



EUROPEAN
COMMISSION

Community research



WORKING PAPER

**Identifying remaining socio-technical challenges at the
national level: Czech Republic**

(WP 1 – MS 4)

**Author(s): Karel Svačina and Zdeněk Konopásek
(Center for Theoretical Study, Charles University, Prague)**

Date of issue: 14/05/2012



Contents

<u>INTRODUCTION</u>	1
<u>1 DESCRIPTION OF CURRENT STATE OF AFFAIRS</u>	2
1.1 NUCLEAR POWER IN THE CZECH REPUBLIC.....	2
1.2 INSTITUTIONAL BACKGROUND	3
1.3 DEALING WITH RADIOACTIVE WASTE AND SPENT NUCLEAR FUEL	4
1.4 A HISTORY OF GEOLOGICAL DISPOSAL PLANNING IN THE CZECH REPUBLIC.....	5
1.5 GOVERNMENT POLICY ON HIGHER ACTIVITY, LONGER-LIVED WASTES (HLW) AND SPENT FUEL.....	7
1.6 THE TECHNICAL RESEARCH, DEVELOPMENT AND DEMONSTRATION (RD&D) PROGRAMME ON THE LONG-TERM MANAGEMENT OF HLW AND SNF AND THE CONSTRUCTION OF GEOLOGICAL DISPOSAL.....	9
1.7 THE FORMAL OR INFORMAL ROLE AND ACTIVITY (OR INACTIVITY) OF CIVIL SOCIETY STAKEHOLDERS.....	10
1.7.1 NATIONAL AND LOCAL NON-GOVERNMENTAL ORGANIZATIONS.....	10
1.7.2 THE WORKING GROUP	12
1.8 THE CURRENT ROLE OF AFFECTED OR POTENTIALLY AFFECTED COMMUNITIES.....	12
<u>2 OVERVIEW OF PREVAILING SOCIO-POLITICAL CHALLENGES</u>	14
2.1 THE SITE SELECTION PROCESS	14
2.2 SPLITTING THE SOCIAL FROM THE TECHNICAL	16
2.3 THE CURRENT FORM OF PUBLIC PARTICIPATION	17
2.4 THE INSTABILITY OF PUBLIC INSTITUTIONS	19
2.5 THE COUNTRY'S ENERGY POLICY	20
<u>3 IDENTIFYING SIGNIFICANT SOCIO-TECHNICAL CHALLENGES</u>	22
3.1 ABSENCE OF THE TECHNICAL?	22
3.2 HIERARCHIES AND TIMING OF THE SOCIAL/TECHNICAL	23
3.3 "NATURAL CONDITIONS" VS. "ENGINEERED BARRIERS"	24
3.4 POLITICAL MACHINERIES	25
3.5 TO SUM UP	26
<u>REFERENCES</u>	27

Introduction

This report describes the history, recent developments and the current situation of the management of highly radioactive waste and spent nuclear fuel in the Czech Republic, with a particular focus on the development of geological disposal for this kind of waste. Special attention is given to the interplay of social and technical aspects of the process. The first chapter gives an overview of the state of affairs and sketches out the trajectories leading to it. The institutional background, legislative framework and relevant government policies, as well as the role of affected communities and other civil society stakeholders are considered. The second chapter tries to identify the main socio-political challenges that the process of geological disposal development is currently facing. By socio-political challenges we mean problems and obstacles that complicate the negotiations between the implementer and other relevant groups, be it other state institutions, municipalities, or NGOs. The third chapter takes these observations a step further, and tries to identify significant socio-technical challenges within this process. By looking at the problems as socio-technical, we want to emphasize and highlight the fact that there is interplay of social and technical aspects, and that it is often problematic or counterproductive to consider them as separate, purely social and purely technical aspects. The ultimate goal of identifying significant socio-technical challenges then is to sketch out problems of interest for case study research in the second work package of InSOTEC.

For the purposes of this report we used a variety of sources. We carried out five interviews. Our respondents were: a sociologist, a lawyer, a mayor, a member of an NGO, and a member of staff at RAWRA, the Czech implementing organisation. We visited several meetings of the “Working group for dialogue about geological disposal” as well as several public debates organised by RAWRA. We read through a number of policy documents and reports, such as RAWRA's annual and some technical reports. We also collected newspaper and other online articles. We also benefited from the internal review process within the InSOTEC team, especially from the critical reviews of the Finnish, Hungarian and Slovenian research teams.

The reader will find that the report is lacking a systematic review of social science studies on radioactive waste management in the Czech Republic. The reason is that very little social science research has been done in this respect; the few pieces of work and related events are mentioned in relevant places throughout the report.

1 Description of current state of affairs

1.1 Nuclear power in the Czech Republic

The Czech Republic has quite a strong history of nuclear power. In 1956, Czechoslovakian (communist) government decided to build a nuclear power plant in Jaslovské Bohunice in today's Slovakia. The plant was commissioned in 1972, and featured a soviet-designed reactor KS-150. This reactor was fully manufactured in Czechoslovakia, and it was designed to use unenriched uranium. Being the first and the only of its kind, the reactor suffered from a number of incidents and accidents. The most serious one occurred in 1977, and is rated as level 4 on the INES scale. Since then, the reactor has been being decommissioned.¹

In the Czech Republic, there are two nuclear power plants, which account to about 30% of electricity production in the country. Nuclear power plant Dukovany started operating in 1987 and is designed to operate for 30 years with possible extension. Its four pressurized water reactors VVER-440 have a total power of about 1880 MW. Nuclear power plant Temelín started operation in 2000-2002 and is also designed to operate for 30 years. Its two PWR VVER-1000s have a combined power of 2000 MW.

Generally, the Czech public supports nuclear energy. According to Eurobarometer survey published in 2008, 64% of the Czech respondents were in favour of energy production by nuclear power plants (compared to 61% in 2005), which was together with Lithuania the highest percentage within the EU (Eurobarometer 2008, p. 8). In the past few years, the government and ČEZ, the dominant Czech electricity producer and distributor, have put forward a plan to build two additional reactors at the Temelín power plant. In autumn 2011, ČEZ submitted the documentation for the tender to three bidders. After the Fukushima disaster, Prime Minister Petr Nečas has repeatedly said that this event would not change the government's support for nuclear new build. Construction of the new reactors is planned to start in 2013.

It is difficult to account for both the governmental and public support for nuclear energy. One for all and above all, sciences and technologies are considered in the Czech Republic as much less “political” than in Western Europe and USA (see Konopásek 2006 for some explanations why this is so). People widely trust scientists and engineers, while they distrust the world of politics. Nuclear power, they believe, was finally depoliticised together with the end of communism. The general attitude is that if we keep the political outside of the agenda, it can only be beneficial; experts – who are often seen outside of the dirty world of politics – know best. Apart from this general attitude, and in accordance with it, the Czech attitudes toward nuclear energy are to a large extent shaped, e.g., by the sensitive and complicated relationships between the Czech Republic and Austria. For a number of years, support for the nuclear energy often equals, on the Czech side, to the refusal of what people understand as an unacceptable and inappropriate *political* pressure from the neighbouring Austria. In other words, many Czechs are convinced that Austrians inappropriately use the “technical” issue of nuclear power to pursue their political agenda. Also, the environmental disaster related to the operation of coal-fired power stations during 1970s-80s, still visible in certain regions, has become a

¹ Subsequently, four more reactors (type VVER-440) were built in Bohunice. Two of them are being decommissioned, the other two are in operation. In the 1990s another nuclear power plant was built in Slovakia; thus, there are now seven reactors in Slovakia – three in decommissioning, and four in operation.

sign of a highly problematic energy policy framed by a mixture of politics and ideology. The coal-related pollution was (and still is) considered to be the result of bad communist politics traditionally focused on heavy industry and extensive exploitation of natural resources. In short, dead woods around the northern borders of Bohemia were seen mainly as a political failure of the communist regime.

1.2 Institutional background

In the Czech Republic, the state is responsible for dealing with nuclear waste. To this end, there is the Radioactive Waste Repository Authority (RAWRA), which is a state organization established in 1997 by the Ministry of Industry and Trade. It is responsible for the disposal of all kinds of radioactive waste, for operating repositories for low-level waste, as well as for preparation of the geological disposal for high-level waste. Its director is designated by the Ministry for Industry and Trade, and its budget is approved annually by the government. RAWRA is funded from the “Nuclear fund”, to which all radioactive waste producers are required to contribute by law. Nuclear safety is supervised by the State Office for Nuclear Safety (SÚJB). It is worth noting that RAWRA and SÚJB have a different legal status. While SÚJB is a state office formally independent of any other state authorities, RAWRA is established by the Ministry of Industry and Trade. As such, it would be possible for the Ministry to dissolve RAWRA for instance in case it deemed it redundant.²

Both of the Czech nuclear power plants are operated by ČEZ, the dominant Czech energy producer and distributor. ČEZ is 70% owned by the Czech state. It should perhaps be added that contrary to the high level of general support of nuclear energy production, the level of people's trust in state institutions and large corporations owned to a large degree by the state (such as ČEZ) is rather low.³ In addition, ČEZ has been a key player in a number of controversies discussed in the media,⁴ and the strong ties between the company and the state have been widely criticized.

The process of planning and construction of geological disposal concerns a number of other institutions as well. In order to be able to start geological research in the preselected municipalities, RAWRA will need to apply for a permit from the Ministry of the Environment. Subsequently, the permissions for drilling and possible construction of an underground laboratory or the final repository will need to be given by the Czech Mining Office.

² The Atomic Act states that in case RAWRA was dissolved, its responsibilities would be automatically transferred to its establisher, which is the Ministry of Industry and Trade.

³ Eurobarometer surveys show that less than 20% people in the Czech Republic trust their government in 2011. Since 2004, this number has been oscillating between 18-36%. The trust in the Czech parliament is even slightly lower. These numbers are about 10% below the EU average. (These figures are based on data in the „Trends questions database“ of Eurobarometer surveys available at <http://ec.europa.eu/public_opinion/cf/index_en.cfm>.) Similar surveys carried out by the Public Opinion Research Centre of the Institute of Sociology of the Academy of Sciences of the Czech Republic support these results.

⁴ For instance, it has been criticized for receiving European emission permits from the government for free in return for a pledge to invest into the modernization of its power plants, while at the same time, in February 2012 it was successful in applying for a financial support from the EU-funded Operation programme „Environment“, to do the same. Thus, the criticism in this case was that it was given financial incentives twice to do one thing. (Deník Referendum 2012)

1.3 Dealing with radioactive waste and spent nuclear fuel

There are currently four repositories for low and intermediate-level radioactive waste in the Czech Republic. "Hostim" repository was in operation between 1959 and 1965, and it was used for the disposal of low and intermediate-level radioactive waste. In 1997 it was sealed and is now monitored. "Bratrství" [Brotherhood]⁵ repository is situated in a former uranium mine near Jáchymov in western Bohemia. It is used to dispose of waste containing natural radionuclides only. "Richard" underground repository is situated in Litoměřice in northern Bohemia. It is used for the disposal of institutional radioactive waste. Finally, the largest low and intermediate-level radioactive waste repository is in Dukovany, adjacent to the nuclear power plant. It is used for disposing of waste created during the operation of the two nuclear power plants, Dukovany and Temelín. (RAWRA 2011a)

Spent nuclear fuel is currently stored in "dry" casks in storage facilities situated on the premises of the two nuclear power plants. The producers of spent nuclear fuel are responsible for its transport and storage, therefore the storage facilities are operated by ČEZ. In Dukovany, there is an "interim" storage site which opened in 1995 and has a capacity of 60 containers (each containing 10 tonnes of heavy metals). The storage was filled in 2006. In the same year, a "long-term" storage facility opened at the same site. Its capacity is another 133 containers, i.e. 1340 tonnes of spent fuel.⁶ This should be enough to store all of the spent fuel produced in the projected lifetime of the Dukovany power plant. In Temelín, the situation is similar. A storage facility to hold 1370 tonnes of spent fuel was built and started test operation in 2010. According to SÚJB, the spent nuclear fuel is to be kept in these storage facilities until geological disposal is built (SÚJB 2011).

The capacity of the current storage facilities should be large enough to store all the spent fuel produced by the two existing nuclear power plants. At projected lifetime of 40 years, they are expected to produce about 4 thousand tonnes of spent nuclear fuel. However, given the current plan of the government and ČEZ to construct as many as two new blocs in Temelín and one in Dukovany, the amount of the spent nuclear fuel would increase to 9 thousand tonnes, which would require more storage capacity. There has been a plan of the energy company ČEZ to build an underground central storage facility in the area called "Skalka", close to uranium mines Rožná and Olší (a location that has newly been considered by RAWRA as a potential site for geological disposal as well). ČEZ has obtained the legal permissions to construct the facility, but it is not clear whether it will go forward

⁵ A detour: The communist name of the facility is a noteworthy detail indicating some historical consequence of nuclear power in socialist Czechoslovakia. Bratrství was not only the name of an uranium mine, but also the name of one of the 18 camps for forced labour and correction in which „enemies of the communist régime“, including prisoners of war and non-displaced Germans were living, working and dying in inhuman conditions. On the basis of a secret treaty from 1945, huge quantities of uranium were produced and exported to the Soviet Union. Initially, the daily life of these camps was directly under the „brotherly“ Soviet administration, before it was overtaken by the Czechoslovak prison service and state security. Thus, nuclear production and use in the country became strongly associated with torture, death, communist oppression, economic exploitation and overall Soviet force associated with uranium production, and this lasted rather long, even after the communist power became more complicated and much less brute. The Chernobyl nuclear disaster in 1986 was therefore generally perceived not as a problem related mainly to technology, but as one of the failures of communism. Anti-nuclear movement of the Western style was non-existing in Czechoslovakia of the second half of the 20th century. One should not forget about this historical consequence when observing current, strangely positive, public attitudes toward nuclear technologies in the Czech Republic.

⁶ Although the former storage is called „interim“ and the latter „long-term“, in practice they seem to be the same.

with the plan. It is currently considered by ČEZ to serve as a “backup” storage site before geological disposal will be built (ČEZ 2011).

1.4 A history of geological disposal planning in the Czech Republic

Planning geological disposal in the Czech Republic dates back to the 1980s, and it could be divided into several periods, which roughly correspond to the decades of 1980s, 1990s, 2000s and 2010s. In the 1980s, the socialist government had a plan to build geological disposal in the future, but there was no rush. Nuclear waste was not seen as a problem, and there was no public discussion of the matter. Fuel for the Czechoslovakian nuclear power plants was bought in the Soviet Union, where the spent fuel was also returned (Matoušek et al. 2003, p. 13).

In the early 1990s, the Czech Geological Survey under the Ministry of the Environment carried out a research based on available geological data, which yielded 27 areas within the Czech Republic that were recommended for further investigation regarding the construction of geological disposal (Krajíček et al. 2006, p. 16). In 1993, the then Ministry of Economy⁷ initiated and funded a six-year “Geological disposal development programme”. As a part of this programme, the Nuclear Research Institute was asked to carry out research of existing geological data in order to gather all the relevant and available geological information, and identify areas suitable for further investigation. This endeavour resulted in identifying 8 locations within 5 of the original 27 areas. (Krajíček et al. 2006, p. 17) Another outcome of the development programme was the “reference project” published in 1999, which is a project of the future geological disposal facility at a hypothetical location in a granite environment (RAWRA 1999, p. 5).

In 1997, RAWRA was established and it took over the responsibility for the geological disposal development programme. It adopted the “reference project” of geological disposal. However, in terms of site selection, RAWRA initiated a new process of “regional mapping” (Piskač et al. 2003) – the goal was to consider the whole of the Czech Republic, this time not only in terms of geological suitability, but also considering other criteria, such as proximity of the site to valuable natural resources, industrial objects, or natural reserves (Piskač et al. 2003, p. 11-14). The outcome of this effort was a list of eleven locations in different regions of the Czech Republic, and in different types of geological environment (Piskač et al. 2003, p. 14). Next, this list was prioritized according to criteria such as population density, surrounding area (whether it is urban, agricultural, forest, or water), and the amount of natural radioactivity from radon⁸ (Piskač et al. 2003, p. 14-20). The result was a list of seven locations in granite, three in metamorphic rock, one in sedimentary rock, and one “backup” location with reinforced engineered barriers located in an unused open-pit coal mine. Based on this study, RAWRA decided to focus on six of the seven locations in granite (Krajíček et al. 2006, p. 18). Between 2003-2006, “pre-feasibility studies”⁹ were carried out for each of the six

⁷ The Ministry of Economy was created in 1992 and dissolved in 1996. Its responsibilities were transferred under *the Ministry of Education, Youth and Sports, the Ministry of Industry and Trade, the Ministry of the Environment*, and others.

⁸ The amount of natural radioactivity was not considered as a criterium affecting the feasibility of constructing geological disposal itself, but it was taken into account and evaluated for the sites considered, because „it is always the subject of discussion with the public and a common argument against the siting of any nuclear facility“ (Piskač et al. 2003, p. 16). Apart from that, Piskač et al. note that the amount of natural radioactivity at a site has to be considered as an indicator of existing fractures in the granite massive (Piskač et al. 2003, p. 18).

⁹ The goal of the pre-feasibility studies was to „verify the possibility of siting and construction of the surface part of the

locations (Skořepa et al. 2006), and the six locations have remained in focus of RAWRA to present day.

Such is the story of planning geological disposal in the Czech Republic that one can reconstruct from RAWRA's technical reports and other documents. However, the mayors in affected municipalities emphasize different aspects of the planning process. They often emphasize that they had not been told about the research in their municipalities, and that they had not been consulted about the prospect of the construction of geological disposal for radioactive waste. One of the mayors said for a local newspaper: "it started in 2002, when the state confronted us with a plan already made. No one had talked to us before" (Šímová 2009). The mayors say that in fact they learned about the candidate sites first from the media, not from the government or RAWRA.¹⁰ Following the announcement of the candidate sites, strong local public opposition emerged. Most of the affected municipalities organized local referenda in the concerned villages regarding geological disposal, in which sweeping majorities voted against the repository.¹¹

In the meantime, in 2002 the government approved a policy document called "Strategy for dealing with radioactive waste" (MPO ČR 2001), which states that a primary and a backup site are to be chosen by 2015. Nevertheless, in 2004, the minister of industry and trade declared a five year moratorium on the siting process, due to "public pressure" (RAWRA 2009, p. 18). The moratorium ended in 2009, when the siting process was resumed. More recently, it was announced that following a governmental decision, RAWRA also started considering military areas within the Czech Republic as possible sites for building geological disposal. Primary research showed that two military areas, Boletice and Hradiště, could be suitable (RAWRA 2011, p. 23). In 2011 RAWRA announced that

geological disposal in terms of technical, socio-economical and environmental conditions and properties of the locations in question." (Krajíček et al. 2006, p. 107) They dealt with problems such as where and how to situate the surface facilities of the geological disposal and how to connect these to the existing infrastructures. They also considered the possible impacts of the construction and operation of GD on the local environment and population, for instance in terms of noise and dust pollution, the influx of workers, or the consequences for the local real estate market. Nevertheless, Skořepa et al. (2006) explain that these studies are „pre-feasibility“, because a lot of data that regular feasibility studies work with were not available at that time. Therefore, „the conclusions and recommendations of the particular chapters [of the pre-feasibility studies] need to be understood as the delineation of areas for further works, in which these particular problems will be dealt with separately and in more and more detail.“ (Skořepa et al. 2006, p. 66) It should be added that as of early 2012, no further steps in this sense seem to have been done; as framed by RAWRA, the further assessment of feasibility is possible on the condition that detailed geological research at the sites will be carried out.

¹⁰ In an interview, a RAWRA employee said that this situation resulted from the fact that on the one hand, by law, RAWRA had to make the information public, while on the other hand, it did not manage to be „the first“ to tell the municipalities (at that time the situation concerned 48 different municipalities in the six areas). Media got the information as soon as it became public, and thus some of the municipalities learned about the research from the media.

¹¹ A referendum is not a very common instrument in the Czech Republic. A national referendum is embodied in the constitution, but a constitutional law defining how to carry out such a referendum has never been approved by the Parliament. A special ad-hoc constitutional law had to be approved for the referendum on the accession of the Czech Republic to the EU. Apart from the national referendum, there is the local referendum, which can be initiated by the municipal council or by a petition of the citizens. In order for the local referendum to be valid, 35% of the voters need to participate, according to a law passed in 2008. The decision of the local referendum is binding for the local government if more than 50% of those who participated, and at least 25% of all the eligible voters vote for this decision (i.e. if 35% participate, it means that 71,43% of them need to vote for the decision for it to be binding). However, between 2004 and 2008, when most of the referenda regarding geological disposal took place, 50% of the voters had to participate in order for the referendum to be valid. Nevertheless, the referenda took place in 27 municipalities and in 26 of them more than 50% voters participated. In most cases, more than 90% of those who voted voted against the prospect of building geological disposal within the municipality.

preliminary research has shown that another site, which had not been considered before, may be suitable. It is located between two uranium mines Rožná and Olší¹². It was officially added on the list of candidate sites in October 2011 under the name of “Kraví Hora”(RAWRA 2011b).

In 2010, RAWRA initiated the creation of a “Working group for dialogue about geological disposal”. The group brings together representatives of the government, the parliament, RAWRA and SÚJB, as well as representatives of national and local NGOs and municipalities in the areas proposed as suitable for further research. The group currently focuses mostly on legislative matters; in 2011, it has submitted a proposal to implement the right of veto for the municipalities regarding geological research, as well as financial contributions for the municipalities where detailed geological research will be carried out. The proposal for financial contributions has been approved¹³, but the proposal for the veto has not.

As of April 2012, RAWRA is trying to organize public debates in the concerned municipalities, and its next goal is to obtain consent from the municipalities with detailed geological research. In order to apply for a research area and start geological research at one site, they are looking for the consent of all the municipalities at that site (the number ranges from three to nine municipalities at one site), emphasizing the fact that the consent with geological research is not the consent with the future repository. RAWRA hopes to start geological research at one site in 2012, and would like to research four areas in total.¹⁴ So far, two municipalities from one area have expressed their preliminary consent on the condition that their area will not be the only one to be researched.

1.5 Government policy on higher activity, longer-lived wastes (HLW) and spent fuel

The primary legal framework for issues related to radioactive materials and nuclear energy is provided by the “Atomic Act”, created in 1997 and amended numerous times. This law delineates the activities and responsibilities of the State Office for Nuclear Safety (SÚJB) as well as RAWRA. Among many other things, it defines the moment when spent nuclear fuel becomes radioactive waste – that is when its owner classifies it as waste.¹⁵ It also says that the state is responsible for disposing of all kinds of radioactive waste. In practice this means that ČEZ, the operator of the NPPs, is responsible for the storage of spent nuclear fuel, and therefore it also operates the storage facilities, and it would be its responsibility to construct the central underground storage. It is largely up to the company when it will decide to declare the spent fuel to be radioactive waste and hand it over to the state for

¹² While the Olší mine was closed in 1989, the Rožná mine is still in operation.

¹³ The financial contributions that have been approved are following: all municipalities where the geological research will be carried out will get money from the nuclear fund. The annual amount will be 600 thousand CZK (i.e. about 24 thousand Euros) plus 0,3 CZK for each square metre of the research area, with the limit of 4 million CZK (i.e. about 160 thousand Euros). Depending on the proposed research area, in the affected municipalities the proposed contributions add up to about 800 thousand CZK (about 32 thousand Euros) to the limit of 4 million CZK. The municipalities would be free to use the money for any investment related to public well-being, be it infrastructure, education, etc. They could also save the money for a larger investment. It should be added that most of the municipalities are very small, with several hundred or a few thousand inhabitants, and therefore in many cases the proposed amount would be a significant contribution to their annual budget.

¹⁴ Jiří Slovák (RAWRA), at the public debate in Jihlava, 14 February 2012.

¹⁵ In exceptional cases, SÚJB can do this. It is also referenced in “Strategy for dealing with radioactive waste”, p. 6.

disposal. A member of staff of RAWRA said in an interview that ČEZ has indicated that this would happen around 2065.

The current government policy on high-level waste is framed by the “Strategy for dealing with radioactive waste” (MPO ČR 2001) approved in 2002. This document states that the primary strategy for dealing with high-level waste is deep geological disposal (MPO ČR 2001, p. 13). Further, it states that it is supposed that high-level waste will not be disposed of in the deep geological repository before 2065 (*Ibid.*), and that storing the waste at least until 2065 gives room to the possibility to use reprocessing or transmutation in the future (*Ibid.*). Thus, it also recommends to “observe” (p. 21) and to “support” (p. 22) technologies of reprocessing and transmutation.

Although the state is responsible for disposing of all kinds of radioactive waste (p. 5), the producers of spent nuclear fuel and high-level waste are responsible for its storage and transport before it will be disposed of in the deep repository (p. 13). Spent nuclear fuel becomes radioactive waste when its producer declares it a waste. In this case, the state is also responsible for the preparation of the waste into a disposable form (p. 5). Dealing with radioactive waste is financed from the “nuclear fund”, to which all radioactive waste producers are required to pay. The amount they pay is set by a government's decree. Small producers pay fixed fee annually, while ČEZ, the operator of the nuclear power plants, pays 50 CZK (about 2 EUR) for each MWh produced in the NPPs. This scheme is supposed to ensure that the producers of radioactive waste pay for its disposal. RAWRA periodically revises the fees so that the contributions match the projected costs of radioactive management over the expected time period. Nevertheless, in practice and in terms of geological disposal, when doing these calculations RAWRA works with the projected cost of the geological disposal that was calculated in 1999 when the Reference project was created. Accordingly, the tariff that the operator of the nuclear plants pays has not changed since the inception of this scheme. As a result, some non-governmental organisations have objected that the amount of 50 CZK per one MWh is too little, and that the final cost of the repository will exceed the 47 billion CZK (i.e. about 1.9 billion EUR) estimate from 1999 (interview of a member of an NGO). The corollary is that if there is not enough money in the nuclear fund, the taxpayers would have to even up the difference.¹⁶

The Strategy also provides a schedule for implementing geological disposal (p. 22). It says that by 2015 a “primary” and a “backup” site “with the best geological conditions” for geological disposal needs to be found. By 2025 the choice will be confirmed by geological research. By 2030, the construction of an underground laboratory needs to be prepared. Finally, by 2065, the repository is to be opened.

It is worth mentioning that the Ministry for the Environment issued a negative standpoint towards this document in the EIA process, arguing, among others, that other options of dealing with spent nuclear fuel are not considered, that the document is not specific enough, that the strategy is not put in the context of sustainable economy, that the analysis of costs of geological disposal is insufficient, and that the principle of best available technology is not adopted (MŽP ČR 2001). Nevertheless, the government approved the document in its original form.

¹⁶ The Nuclear fund is controlled by the Ministry of Finance, which reinvests the money paid to the fund (mostly to government bonds). As a result, over the last few years, the balance of the fund has grown, not only due to the payments of the producers of the radioactive waste, but also due to the profits of the reinvesting. On the other hand, the Supreme Audit Office of the Czech Republic carried out an audit of the Nuclear Fund and found some irregularities in how the Fund has been managed by the Ministry of Finance (NKÚ 2011).

The “Strategy of dealing with nuclear waste” is framed not only by the Atomic Act, but also by the the “National energy strategy”, a governmental document that outlines energy needs and supplies of the country. This document was issued in 2004 and updated in 2010. Currently, the Ministry of Industry and Trade is working on new a version of this document, which was due to be delivered at the end of 2011, but is being delayed. It is now expected to be delivered in mid 2012, and it is also expected, that the “Strategy for dealing with nuclear waste” will be updated in order to be in accord with the national energy strategy.

1.6 The technical research, development and demonstration (RD&D) programme on the long-term management of HLW and SNF and the construction of geological disposal

It has been noted that the state is responsible for long-term management of radioactive waste, that its primary strategy for long-term dealing with spent nuclear fuel is the construction of geological disposal, and that RAWRA is responsible for its preparation. As such, it is also responsible for carrying our research related to geological disposal development. However, RAWRA itself is not a large organization (it employs around 40 people), and its own research capacities are limited. Therefore, RAWRA subcontracts research to various other organizations. Some of these are

- Czech Geological Survey, which is a state organisation that carries out geological research primarily for other state organisations.
- Centre of Experimental Geotechnics (CEG) at the Faculty of Civil Engineering of the Czech Technical University in Prague, which runs an underground laboratory and carries out a number of experiments, for instance those related to studying the properties of bentonite (RAWRA 2011, p. 24).
- Department of Geological Sciences at the Faculty of Science of Masaryk University, which also specializes in hydrogeology.
- Aquatest, a private company which carried out preliminary geological observations that contributed to narrowing down the number of potential sites for geological disposal. It is worth mentioning that dr. Slovák, who was in charge of this particular research project at Aquatest, later became the head of the Department for Geological Repository Development at RAWRA.
- Research related to radioactive waste and the nuclear industry is carried out by a number of other organizations as well, such as the Faculty of Nuclear Sciences and Physical Engineering at the Czech Technical University in Prague, Nuclear Physics Institute of the Academy of Sciences of the Czech Republic, or Nuclear Research Institute, plc. (NRI). The latter organization cooperates with RAWRA on many research projects. Organizationally, NRI used to be a part of the Czech Academy of Sciences, but it was privatised in 1993, and its major shareholder is now ČEZ (the dominant Czech electricity producer and distributor). The institute has several subsidiaries, one of which is the Research Centre Řež. It is worth noting that in late 2011, the European Commission approved a large project called SUSEN, funded within the “Operational Program Research and Development for Innovations” from the European Regional Development Fund. This €100 million project, whose acronym stands for SUSustainable ENergy, consists in constructing new laboratories devoted to studying the

possibilities of improving safety, reliability and lifetime of current (generation II and III) nuclear power plants, as well as doing research towards the implementation of generation III+ and IV nuclear power plants (Research Centre Řež 2011).

The technical concept of geological disposal in the Czech Republic is generally similar to the one developed in Sweden or Finland. The disposal is planned in a granite environment, with engineered barriers consisting of a metal (most likely steel) container surrounded by bentonite. However, the concept has not been fully developed yet. Much of the research carried out by RAWRA and its partners relates to geology – most recently, a proposal for necessary geological works to carry out research at the selected sites has been created, and the properties of Czech granites are continuously studied (RAWRA 2011, p. 19-22). Another part of the research efforts focuses on engineered barriers, most recently bentonites (RAWRA 2011, p. 24). RAWRA has also been involved in a number of international research projects, most lately PETRUS II and MoDeRn. Apart from that, RAWRA is also researching other ways of dealing with nuclear waste such as transmutation and reprocessing. More specifically, they have been conducting research of electrochemical separation techniques in fluoride melts (RAWRA 2011, p. 26). However, the budget for this type of research has recently been cut down in favour of the efforts to find a suitable site for and implement geological disposal (research interview with a member of staff at RAWRA).

It should be noted that there is no real “demonstration” programme of the geological disposal development programme going on. In terms of demonstrating safety of the geological disposal to the authorities, it is expected that RAWRA will need to submit the safety case to SÚJB, but the process is currently planned in a way that this will not be on the agenda for a long time. In terms of demonstrating the concept of geological disposal to the public, RAWRA runs a number of information centres and organizes trips to nuclear power plants and existing (low-level waste) repositories, but the current research related to geological disposal is hardly publicized. It is briefly described in RAWRA's annual reports and in a limited number of publicly available brochures, but otherwise it is not easy to access the results of the research. For instance, even the pre-feasibility studies of the preselected locations, which contain important findings for many of the municipalities, are not easily accessible.

1.7 The formal or informal role and activity (or inactivity) of civil society stakeholders

1.7.1 National and local non-governmental organizations

There are several national and a number of local non-governmental organizations that are active in relation to the planning of geological disposal. The most active national NGOs are “Hnutí Duha” and “Calla”¹⁷. While “Hnutí Duha” focuses more on energy policy, Calla has been working, among other topics, specifically on the case of geological disposal. Although originally a regional NGO, it has worked closely with a number of municipalities across the Czech Republic, organizing regular meetings and public hearings (research interview with a member of staff). Together with the

¹⁷ Hnutí Duha can be regarded as one of the most important national environmental NGOs in the Czech Republic. It was established in 1989 and is a member of the Friends of the Earth network (<http://www.hnutiduha.cz/>). Calla was established in 1991 as a regional environmental NGO based in southern Bohemia, but its activities related to the support of renewable energy production can be described as national (www.calla.cz).

Environmental Law Service¹⁸, they have also been instrumental in advising the local referenda that took place in the affected municipalities between 2004 and 2009. Calla and the Environmental Law Service are also active in the “Working group for dialogue”, and they seem to be the initiators of some of the legal changes that the group has proposed. In addition, they have been publishing various reports and analyses relating to nuclear waste management and (nuclear) energy. Furthermore, a national association of non-governmental organizations called “the Green Circle” also has a representative in the Working group.

Apart from the national NGOs, there is a number of local organizations concerned with geological disposal planning. Some of them were created particularly in response to the announcement of the preselected sites in the early 2000s. However, many of them do not seem to be currently very active – several people in interviews suggested that the five-year moratorium between 2004 and 2009 effectively reduced their activity, because in this time, RAWRA officially stopped the site selection process and therefore, the local NGOs also diminished their activity.

All these NGOs are critical of the plans to construct geological disposal, or of the way that the development process is being carried out. Although some organizations acknowledge the need to take care of high level radioactive waste and even consider geological disposal to be the best or the only option, we are not aware of any non-governmental groups that would be generally framed as supportive of the current process of geological disposal development. On the one hand, some members of the NGOs are quite active for instance within the Working group for dialogue, but on the other hand, they emphasize that their involvement is geared towards “empowering the municipalities” in the process (research interview, December 2011). Nevertheless, it should also be noted that there is a number of pro-nuclear organizations¹⁹, pro-nuclear websites²⁰, and pro-nuclear blogs²¹. There has also been a non-governmental pro-nuclear organization called “South-Bohemian Fathers”, which was created in response to an anti-nuclear NGO called “South-Bohemian Mothers”.²² To our knowledge, none of these groups play an active part in the development process of geological disposal; nevertheless, they reflect the wide public support for nuclear energy in the Czech Republic.

¹⁸ Environmental Law Service is a „non-governmental, non-profit and apolitical organization of lawyers and law students, who defend the rights of citizens and the environment in the Czech Republic by legal means.“ (www.eps.cz)

¹⁹ For instance the Czech Nuclear Society, <http://www.csvts.cz/cns/>

²⁰ See e.g. the Pro-Atom Web, <http://proatom.luksoft.cz/>

²¹ For instance that of the nuclear physicist Radek Škoda, <http://skoda.blog.ihned.cz/>

²² South-Bohemian Mothers became well known in the early 1990s as an organization protesting against the construction of the Temelín nuclear power plant, and have been concerned with Temelín as well as with other issues since then. South-Bohemian Fathers were created in 1999 as an “ecological organization supporting the development of nuclear energy in the Czech Republic” (Jihočeští taťkové 2011). According to the data on their website, the organization does not seem to be very active recently – the last two posts were published in January 2008 and June 2009. While South-Bohemian Mothers were subject to critique that they secretly receive funding from Austria, South-Bohemian Fathers were criticized that their members are mostly the employers of the Temelín nuclear power plant, and that the organization is supported by ČEZ.

1.7.2 The Working Group

It has been mentioned that in 2010, a “Working group for dialogue about geological disposal”²³ was established. The group brings together representatives of state institutions, non-governmental organizations, municipalities preselected as potentially suitable sites, a sociologist and a lawyer. According to its statutes, the group was created in order to “strengthen the transparent process of site selection for geological disposal..., respecting the interests of the public.” (Pracovní skupina pro dialog o hlubinném úložišti 2010, p. 1). The creation of the group was initiated by RAWRA, and its origins go back to the ARGONA project. RAWRA and NRI participated in this EC FP6 project, whose goal in the Czech Republic was to implement the “RISCOM” model for public participation in the case of nuclear waste management (Vojtěchová 2009a). As a part of this effort, a “Reference group” was established, and a public hearing between different stakeholders was organized (Vojtěchová 2009a, p. 15). The representatives of RAWRA and NRI were very happy with the outcomes of the ARGONA project, saying that “Establishing the RISCOM Reference Group meant a significant shift in the cooperation of all stakeholders in the management of nuclear waste in the Czech Republic. A well-functioning group consisting of all stakeholders has been established and a good milieu was formed for mutual dialogue and cooperation among “the parties” such as state institutions (e.g. RAWRA and relevant ministries), NGOs and representatives of communities from selected localities.” (Vojtěchová 2009a, p. 15-16) RAWRA felt that this effort should continue in some form, and the current “Working group for dialogue” is the result. The Working group adopts the main principles of the Reference group, particularly, the emphasis on transparency, dialogue, and deliberation (Pracovní skupina pro dialog o hlubinném úložišti 2010, p. 5). Nevertheless, it has a different status, being officially an advisory body to the Ministry of Industry and Trade, and there are no formal links between the former project ARGONA and its Reference group and the current Working group.²⁴

1.8 The current role of affected or potentially affected communities

The current role of potentially affected communities is shaped by the local referenda, by the moratorium which ended in 2009, and by the existence of the official Working group.

When it became publicly known in the early 2000s that RAWRA had preselected six sites as potential locations for constructing geological disposal, strong public opposition in the affected municipalities followed. People organized protest meetings which were widely covered by local as well as national media.²⁵ In 2004 the Minister of Industry and Trade declared a five-year moratorium due to “public pressure” (RAWRA 2009, p. 18), and with the aim “to find broader societal consensus” (Ekolist.cz 2009). However, some of the mayors have complained that on the contrary, nothing happened

²³ The official English website of RAWRA uses the term “Work team”. Nevertheless, in another context (during one of the group's meetings), some members of the group explicitly said that they would not consider it a “team”, because the people in the group come from different organisations and their professional interests are clearly different. Therefore, in this report we will use the literal and more neutral translation “Working group”.

²⁴ Recently, there have been attempts to link the Working group to the successor of the RISCOM project, the EC FP7 IPPA project. People from NRI who are participating in the IPPA project and who also attend the Working group have repeatedly proposed that the Working group could also function as a group within the IPPA project. This proposal has not been approved as of February 2012. Some members of the Working group have objected that they did not want to be a part of a project that they „knew nothing about and could not decide about“ (research interview, December 2012).

²⁵ A well known protest took place in 2003, when a tractor ploughed a 30 by 40 metres large „NO“ sign in a field near one of the affected villages, and about a hundred people were photographed standing in the sign.

during the moratorium, that the state did not do anything, and did not even respond to the mayors' suggestions (*Ibid.*). A member of an NGO suggested in a research interview that declaring the moratorium was "strategically an excellent move", because first, it put off an unpopular political problem to another electoral term, and second, because it would not only calm down the immediate public outrage and protests which followed the announcement of the candidate sites, but also cool down the activity of civil stakeholders and affected communities in the long run. Thus, some stakeholders seem to view the moratorium not as a means to move forward with the societal debate, but as a means to put the affected communities and civil society stakeholders into a more passive position.

It has been mentioned that most of the affected municipalities organized local referenda between 2004 and 2009. The referenda are notable in several ways: first, due to the limited role of the referendum in the Czech political environment, it is notable that the referenda took place in such a large number of municipalities; second, the participation in the referenda was extremely high compared to any other elections; third, sweeping majorities of those who participated voted against the prospect of a repository in their municipality.²⁶

Today, the results of the referenda are a strong argument that the mayors often use in negotiations with RAWRA – they emphasize that as local representatives, they are obliged to respect the results of the referenda. In some municipalities the statement of the referendum was, "Are you in favour of the proposal that the municipality should use all its legal measures to prevent the construction of a geological disposal for spent nuclear fuel in the locality"? Thus, the local representatives argue that they are obliged to try to prevent the construction of the repository, and in order to change this position, there would have to be another referendum.

The fact that the referenda took place possibly has another consequence for current direct citizen participation in the negotiation process. One mayor said in an interview that having the results of the referendum, she does not feel the need to discuss with her citizens the current negotiations between the representatives of the municipalities and the state: "we have the results of the referendum and now we are trying to balance the relationship with the state; therefore, we do not pass the agenda to the people now." (research interview, October 2011) In other words, the results of the referenda in a certain way limit the room for direct citizen involvement in the negotiation process.

Another side of this issue is that due to limited citizen participation, in some cases the position of the municipality is strongly shaped by individual preferences of the mayors. Some mayors seem to be more concerned with pursuing the right of veto for the municipalities, while others may be more interested in negotiating financial contributions for geological research. Moreover, although not often perceived as a political issue in municipal elections, in some cases when the local political representation changed, the position or the preferences of the municipality in the negotiations also changed. A member of a national NGO who has worked with some of the mayors for a number of years shared this view in a research interview (December 2011). He also suggested that the existence of a local NGO may contribute to the stability of the municipality's position, but at the same time admitted that many of the local NGOs are so small, that sometimes their existence is based on the activity of a few individuals.

²⁶ The results of the referenda that took place between 2003 and 2008 are reproduced for instance in Vojtěchová 2009b, p. 22.

2 Overview of prevailing socio-political challenges

It is possible to identify a number of prevailing socio-political challenges regarding the planning of geological disposal of high-level nuclear waste in the Czech Republic. They are all to a large extent intertwined; nevertheless, we will list them here separately.

2.1 The site selection process

Site selection has been the main theme of the public debate on geological disposal since the early 2000s. As of late 2011, RAWRA is trying to obtain consent of the affected municipalities to start carrying out detailed geological research in the preselected locations. The government has approved its work plan and budget for 2012, which includes resources to finance the geological research (RAWRA 2011c). Formally, RAWRA does not need to obtain any permission from the affected municipalities to start with the geological research; it only needs to apply to the Ministry of the Environment to establish a “research area”. But since the moratorium ended in 2009 and the process was resumed, it has been reiterating that it will not start with the geological works without the consent of the concerned municipalities (see e.g. RAWRA's letter to the municipalities, RAWRA 2011d). None of the municipalities has given an official consent so far, but RAWRA says that they are hoping for consent in at least one location in 2012. The Working group as well as the financial incentives that were recently put into law and approved are supposed to help move this situation forward. Nevertheless, it is not clear what the next developments will be and whether the geological works will start.

One of the possible problems, or a possible source of uncertainty, is that the overall site selection strategy of RAWRA is unclear. We have described how the criteria for site selection seem to have changed from exclusively geological to a more comprehensive set (in the form of the “multi-criteria analysis”). However, this shift has been hardly acknowledged in the public discourse. RAWRA has been emphasizing the geological conditions and the need to carry out detailed geological research in the preselected locations. At the same time, the “Kraví Hora” site that has recently been added to the list of the six candidate sites, had been described in a previous study commissioned by RAWRA as the “least suitable”, and one which “cannot be recommended for further works” (Sequens 2011). Nevertheless, it started to be seriously considered by RAWRA in late 2011. In this respect, it should be noted that Kraví Hora is already a nuclear community with a history of uranium mining, and therefore it can be expected that it will be more willing to accept another facility related to the nuclear fuel cycle. In sum, these developments somewhat undermine the credibility of the overall site selection strategy, and the emphasis on geological research that is dominant in the public discourse. The addition of Kraví Hora to the list of candidate sites suggests that RAWRA has somewhat reconsidered the criteria for a “suitable” site. However, this reconsideration was not part of the public discussion.

Despite the fact that detailed geological research is emphasized as the next necessary step in the geological disposal development, in practice, the “technical” research being carried out is in practice *not* a part of the public discourse. In other words, what is emphasized is the “need” to do geological research at the candidate sites, but other research that is being carried out (for instance in laboratories or former mines – not at the preselected sites) is largely being left out of the debate. RAWRA mentions some of the research projects in its annual reports, but the technical reports are not widely available to the public. This situation applies not only for technical research, but also for the pre-feasibility studies, and other reports related to site selection. On the contrary, what is emphasized in the public discourse is the need to “find a suitable site”, one where the municipalities

will not object to the construction plans. Thus, it can be said that the “technical” part of the development process is in the public discourse currently suppressed in favour of negotiating with the municipalities. This approach, among other things, supports the idea (highly problematic from the STS perspective), that there is a natural hierarchy of, first, reaching public consent, *and then*, second (or perhaps at the same time, but separately), “doing the technical thing”.²⁷

Another challenge related to the siting of geological disposal is that the formal steps necessary to take are a bit unclear. The preparatory works relate to several different laws, especially the “Atomic act”, the “Mining act”, the “Construction act”, and RAWRA representatives have indicated that it is not always clear which law they should follow at particular steps of the process. Perhaps partly in order to solve this problem, RAWRA has recently proposed – within the Working group – that a new law could be created. The law would be specifically concerned with the development of the geological disposal for radioactive waste, and it would bring together all the agenda related to its planning and construction.

Some of the members of the Working group have objected to the prospect of creating a new law. They say that from a legal perspective, it is not necessary. Moreover, a case-specific law is generally undesirable. Also, creating a new law would mean that all the other affected laws will need to be changed. Such process would be very complicated and it would take years. Perhaps even more importantly, some members of the Working group have suggested that proposing the new law is just a way to keep the group busy working on something, and that RAWRA is hoping in the meantime to be able to make a deal with some of the municipalities on an individual basis. They also pointed out that the task of the Working group should not be to create, pursue, and lobby for new laws, but to advise the policy makers (interviews with a lawyer and a member of the Working group, November and December 2011).

Perhaps another side of this problem is that the role of RAWRA itself is a bit unclear. On the one hand, RAWRA is by law responsible for the disposal of all types of radioactive waste and for implementing GD. In this sense, its role is clearly defined. On the other hand, it operates in a highly unstable (political) environment. For instance, the politicians don't seem to be much interested. As if they tried to avoid touching the issue, waiting for what would happen (and perhaps sometimes even hoping that a completely different route would open in the future)²⁸. In addition, there seems to be a strong push from the industry to build new nuclear energy sources, and the politicians seem to endorse this vision, which increases the need to have a solution for spent nuclear fuel as a legitimization for the nuclear new build. As a result, during the meetings of the Working group it is apparent that members of RAWRA are often not certain about what they can do, or what they should do, especially vis-a-vis the Ministry of Industry and Trade and the State Office for Nuclear

²⁷ This situation can be illustrated by a moment that took place during a meeting of the Working group in September 2011. A member of the group from a national NGO brought up the point that the new national energy strategy (at that time newly proposed by the Ministry of Industry and Trade) counts on a massive nuclear new build, and that this new build will surely have consequences for the size and operation of the geological repository. A RAWRA representative responded that that was „just a technical detail, a technical problem.“ The matter was not discussed further.

²⁸ It was suggested in our interviews (not only with members of the non-governmental sector) that for instance the Minister of Industry and Trade who initiated the moratorium in 2004, said to RAWRA representatives that the Social Democratic party, which was the largest party in the government at that time, did not need to deal with the issue at that moment. (The next parliamentary elections were held in 2006, when the social democrats lost by three percent to their biggest rival.)

Safety. In other words, it seems that RAWRA is not sure about its own powers. As a result, its work (both technical research and the work with the public) seems to be somewhat cut off from the government. The representatives of the municipalities seem to sense this tension, and that may be another reason why they do not trust RAWRA as an organization very much (although some emphasize that they do trust individuals working for RAWRA) and why they put pressure on establishing legal guarantees.

2.2 Splitting the social from the technical

In RAWRA's annual reports 1998-2010, one can observe a significant shift in how the problem of “site selection” is portrayed. In the 1998 report, site selection is a matter of finding the site with the best geological conditions (RAWRA 1999, p. 5). Thus, it is in principle a technical and rather unproblematic issue. In 2003, when the multi-criteria analysis is presented, it becomes much more complex, including factors such as population density or nature preservation (RAWRA 2004, p. 11-14). But still, it is a problem that needs to be tackled by expertise. In the 2010 report, the problem of site selection is divided into two parts. One part refers about various geological works that are being carried out – some projects have been successfully completed, while others have just started (RAWRA 2011, p. 18-23). The other part regards the involvement of the public in the site selection process by means of the Working group, which is supposed to support the “transparency” and “open dialogue” in the decision-making process (RAWRA 2011, p. 30). Thus, site selection in 2010 becomes a technical *and* a social problem. Even in the annual report, these two parts are kept separate; they are found in different chapters of the report. While the first one is certainly not simple, it is referred to in a rather straightforward way. The other one, in contrast, is filled with ideographs such as “openness”, “dialogue”, “transparency”, and “partnership”.

This way of dividing the problem of the site selection process seems to be highly problematic for late STS, in that the technical dimension is split from the political one. Moreover, from this perspective it seems that the political dimension is complex and problematic, while the technical core, although filled with expertise, is rather straightforward and smooth to implement. In contrast, other times it is the other way round: for instance, the official schedule for the development process mentioned earlier suggests that politics will be dealt with first and quite quickly (a main and a backup site is to be chosen by 2015²⁹), and then there will be time to do the technical research (ten years until 2025 for geological research, some twenty-five years for the laboratory, and fifteen years for the construction of the repository).

It is possible to observe that similar “splitting the social from the technical” is done in other, often mundane and implicit ways. For instance, it has been noted that RAWRA currently emphasizes the need to carry out geological research in order to move forward in the site selection process. At the same time, RAWRA representatives have recently been reiterating that consent of the municipalities with geological research does not imply their consent with the repository. In a sense, the municipalities' prospective consent is being linked with the technical research, which is presented as a straightforward and unproblematic endeavour (“We are not talking about the repository now. We

²⁹ RAWRA's officials admit that this deadline is not realistic any more. They have currently shifted it to 2018.

only need to do the research now, to get to know the geological conditions,” repeated a RAWRA representative during a “round-table” discussion in February 2012). At the same time, it is being separated from the repository and its siting. This separation also implies the separation of the technical research from the site selection process, which is in this instance rendered as a “political” issue.³⁰

2.3 The current form of public participation

The current involvement of the public in the geological disposal development programme is shaped by the “Working group for dialogue about geological disposal”. It has been mentioned earlier in the report that the principles and ideas behind the way the group functions are largely derived from the “Argona” project and the “Riscom” method. Riscom is a method for conducting a dialogue in a structured, controlled and organized way.³¹ Such is the way the Working group also officially operates. It has a limited number of members – the quota had been previously discussed and was put in the statutory document of the group; the individual members have to be nominated. The meetings are moderated by a professional moderator, who makes sure that a programme that has been set in advance is followed. All in all, the group operates in a certain, predefined way, it is a certain way of “organized participation”.

Many of the group's members seem to appreciate its existence. They feel that the group provides space for dialogue between different parties and for “getting to know each other”. At the same time, there seem to be some tensions and problems related, sometimes indirectly, to the Working group. Most importantly, this form of participation, together with the moratorium, has replaced some other forms of involving the concerned municipalities. For instance, a member of a national NGO pointed out that after the group came into existence, their NGO ceased to organise regular meetings with some of the local representatives, thinking that the Group would make up for it. However, after one year of the Working group's existence they are considering starting to organize their meetings again (personal interview, December 2011). Some of the mayors also consider the Working group to be their primary source of information about the development of geological disposal (research interview with a mayor, October 2011). Thus, it seems that the emphasis firstly on Argona/Riscom and subsequently the Working group has shaped the current public involvement into a rather narrow, rigid and localized form, organized “from the top”. In addition, since the Working group was created, the activity of civil society stakeholders outside of the group seems to have decreased. In this respect, the Working group seems to embody some of the effects and limits of institutionalised public participation discussed by Stöckelová (2009).

There seem to be a number of tensions or problems within the Working group itself: at a practical level, the group has focused on two points so far: on how to implement a veto right for the

³⁰ Yet another factor that can sometimes play a role in this separation of the technical and the political is the existence of the KBS-3 technology and the way it is recently becoming somewhat export-oriented (cf. Elam and Sundqvist 2009). A RAWRA employee mentioned in an interview that as regards the technical implementation of GD, one can expect that there will always be the possibility of technology transfer from Sweden. This option is not a preferred one in the Czech Republic, but the possibility makes room for the separation of the technical from the social, because it makes the technical solution seem less problematic and separated from the „social part“.

³¹ For more information about the Riscom model, see for instance <http://www.karita.se/our_approach/riscom_model.php>. Vojtěchová (2009a) reports on the initial application of the model in the Czech Republic.

municipalities, so that they are able to officially refuse the repository (as of now, they are not legally able to do it), and on implementing financial contributions for the municipalities for geological research being carried out in their area. The group has proposed changes to the Atomic act that addressed both of these issues. However, while financial contributions made it into the law, the right of veto did not. It is probably not possible to find a single reason for this outcome. Some members of the group suggest that it was due to little support for the veto right on the part of RAWRA, despite the fact that the group has come to a decision to support both of the proposed changes. Other members suggest that the financial contributions found more support from the members of the parliament than the veto, and that the proposal for the veto was not negotiated with the members of the parliament enough in advance. Some also point out that many of the legislators just do not feel the need to make such changes in the Czech legislation.

Nevertheless, this issue illustrates the fact that on the one hand, it is often stressed during the Working group's meetings that the group endorses the principles of deliberation and aims at reaching a consensus of all parties, while on the other hand, it is often impossible to reach these goals. Various representatives of the public only partly and only sometimes share their interests, which results into particular clashes and tensions. While some municipalities feel bounded by the political opinion of local inhabitants about their surrounding, and openly do not care very much about broader contexts of nuclear waste, others seem to be pleased by the prospect of a substantial financial contribution to their budget. Some NGO representatives take the requirement of the "veto" partly only as a specific instance of a more general issue of political and civic cultures. They emphasise the principally unequal and unjust relationships between the state and municipalities (that frame many other cases NGOs are involved in). Other NGOs, especially the local ones, are clearly against the repository in their area, and therefore for them the veto is primarily a way to refuse the repository for good. RAWRA is accountable to the Ministry, and it is not always clear what the Ministry wants. As a result, it is not always clear what RAWRA or the Ministry expects the group to be. In sum, rather than a "safe space" and arena for reaching consensus by deliberation, the Working group is a body comprised of quite clearly delineated groups with different interests that are often in conflict: sometimes it seems that for RAWRA, the Group is a tool to achieve consent from the municipalities, for some of the mayors and NGOs it is an opportunity to change the relationship between the state and the municipalities, for others it is an opportunity to refuse the repository in their municipality, while for some mayors it is an opportunity to get extra money for their municipality's budget. Some of the members themselves acknowledge this fact – for instance, in our research interviews they would make distinctions between "us" and "them", or refer to different groups of mayors.

Furthermore, the practical status of the Working group in relation to RAWRA and the Ministry is unclear. It has been noted that some members suggest that the group's proposal for veto was not in practice endorsed by RAWRA's representatives, which was the reason why it was refused by the legislators. After this failure, RAWRA proposed to start working on a completely new law within the Working group, which some of the other members consider to be a form of a "bait", something to keep the group busy working on. Perhaps even more importantly, the Ministry of the Industry and Trade has been reluctant to comment on what it sees the group's role is, other than saying that dialogue and transparency are important. Most recently, at a public "round-table" discussion organized in February by RAWRA, a representative of the Ministry of Industry and Trade Radek Šula clearly said that the Ministry does not see any need to improve the legislation with regard to the

powers of municipalities, and that they think that the municipalities currently have enough instruments available to defend their position.³² In response, Edvard Sequens from the Calla organisation and a member of the Working group said that in that case, the Working group needs to rethink its existence, because he and some other members had been convinced that suggesting improvements of the legislation was the main aim of the group as an advisory body of the Ministry. This episode illustrates the unclear and problematic relationship between the Working group and the Ministry.

Last but not least, the current form of negotiations in the site selection process seems to be affected by previous events in the negotiation process. Some municipalities say that they mistrust RAWRA due to its approach in 2000s. This is perhaps one of the reasons why they insist on implementing the right of veto into the legislation.

2.4 The instability of public institutions

There is a more general socio-political challenge that could be described as the “instability of public institutions”, and which seems to be characteristic of the Czech Republic in general. In relation to the development of geological disposal, it is possible to be observed in several ways: first, it has been noted that the level of trust in public institutions is extremely low in the Czech Republic. The mistrust in the government and the parliament is one of the highest within the EU. On the other hand, it is interesting to note that in a Eurobarometer survey, 31% people said that they would leave the responsible authorities to decide on the matter of geological disposal. This number was the second highest in the EU (Eurobarometer 2008, p. 41). Thus, the Czech public shows a very strong mistrust in its public institutions, while at the same time being rather passive towards governance issues.

Second, there seem to be some tensions related to the division of responsibility in radioactive waste management: although the division of responsibility is formally quite clear and unproblematic, in practice it is complicated by a number of factors. One is that ČEZ is by majority state-owned and is often criticized for having a strong lobbying power in the parliament. ČEZ also owns the majority of the shares of the Nuclear Research Institute to whom RAWRA commissions many research projects. There has also been a controversy regarding the €100 million SUSEN project. The main recipient of the project funding will be the Research Centre Řež, which is wholly owned by the Nuclear Research Institute, which is owned by ČEZ. In autumn 2011, the European Commission sent an “interruption letter” to the Ministry of Education responsible for the administration of the European projects, with several objections to the project proposal. They were concerned with equal access to the newly constructed laboratories and results of the research, as well as with the question whether the proposal is not in fact trying to finance a private research enterprise. The Ministry refused the objections and said that they would “cooperate with the applicant, so that the whole process is finished successfully.” (AtomInfo 2011) This issue does not seem to be related to radioactive waste management in particular, but it illustrates the complicated relationships between the state, research organisations and the dominant energy company.

There are a number of other issues, which may not be directly related to radioactive waste management, but which illustrate the general instability of public institutions in the Czech Republic. First, the position of the Ministry of the Environment is very weak, and some NGOs point out that it

³² This “round-table discussion” took place on February 14th, 2012 in the aula of the Polytechnical College in Jihlava.

has been getting weaker in the past years (for instance, the government approved the policy on nuclear waste despite the Ministry's negative statement during the EIA; it was recently proposed that the ministry could be merged with the Ministry for Regional Development). Second, there are frequent changes in personnel in many organisations. For instance, between 2009 and 2012, there have been three different directors of RAWRA, three different Ministers for Industry and Trade, and six different Ministers of the Environment. Third, it can be assumed that this instability also relates to the low level of trust of the mayors in RAWRA – some mayors say that they may trust the individuals who currently work on the geological disposal, but they cannot trust the institution. RAWRA is accountable to the Ministry of Industry and Trade, and it could be dissolved (its legal position is not as strong as the position of the State Office for Nuclear Safety, for instance). That is one of the reasons why the mayors see the veto as a stronger guarantee than the promises of individual RAWRA representatives. Fourth, some NGOs suggest that there has been a general trend to limit the possibilities of public involvement in controversies and political issues. It can be observed by cuts in funding and recent changes in laws, such as the law for constructing public infrastructure.³³

2.5 The country's energy policy

The Ministry of Industry and Trade has been preparing an updated national energy strategy. In autumn 2011, a draft version leaked out to the public. In all scenarios, it included a massive nuclear new build (of up to 10,000 MW). Even the chair of the State Office for Nuclear Safety said that such increase is “unrealistic” in the Czech Republic, that it would not be possible to build new NPPs at such a massive scale.

It is of interest that supposedly, the draft version of the document was written by Mr. Pazdera, a former CEO of the Nuclear Research Institute and later a high officer within ČEZ. In autumn 2011, Mr. Pazdera was designated as the deputy minister for industry responsible for energy policy. Nevertheless, the minister also changed in the meantime (due to a personal financial scandal of the former minister), and the new minister asked to take extra 6 months to revise the Energy strategy (it was originally due to be completed by the end of 2011). Thus, the revised national energy policy is currently to be published in the mid-2012. According to the media, it will not feature such a massive nuclear new build, but most likely it will endorse the vision of constructing the two new blocks at the Temelín nuclear power plant, and possibly some new blocks at the Dukovany plant as well.

It is also of interest that a consortium of five NGOs has recently published an alternative energy policy document called *Smart energy* (Polanecký et al. 2010), which tries to outline the possibilities of increasing energy efficiency and the use of renewable sources of energy in the Czech Republic. In fact, it is strikingly similar to the new Danish energy policy (see The Danish Government 2011). Nevertheless, it has not been taken into account by those who prepare the Czech energy policy.

All in all, the (obscure) way in which the Czech energy strategy is being prepared, together with the intertwined relationships between the state institutions and the dominant energy producer, with the plans for nuclear new build³⁴ openly supported by the government³⁵, all create a significant socio-

³³ As an example, the association of Czech environmental NGOs „Green Circle“ runs a project that wants to support the possibilities for public participation in these situations, and argues that currently these possibilities are under pressure to be limited (<http://www.zelenykruh.cz/en/>).

³⁴ ČEZ wants to build two additional reactors at the Temelín power plant. The plans from the 1980s included the

political challenge which complicates the negotiations between the state and the municipalities regarding the nuclear waste disposal, and compromises the declared effort to lead “transparent” and “open” dialogue in this matter.

construction of four blocks in Temelín. However, after 1989, the works on the third and fourth reactor were stopped. Thus, ČEZ calls the plan today as „completing“ the nuclear power plant, rather than „building new blocks“.

³⁵ Apart from the fact that the Prime Minister has iterated a number of times the government's support for the new build, it should also be noted that the government has created a position called „the governmental ambassador for energy security“, and another position called „the governmental envoy for the completion of the Temelín nuclear power plant.“ Both of these positions are held by a single person at the same time.

3 Identifying significant socio-technical challenges

It may be (and it probably is) that socio-technical challenges described in this section are not much specific for the Czech Republic. Rather, we try to highlight not some particular moments per se, but possible links between the specific features of the Czech reality and general interpretive framework of the InSOTEC project.

This final part is therefore less an objective report and more an interpretive exploration. This exploration is based on the *assumption* that it makes sense to talk about politics of radioactive waste management in STS-related terms of socio-technical networks and to focus upon the ambivalent relationships between “the social” and “the technical”. At some occasions and for some people, often provisionally, partially and locally, the social should be distinguished and even separated from the technical, so that a solution for the problem can be found and achieved (e.g. characteristically, people get convinced that a social consensus should be established *first*, and only *afterwards* technical implementation can proceed). Such a standpoint may have been summarized as follows: *both* the social and the technical must be respected, but provided the two remain distinct, not interfering with each other. Then, struggles over where the dividing line between the two spheres is shape the processes and the results of practical controversies. On other occasions and often by the opposing parties, however, social aspects are considered as non-separable from the technical ones.

To talk about the *socio-technical* does not simply mean that technical aspects are considered alongside the social ones (and vice versa), to think “also of the other side”, so to speak. Rather, within the STS tradition, it means to analytically focus on how the dividing line between the social and technical is maintained or dismantled, made visible or invisible, suppressed or strengthened, and thus, turned into a resource for practical action of this or that type. To understand the complex and still rather unexplored circumstances of the nuclear waste management, we have to study the key element of the respective processes, i.e., the boundary-work that takes place in between of what we conventionally call “social” and “technical”.

The socio-technical issues we want to introduce are, in fact, mutually related. They co-produce a single complex development and they can hardly be listed as independent items of a list.

In the Czech Republic, the only visible part of the deep geological disposal agenda currently is the selection of suitable places for a depository. Newspapers publish reports about what candidate places have been suggested, about how the concerned villages protest against their inclusion in the list and, recently, how these villages react to the financial incentives proposed by the state (as a reward for their eventual consent with detailed geological inquiries that should start this year). In other words, the main focus is on attempts at negotiation with local inhabitants.

3.1 Absence of the technical?

The technical aspects and solutions are not much part of this public discourse about site selection. People are not asking about them, experts are not explaining them or using them to support their arguments to convince the opponents. It is expected that technical issues will be handled by respective experts later on, or simultaneously, but separately. Perhaps with one specific exception (to which we will come back later): organized trips abroad, mainly to Finland and Sweden (e.g. in RAWRA 2010, p. 31), one of the most advanced countries in GD. During these trips, organized by RAWRA, representatives of concerned municipalities visit existing “rock laboratories” to see by their

own eyeballs what such facilities might look like. Such occasions might be rare opportunities to ask technical questions and consider technical particularities of GD. Still, they are opportunities to ask primarily about the situation in Sweden or Finland, rather than the Czech Republic.

It is still unclear to what extent this absence of “technical aspects” in the public discourse corresponds with actual research programs and engineering activities focused on deep geological disposal. As indicated in the previous section, most of the technical research is in practice done behind the closed doors, and it is only briefly reported about. The position and the mission of RAWRA are in some ways unclear, and sometimes it seems that the current situation of negotiating with villages (without really doing something beyond) in a way suits many potentially involved parties. It is important to note here that the new era of GD in the Czech Republic, after five years of moratorium, started by RAWRA declaring that it would not go against the will of the villages, hereby defining its new focus on the dialogue with public.

3.2 Hierarchies and timing of the social/technical

The absence of the technical in the current public discourse in the Czech Republic could be seen, to a large extent, as a matter of timing: techno-scientific expert interventions, if referred to, are typically located in the *future*, i.e., after the social consensus about siting is achieved. Simply put, the time for the technical and the time for experts is yet to come. As observed in the previous sections, an exception here is the current emphasis on the need to carry out geological research in the preselected locations as soon as possible. But we have also seen that this “technical” issue is handled in such a way that it is being separated from the “social” problem of selecting a final site for geological disposal (“we are not talking about the repository now, we are only talking about geological research”). Otherwise, for the time being, the rule of experts in this area had to be moved aside to ensure public support. Only afterwards, after “the social problem” is solved, we can go back to “the real thing” of technological innovation. One can follow this logic in the official schedule of the entire process, in the agenda of the public participation body, in how NGOs, politicians and often also municipalities talk about these issues.³⁶

Setting apart and making a hierarchy of the social and the technical are characteristically performed by their practical separation in time. However, it is not that this operates as a carefully designed and elaborate strategy of certain actors. For many, it operates as a “logical” consequence of how we often understand the relation between knowing and doing. In science-driven settings, knowledge is taken as a precondition of action. First, we have to diagnose, analyze possible side-effects and do careful planning; only then interventions such as rational medical treatment or technological innovation can take place. But what if it appears that solid information and knowledge cannot be obtained without some steps in technical implementation? For instance, what if it appears that we hardly can obtain sufficient knowledge of building, starting and maintaining a depository in a specific site without simultaneously constructing it? After all, a visitor of disposal sites in Sweden or Finland quickly realizes that making a “rock laboratory” (a knowledge-producing site) to a large extent equals

³⁶ Organized public participation is intended only for the beginning of the process only and it is being set apart from any subsequent issues. Quite interestingly, this pattern of public participation is not enacted only by top-down organizers of public involvement, but also by NGOs. Interested NGOs representatives focus very much on implementing a „veto“ right that should ideally take place early in the process of site selection; they almost do not pay attention, however, to what might happen later in the process, in terms of technical research/development and negotiations between the municipalities and the state.

to making a *real depository* (minus the waste). Before heavy machinery penetrating deep under surface, any knowledge is only tentative, preliminary and full of “mere assumptions”. Thus, it seems that we need some technical intervention in order to know what to negotiate. But in the Czech Republic, negotiations have been put forward – in front of, or separate from the technical knowledge-production. For the municipalities, it may be similar to being persuaded to buying something (or, to be more precise, to be given money for taking something) that is wrapped in a paper bag, and you can only open it once you get home.

Not only brochures for the visitors of the existing underground laboratories make it quite clear, but also the very process of siting. Municipalities in the Czech Republic are asked for their consent to *start research*. And they are assured: just research, nothing more, for the time being! Do not be overcautiously afraid! And municipal representatives perhaps a bit intuitively, but rightly suspect: Words, words, words! Once you start digging here, it would already be part of building the disposal site. That is why some of them require that research should proceed in *several places* in parallel. In part, it may symbolically express relative independence of this research (in several places) from actual construction of (one) facility; also, however, it may be understood as an indirect pressure to limit the research work (it would cost much more if done in several places) so that it may be either given up completely under the current conditions or kept only at a very basic level, which would remain far away from a real technical implementation.

This seems, of course, a contra productive, paradoxical strategy, because at the same time the municipalities sometimes insist upon precise and far-seeing expert knowledge that would guarantee safety of the planned facility. They complain that we simply do not know enough about possible risks and consequences.³⁷ But how to know more without going deep down to study specific geologic and water conditions and without experimenting on site with materials, procedures and technologies? In other words, how to know more without abandoning the idea that a political consensus can be achieved *first* (on some clearly safe technological procedure) and only then the facility would be simply constructed? Already now the negotiations are very difficult and tiring. Why then to accept the idea that technical implementation, in each particular step, requires some partial and situated consent from the concerned public (together with complicated translations of the entire project into something else) and that all this decision-making martyrdom cannot be really done once and for all?

This tension is present in various forms in the current state of affairs in the Czech Republic. As such, it presents interesting material for the study of socio-technical issues.

3.3 “Natural conditions” vs. “engineered barriers”

In the Czech Republic, there is one interesting feature of the debate about candidate sites and about reasons for their selection. This debate is almost exclusively based on supposed geological suitability of the locations – they all are simply characteristic by unique geological qualities of underlying bedrocks. Period. As if nothing else counted: Nature itself decides. (Only now we are at the specific phase when humans – thus pre-selected by Nature – and their interests can be taken into account, when these lay-men are asked for their consent, to be subsequently left without voice and concern afterwards, when the technical work would start.)

³⁷ Other times, however, some of them are not interested in any kind of similar argumentation and, instead, they say their fellow citizens “simply do not want it here”, regardless of any scientific assurances.

Mark Elam and Göran Sundqvist (2011), when describing the relatively successful Swedish nuclear waste management programme as a “mutable mobile” (Latour), speak about two sets of arguments used during the siting process. One emphasizes suitable (immutable and immobile) “natural conditions” of a location, while the other highlights “technological barriers”, i.e. what can be done by humans to *make* various places suitable and safe for the given purpose, and thus make the SKB project a more “fluid” one.

It is obvious from what we know about the situation in the Czech Republic that, in comparison to the Swedish case described by Elam and Sundqvist, the public legitimacy of proposals and decisions is based not on heterogeneous sources and considerations, but rather exclusively on a single and very simple assumption of geological (natural) suitability. Although research into engineered barriers is apparently being carried out, in the public arena, the discourse of “technological barriers” is practically missing – as already indicated. Moreover, the history of the site selection process as portrayed in the previous chapters shows that there is a hint of a similar shift – from finding “the best” site in terms of geology, to considering one which had been labeled as “not recommended”, but which may turn out to be the most acceptable. The absence of the discourse on “technological barriers” may be partly due to the initial stages of the process. The sense for heterogeneity needs time and various forces to develop. Partly, however, it has also something to do with varying political cultures related to techno-scientific settings and issues. We believe that in the Czech Republic this political culture is different from most Western European countries – not radically, but slightly (and even so importantly) different.

In this respect, the emphasis on natural conditions in the Czech siting debate refers also to complicated relationships between the social and the technical. The discourse of “technological barriers”, pointing toward what can be done to *make* sites safe and thus suitable for the facility, speaks (mainly through the mouths of engineers) of technological artifacts, materials etc. It is obviously a part of the “technical”. Not exclusively though. It also brings an element of responsibility and human intervention. In comparison to this, the discourse of “natural conditions” suggests that it is primarily Nature itself, without any human involvement, what can decide and what guarantees secure existence of the disposal site. “Natural conditions” seem being given in advance, articulated by expert voices, beyond any discussion (and even beyond anyone’s responsibility)... a very simple and powerful argument. While addressing “technological barriers” interconnects, in a way, the social and the technical and makes it clearer that the two cannot be separated, talking (exclusively) about suitable bedrocks beneath the locations seems promoting separation or purification of the social or political from the scientific and technical; and, also, knowledge from action – we can have decisive knowledge first, upon which we are able to safely build.

3.4 Political machineries

If we take translation of a controversy into a “technical problem” as a means of its de-politicization (and vice versa), we can add another aspect of socio-technical tensions characteristic for the Czech Republic, namely *technicization* of the political process itself. At the centre of any political action we can find the tension between relatively spontaneous protests or resistance on the one hand and carefully orchestrated and formalized engagement of the “public” on the other hand. Public debates and public participation in the issues related to the geological disposal of nuclear waste in the Czech Republic seem to be highly technicized (or at least under technicizing pressures).

Besides already mentioned signs of this phenomenon, there are plenty of others. It is indicative, for instance, that the Czech term used for public involvement evokes literally “switching on” or “hooking

up”, in a very technical meaning. Public participation in this specific context seems to be limited to the Working group, formally established and orchestrated from the top (following the Riscom model for public participation); the agenda of this group focuses on legal issues and formalized collaborations. Other forms of public involvement (including less formal meetings between municipalities only) have decreased – possibly also due to the moratorium and then the existence of the Working group. It is symptomatic that various people often speak of establishment of this deliberative forum for geological disposal as a means of *preventing* social conflict, while this very forum was, in fact, established as a result of an already developed social conflict. There are signs that such formalized public participation often leads not to active participation, but rather to passivization of the public. It becomes a technical (and essentially non-political) means of achieving or legitimizing respective decisions (see also Sundqvist and Elam 2010).

But of course, pressures toward technization of politics produce a kind of resistance. We can see this even in the midst of the Working Group: its members often complain that something formally agreed at the round table, transparently and officially, turns into nothing the next day when “real politics” is pursued by means of informal and unofficial meetings and negotiations. Despite well established status of the Group, its effective power is extremely low. And not a small part of its members take their membership with reservations, rather formally, so to speak... Again, even here a highly complex interplay of the technical (de-politicised, formalized etc.) and the social (from-below, inter-active) is observable and playing an important role in the entire process.

3.5 To sum up

In short and to sum up this part about “socio-technical issues”, in the Czech Republic the social and the technical aspects of geological disposal of nuclear waste are kept relatively (!) separated, while the current focus in the public discourse is on political negotiations over siting of the planned facility; within these negotiations the emphasis is put, by various participants, on a single and simple (and isolated) argument of geological (natural) suitability, which indirectly strengthens the overall emphasis on the technical; and public involvement takes a somewhat technicized (technocratic) form, which can be taken as an integral part of the entire techno-political culture in the country.

References

- ATOMINFO (2011): "Evropské komisi se nezamlouvá režský projekt SUSEN." *Atominfo*, 30.8.2011. Available online at <<http://atominfo.cz/2011/08/evropske-komisi-se-nezamlouva-rezsky-projekt-susen/>>.
- ČEZ (2011): "Lokalita Skalka: záložní varianta skladu použitého jaderného paliva." Available online at <http://www.cez.cz/edee/content/file/odpovedna-firma/dl_skalka_screen.indd.pdf>.
- THE DANISH GOVERNMENT (2011): *Our Future Energy*. Copenhagen: The Danish Government.
- DENÍK REFERENDUM (2012): „ČEZ dostane evropské i vládní miliardy. Greenpeace: Dotují se tím škody.“ *Deník Referendum*, 7. 2. 2012. Available online at <<http://denikreferendum.cz/clanek/12492-cez-dostane-evropske-i-vladni-milardy-greenpeace-dotuji-se-tim-skody>>.
- EKOLIST.CZ (2009): "Úložiště jaderného odpadu: MPO nabízí miliony, obce chtějí právo veta." *Ekolist.cz*. Available online at <<http://ekolist.cz/cz/zpravodajstvi/zpravy/uloziste-jaderneho-odpadu-mpo-nabizi-miliony-obce-chteji-pravo-veta>>.
- ELAM, M. & SUNDQVIST, G. (2009). "The Swedish KBS project: a last word in nuclear fuel safety prepares to conquer the world?" *Journal of Risk Research* **12** (7-8), 969-988.
- ELAM, M. & SUNDQVIST, G. (2011). "Meddling in Swedish success in nuclear waste management." *Environmental Politics* **20** (2), 246-263.
- EUROBAROMETER (2008): *Attitudes towards radioactive waste. Special Eurobarometer 297*. European Commission.
- JIHOČEŠTÍ TAŤKOVÉ (2011): "Profil." Available online at <<http://www.jihocestitatkove.cz/index.php/profil/>>.
- KONOPÁSEK, Z. (2006): "Why experts are seen as neutral arbiters in the Czech Republic? Understanding the post-communist politics of de-politicization." CTS Research Reports. Praha: CTS.
- KRAJÍČEK et al. (2006): "Provedení geologických a dalších prací pro hodnocení a zúžení lokalit pro umístění hlubinného úložiště. Předběžná studie proveditelnosti, Svazek B Lokalita č. 7 – Lodhěřov." Prague: RAWRA.
- MATOUŠEK, L. et al. (2003): "Politika nakládání s radioaktivními odpady a její nedostatky." Brno: Hnutí Duha.
- MPO ČR (Ministry of Industry and Trade of the Czech Republic) (2001): *Koncepce nakládání s radioaktivními odpady a vyhořelým jaderným palivem v ČR*. Praha: MŽP ČR.

- MŽP ČR (Ministry of the Environment of the Czech Republic) (2001): "Stanovisko Č.j.: NM700/2453/3753/OPVŽP/01/JS." Prague: MŽP ČR.
- NKÚ (Supreme Audit Office) (2011): "Informace z kontrolní akce č. 11/09." Prague: NKÚ.
- PISKAČ, J. et al. (2003): "Výběr lokality a staveniště HÚ v ČR. Analýza území ČR, Fáze regionálního mapování. Zkrácená verze zprávy." Prague: RAWRA.
- POLANECKÝ et al. (2010): *Chytrá energie*. Brno – České Budějovice – Praha: Hnutí DUHA, Calla – Sdružení pro záchranu prostředí, Greenpeace ČR, Centrum pro dopravu a energetiku, Ekologický institut Veronica .
- PRACOVNÍ SKUPINA PRO DIALOG O HLUBINNÉM ÚLOŽIŠTI (2010). "Statut." Praha: Pracovní skupina pro dialog o hlubinném úložišti.
- RAWRA (1999): "Výroční zpráva o činnosti Správy úložišť radioaktivních odpadů v roce 1998. (RAWRA 1998 Annual Report).
- RAWRA (2004): "Výroční zpráva o činnosti Správy úložišť radioaktivních odpadů v roce 2003. (RAWRA 2003 Annual Report).
- RAWRA (2009): "Výroční zpráva o činnosti Správy úložišť radioaktivních odpadů v roce 2008. (RAWRA 2008 Annual Report).
- RAWRA (2010): "Výroční zpráva o činnosti Správy úložišť radioaktivních odpadů v roce 2009. (RAWRA 2009 Annual Report).
- RAWRA (2011): "Annual Report 2010".
- RAWRA (2011a): "LLW Repositories." Available online at <<http://www.surao.cz/eng/Radioactive-Waste-Repository/LLW-Repositories>>.
- RAWRA (2011b): "Kraví Hora na Žďársku byla zařazena mezi lokality uvažované pro umístění hlubinného úložiště." Available online at <<http://www.surao.cz/cze/O-SURAO/Aktuality/Kravi-Hora-na-Zdarsku-byla-zarazena-mezilokality-uvazovane-pro-umistenihlubinneho-uloziste>>.
- RAWRA (2011c): "Plán činnosti a rozpočet Správy úložišť radioaktivních odpadů na rok 2012, tříletý plán a dlouhodobý plán." Prague: RAWRA.
- RAWRA (2011d): "Správa úložišť radioaktivních odpadů oslovila dopisem z 9. března starosty všech šesti potenciálních lokalit vytipovaných pro možné umístění hlubinného úložiště." RAWRA press release, March 16, 2011.
- RESEARCH CENTRE ŘEŽ (2011): "Project Goals." Available online at <<http://www.cvrez.cz/web/en/project-goals>>.
- SEQUENS, E. (2011): "Nové lokality ve hře o úložiště." In *Jaderný odpad? Děkujeme, nechceme 2011* (1, 2). České Budějovice: Calla – sdružení pro záchranu prostředí.

- SKOŘEPA, J. et al. (2006): "Provedení geologických a dalších prací pro hodnocení a zúžení lokalit pro umístění hlubinného úložiště. Zpráva o řešení a výsledcích projektu, Svazek A Souhrnná zpráva." Prague: RAWRA.
- STÖCKELOVÁ, T. (2009). "Beyond inclusion: effects and limits of institutionalised public participation." *International Journal of Risk Assessment and Management* **12** (1), 48-63.
- SÚJB (2011): "Spent Fuel Management." Available online at <http://www.sujb.cz/?c_id=1031>.
- SUNDQVIST, G. & ELAM, M. (2010). „Public Involvement Designed to Circumvent Public Concern? The "Participatory Turn" in European Nuclear Activities.“ *Risk, Hazards & Crisis in Public Policy* **1** (4), Article 8.
- ŠÍMOVÁ, M. (2009): "Starostové jeli na 'masáž' kvůli hlubinnému úložišti." *Mladá fronta DNES*, 28. 11. 2009.
- VOJTĚCHOVÁ, H. (2009a): "Application of the RISCUM model in the Czech Republic." ARGONA Deliverable 14. Řež: NRI.
- VOJTĚCHOVÁ, H. (2009b): "The Role of Local Referenda." ARGONA Deliverable 16a. Řež: NRI.