of a DGR together with its complete safety assessment.

8.2.2. Inclusion of candidate sites in regional plans

In sites assessed by the geological survey as suitable for the siting of a DGR it will be necessary to restrict their uncontrolled use and conduct of uncontrolled technical and, above all, drilling activities. To this purpose protected areas for “special intervention into the Earth’s crust” according to Act 44/1988 (the Mining Act), as amended, will be declared. Declaration of a protection area is foreseen at two sites, which will be characterized in accordance to the plan of geological investigations.

8.3. Anticipated income and expenditure

8.3.1. Anticipated income

Nuclear account income is made up of payments by ČEZ and other waste generators, as stipulated by Government Decree No. 416/2002, and returns on the investment of surplus funds. Since the commissioning of the Temelín NPP, ČEZ’s annual payments to the nuclear account amount to approximately CZK 1.3 billion. With increasing nuclear account property will increase the income obtained from the investments of nuclear account financial means. RAWRA is required to carefully monitor payments into and withdrawals from the nuclear account and used assumptions for payments determination. According to today Administration’s calculations, the present payments of CZK 50 per MWh produced by nuclear power plants are sufficient in the run of several years.

8.3.2. Anticipated expenditure

Annual expenditure on the LLW/ILW repositories (Dukovany, Richard and Bratrství) do not exceed CZK 45 million per year. These cover disposal, maintenance of land, buildings, equipment and the underground areas (Richard and Bratrství), radiation protection, security, fire service, emergency preparedness, and the monitoring of impacts on the environment.

Radioactive waste repositories were in operation for several decades before the Atomic Act came into force during which time no reserve funds were accumulated for future related expenditure (i.e. decommissioning and closure). Hence the state provides funding for handling such radioactive waste.

Substantial expenditure on the actual construction, operation and closure of a DGR, the conditioning of spent nuclear fuel into a form suitable for disposal and on the final disposal of spent nuclear fuel and high-level waste will commence no earlier than 2050. Expenditure on the DGR preparation stage (to 2015) is estimated at approximately CZK 550 million at 2008 price levels (comprising expenditure on the design of the DGR and geological studies).

9. APPENDIX: EVALUATION OF MILITARY DOMAINS FOR DEEP GEOLOGICAL REPOSITORY SITING

From the standpoint of deep repository siting at the territory of the Czech Republic, areas of military domains will be evaluated. The Ministry of Defense operates military domains in Hradiště, Brdy, Boletice, Březina and Libavá.

The following Table provides preliminary evaluation of geological situation at the individual military domains in view of potential repository siting.:

Military domain	Area (hectares)	Geological conditions
Hradiště	33 161	Volcanic rocks, seismically unstable region, proximity to mineral and healing water sources
Brdy	26 009	Complex of permeable and semi-permeable sedimentary rocks, two small granite bodies
Boletice	21 953	Granitic rocks and a large granulite body (metamorphic granite)
Březina	15 817	Complex of permeable and semi-permeable sedimentary rocks, partially tectonically disturbed
Libavá	32 724	Complex of permeable and semi-permeable sedimentary rocks with tectonic disturbances, potential proximity to mineral water sources

From the existing geological settings and from the geological maps it can be supposed that suitable geological media for repository siting within a military domain can be found. In case of stretching outside the military domain, it may be technically solvable to retain all repository surface buildings and technical works on underground openings within the military domain area. This means that possible conflicts of interest could be avoided by technical means. Geological conditions of repository siting have to be considered potentially suitable. Inclusion into the list of potential sites requires performing such site investigations, which would correspond to the studies carried out at other sites. For final assessment of military domains participation of Ministry of Defense is necessary.

Extent of studies and time schedule for inclusion into the list of potential sites

Step	Realization deadline	Cost estimate (thousands CZK)
Search of existing geological information	2008-2009	1 200
analyses of satellite and aerial images, re-interpretation of existing geophysical data, and in-situ verification of several geophysical profiles, confirmation of site suitability	2009	4 800
Definition of a suitable site for repository surface area and a preliminary study of construction feasibility	2009-2010	3 000