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ABBREVIATIONS

AE	- Nuclear power plant
ALARA	- As Low as Reasonably Achievable
BOZP	- Safety and protection of health at work
CSNI	- Committee of safety of nuclear installations
ČR	- Czech Republic
ČSKAE	- Czechoslovak Commission for the Atomic Energy
DG	- Diesel generator
EBO	- NPP Bohunice
EC	- European Commission
EDU	- NPP Dukovany
EIA	- Environmental Impact Assessment
EK	- European Commission
EMO	- NPP Mochovce
ENEF	- European Nuclear Energy Forum
EÚ	- European Union
FS KRAO	- Final treatment of liquid radioactive waste
HÚ	- Deep geological disposal
CHKO	- Protected land area
IAEA	- International Atomic Energy Agency
ICRP	- International Commission on Radiological Protection
INES	- International Nuclear Events Scale
IPSART	- International Probabilistic Safety Assessment Review Team
IRAO	- Institutional radioactive waste
JE	- nuclear power plant
JZ	- Nuclear facility
KPÚ	- Regional land office
KÚŽP	- Regional environmental office
LRKO	- Laboratories of radiation surveillance of the environment
MH SR	- Ministry of Economy of the Slovak Republic

MO 3,4	- Nuclear power plant Mochovce, 3rd and 4th block
MP SR	- Ministry of the soil protection of the Slovak Republic
MV SR	- Ministry of Interior of the Slovak Republic
MZ SR	- Ministry of health of the Slovak Republic
MZV SR	- Ministry of Foreign Affairs of the Slovak Republic
MŽP SR	- Ministry of environment of the Slovak Republic
NJF	- National Nuclear Fund
NR SR	- Parliament of the Slovak Republic
NV SR	- Order of the Government of the Slovak Republic
ObÚŽP	- District environmental office
OECD/NEA	- Organization for Economic Co-operation and Development/Nuclear Energy Agency
PG	- Steam generator
PRA	- Probabilistic Risk Assessment
PSA	- Probabilistic Safety Assessment
PZ	- Police force
RAO	- Radioactive Waste
RÚ RAO	- Republic radioactive waste repository
SE	- Slovak power plants
SEA	- Strategic Environmental Assessment
SR	- Slovak Republic
STN	- Slovak technical standard
TNR	- Reactor pressure vessel
TVD	- Technical water significant
ÚJD	- Nuclear Regulatory Authority of the Slovak Republic
SR/NRA SR	
UNSCEAR	- United Nations Scientific Committee on the Effects of Atomic Radiation
ÚP	- Terrestrial planning
ÚVZ SR	- Public Health Authority of the Slovak Republic
VJP	- Spent nuclear fuel
VVER	- Power reactor moderated and cooled by water
WANO	- World Association of Nuclear Operators
WENRA	- Western European Nuclear Regulators Association

- WIPP - Waste Isolation Pilot Plant
- ZČJE - Back-end of the nuclear energy
- ŽP - environment

1. INTRODUCTION

The submitted expert appraisal of the proposed activity “Nuclear Power Plant Mochovce WWER 4x440 MW – 3rd construction” represents, according to Article 36 of Act No. 24/2006 Coll., a semi-final step of the corresponding EIA process. The third construction is basically finalization of the third and fourth block of the nuclear power plant Mochovce – in terms of corresponding provisions of the Civil Constructions Act, the changes of the construction before its completion are concerned. Already in this introductory part, the reviewer considers it to be rationale to react on some aspects of the documentation and process EIA, or on aspects common in the viewpoints to this documentation from involved bodies or which were presented on public hearings or consultations at an international level.

In the first place, it is needed to draw attention to the fact that the Environmental Impact Assessment Report (Environmental Impact Statement) exists in two language mutations: English and Slovak; the summary is written also in other languages. Regarding the subject who elaborated the report, it can be presumed that the original version was written in English language. However, the Slovak version, which is not fully identical with English original, is the official one. Thus, if the report itself is reviewed in this appraisal, the Slovak version is always concerned.

Quality of the reviewed report could be significantly enhanced by principal modification of the text structure, harmonization/unification of terms used in individual parts and annexes and by stylistic modification of text. The text often comprises fully incomprehensible sentences. Specialist could think their sense to the end, but the report is not assigned only to specialists. It is evident that many failings have accrued from unprofessional translation of some parts of the text from English to Slovak language, or from a multiple translation, when the text was not further reconditioned and harmonized with appropriate terminology. Today the accurate definitions of terms are established not only in various glossaries (e.g.: „Radioactive waste management glossary: 2003 edition. IAEA, Vienna, 2003“, or the newer: „IAEA safety glossary: terminology used in nuclear and radiation protection: 2007 edition, IAEA, Vienna, 2007), but also by national and international legislation.

One must state that, as a consequence, there are technical mistakes in the text of the report at first sight. Specialists definitively can consider the use of an incorrect term or omitting a seemingly insignificant word, which can change wording of the whole paragraph, as a translator’s mistake. However, the given report assesses the activity which is a subject of noticeable public interest and as such it has been made public and submitted abroad in the first edition without redaction. The reviewer dares to claim that these facts can lead to undesirable doubts regarding the whole intention and work of specialists who participated in groundwork and partial reports. The mistrustfulness and apprehensions from radioactivity, escapes, and accidents are an attendant phenomenon of the nuclear energy development. The reviewer conjectures that publication of such stuff can be more to the detriment of the cause than of use. It is in spite of the fact that the report comprises all information supporting the statement on a negligible impact of the proposed activity on public health.

A relatively large amount of mistakes and manifolds shows insufficient editorial work at compilation of the Slovak version of the report. The same is evidenced by the fact that the same things (e.g. radioactive waste management, releases) in more parts of the report are considered differently by the matter-of fact and content. Thus, the report does not provide an easy survey. In spite of stylistic and terminological failings and

a sizeable level of uncertainty, the document provides complex familiarization with impacts invoked from the proposed activity. It is only very difficult to search corresponding thematic blocks in the document and the relevant data within them.

1.1. HISTORICAL OVERVIEW

The first official decision in regard the siting of construction of the nuclear power plant Mochovce (the siting license) was issued in 1980 (Decision on siting No. Výst. 3865/1980 from October 22, 1980, became effective since November 7, 1980; issued by the District Committee, the Department of building and land use planning, Levice). The final decision on the construction siting comes from the following year (Decision on the construction siting No. Výst. 3818/81 from January 28, 1982, became effective since February 4, 1982; issued by the District Committee, the Department of building and land use planning, Levice), namely for objects of the construction „Nuclear power plant Mochovce 1st construction (preparation of a construction site), 2nd construction (WWER 2 x 440 MW – 1st and 2nd block), 3rd construction (WWER 2 x 440 MW – 3rd and 4th block)“.

Construction of the Nuclear Power Plants Mochovce began in 1986. Outgoing from the above-mentioned siting license, the Department of Construction of the District Committee issued an approval of the construction (construction license No. Výst. 2010/86) of the MO 3,4 in November 12, 1986. Even in 1992, it was decided to supersede the construction of the 3rd and 4th block and consequently perform needed conservation works. Number of facilities in the process of construction was 70 % of a construction part and 30 % of a technological part. On the other hand, a deadline of the MO 3,4 construction finalization was first postponed to December 31, 2005 by a letter of the Department of environment of the Regional authority in Nitra ref. No.: 97/02276-004 dated as May 5, 1997.

The first two blocks of the Mochovce NPPs were completed by their putting into operation according to the corresponding official decisions of ÚJD SR (operational licenses) in 1998 and 2000. The deadline date in the construction license was again postponed to December 31, 2011 by decision of the Regional construction office in Nitra, ref. No.: 2004/00402-007 dated as July 15, 2004.

Then the privatization of the Slovak Electric followed. Since April 2006, Enel has been controlling 66 % of the Slovak Electric, the Fund of national property owns remaining 34 %. Its shareholder rights are performed by the Ministry of Economy of the Slovak Republic. After the privatization, the changes of approaches to the MO, 3,4 construction completing began. In February 2007, General Director of Enel Mr. Fulvio Conti confirmed the decision on the MO 3,4 construction completion. The construction completion officially began on November 3, 2008. Improvements which increased safety of blocks to the level corresponding with up-to-date requirements have been gradually incorporated into the original design. New safety systems allowing handling events formerly not considered in the original design have to be consequently implemented also on existing blocks of the same type. In addition, works on preparation of the construction site were performed, revision of technical equipment of technological and construction parts as well as revision of existing inventories passed.

A positive standpoint of European Commission, according to the Article 43 of the Euratom Treaty, was issued on July 15, 2008. European Commission confirmed that the designs meet international requirements in regard of nuclear safety. International safety appraisals (IAEA, WANO, WENRA, Walkdown 1 and 2) have

confirmed that the safety level of reactors operated in Slovakia is comparable with nuclear power plants operated in other countries worldwide.

Beginning of the construction completion followed the official decision of the Nuclear Regulatory Authority No. 246/2008, where the change of the construction in question before completion was approved. In the official decision, the UJD SR established a new deadline for finalization of the construction: December 31, 2013. Reasoning of the decision of UJD SR refers to the standpoint of Ministry of Environment of the Slovak Republic (ref. No.: 7451/2008-3.4/hp dated as August 8, 2008, where the Ministry stated that the change of the construction before its completion cannot be considered either as a new activity or as a principal change of the original design. It states, that an administrative procedure in case of approval of a given activity according to special provisions had begun before the EIA act was entered into force, therefore the act cannot be applied on the activity approved before its entering into force. At the same time, the Ministry draws attention to the fact, that the nuclear facility shall be assessed according the Act No. 24/2006 Coll. (EIA Act) before putting into operation (operational license) will be approved (granted). ÚJD SR also issued an approval of "execution of changes on classified facilities of MO 3, 4 influencing nuclear safety during the construction" in scope of 120 explicitly listed parts of the initial design documentation (official decision No. 266/2008) and an approval of "execution of changes in the document "Preliminary safety case of 3rd and 4th block of the Mochovce power plant" in a submitted scope" (official decision No. 267/2008).

Investment regarding the construction completion should reach 2.775 billion €. Slovak Electric finances the project mainly from its own operational capital flow and the construction completion of the 3rd and 4th block is not supported by any form of the state help. Two new reactor blocks should be synchronized to the network in 2012 and 2013. After completion and putting into operation, 880 MW_e installed production capacity will be able to cover up to 22 % of Slovak consumption.

1.2. GENERAL ISSUES

1.2.1. Nuclear safety and EIA

A significant part of specific requirements in the assessment scope, as it has been established by the Ministry of Environment, a part of comments to the assessment report or presented on public hearings or international consultations, mainly from enemies of peaceful use of nuclear energy, has been addressing the questions of nuclear safety. They can be found, according to the Atomic Act and its executive regulations, in basic documents for an official decision of the Nuclear Regulatory Authority of the Slovak Republic as appraised within the corresponding procedures on the UJD SR. The UJD SR, as it is mentioned above, as a specialized construction office, approved the change of the construction in question before its completion (by the official decision No. 246/2008) and, as a state body supervising nuclear safety, issued the approval of "execution of changes on classified facilities of MO 3, 4 influencing nuclear safety during construction" in scope of 120 explicitly listed parts of the initial design documentation (i.e. approval of updating the initial design – by the official decision No. 266/2008) and the approval of "execution of changes in the document "Preliminary safety case of 3rd and 4th block of the Mochovce power plant" in a submitted scope" (i.e. an approval of its updating, in fact – by the official decision No. 267/2008). The fact that aspects of nuclear safety already appraised in the framework of regulatory functions of the Nuclear Regulatory Authority are

significantly discussed/objected within the process EIA, leads to considerations regarding the relationship of both processes, and the documentation which both processes are based on.

It is necessary to say that introduction of the EIA process in a nuclear area in the Slovak Republic did not represent such a milestone as in other (non-nuclear) areas. More than 15 years ago, according to provisions of the Construction Act and its executing regulations and regulations of the Czechoslovak Atomic Energy Commission, which were valid that time, there did exist an institute of a fundamental safety report and corresponding procedures leading to the license of siting the nuclear power facility. In the framework of this, the environmental impacts of the construction and operation of such a facility, as resulted from the initial design documentation, were predominantly assessed. If one does not consider possible differences in approach to non-radiological impacts during the existence of a nuclear facility, we can state, with some simplification, that only a basic difference between EIA processes on one hand and procedures of the Nuclear Regulatory Authority on the other hand rest on the concerned public participation margin.

Analysis of the juridical situation regarding accessing of safety documentation for the concerned public needs is a part of official decisions of UJD SR in early 2009, where the inaccessibility of some documents or information required with referring to the Act on a free access to information (official decisions No.: 11/2009, 12/2009, 14/2009, 48/2009). In the reasoning of the decision No. 48/1009, there is a detailed legal analysis, why the documentation, on basis of which the given subject applies to the governmental body for an official decision, cannot be publicly acceptable.

Purely from the matter-of-fact point of view, questions of nuclear safety and environmental impact are hardly separable, or they are overlapping each other, respectively. In addition, it is needed to mention, that besides the Act No. 211/2000 coll. on an access to information, there is also the Act No. 205/2004 Coll. on collection, storing and dissemination of information regarding environment (as amended by the Act No. 4/2010). According to the Article 2, par. (2) of this Act, the Ministry of Environment decides, if the information in question can or cannot be considered as information concerning environment, thus accessible according the act provisions. If such dubiousness concerns a matter which is a subject to the generally binding enactment within an agency of another governmental body, the Ministry decides after a negotiation with that body.

The assessment report and responses to comments to that directly refer or cite the safety documentation. From this point of view, aspects of nuclear safety as they have been inscribed in the EIA documents, or within the public hearings and consultations, respectively, can be understood as some kind of accessible digest from the safety documentation.

There is one point within the EIA processes with an opportunity to uniquely determine how the questions of nuclear safety will be conceived in the assessment report. According to an opinion of the reviewer, that point is logically the scoping, which is done by a competent body (the Ministry of Environment of the Slovak Republic in our case) in collaboration with a departmental body (Ministry of Economy of the Slovak Republic) and with a permissive body (the Nuclear Regulatory Authority of the Slovak Republic) – Art. 30, par. (1) of the EIA Act. According to provision of the next paragraph of the same article, determination of the assessment scope starts from the Annex 11 of the Act and takes into account the standpoints of the departmental body, permissive body, involved body, involved community and public to the intention.

The next contiguous question is, whether the UJD SR should initiate the EIA process in connection with the approval of the changes of construction before its finalization, or whether it could issue a construction license without processing the EIA, respectively. Reasoning why it was possible to issue the license without

processing the EIA is handed up in the official decision of UJD SR No. 79/2009 (points 2 and 3 of its reasonable part). With some simplification, it could be stated from today point of view, that it was because the Act No. 287/2009 Coll., amending the EIA Act particularly in concerning the changes, was not in force that time.

In fact, authors of comments concerning nuclear safety within the EIA process present their:

- dissatisfaction with the scope and concept of information being on the border between the nuclear safety area and the area of EIA in the EIA documentation,
- mistrust of the state supervision of the nuclear safety of nuclear facilities in fact, or mistrust of the independency of the Nuclear Regulatory Authority of the Slovak Republic, respectively.

It is necessary to add that the nuclear supervision performance in the Slovak Republic was positively appraised within the framework of a specific mission of IAEA.

The next relative fact is that the report on environmental impact assessment being appraised here comprises also parts considering professional irradiation of workers. That represents exclusively the domain of corresponding parts of safety reports. Professional irradiation of workers is not a parameter of the environmental impact itself; it can be an attribute of a multi-attribute analysis performed due to selection of an optimal alternative. However, that is not a case of the report on the environmental impact assessment in question.

The EIA process and permission processes represent two independent procedures (the situation is more unclear: the next are the procedures established by provisions of the Act on protection, support and development of public health and its executive regulations, i.e. in the radiation protection area, which is also inseparable from the nuclear safety). An interconnection between the EIA and safety documentation and better (i.e. more detailed and more unambiguous) communication between the state bodies could be, at least partially, a possible solution of overlapping the EIA and safety documentation in future. Legislatively established linkage of the EIA report and a conceptual decommissioning plan in one document already exist today (art. 20, sec. (2) of the Atomic Act).

It is evident in the assessment report that its authors have taken over the corresponding parts of safety documentation without consultations with authors of the safety documentation and without unification of approaches to the concept of nuclear safety in the EIA documentation to reach the optimum in regard of comprehensibility, scope and information amount/quality. From the purely unprejudiced point of view, there should not be anything in the safety documentation which could not to be generally accessible (with an exception of parts which are a subject of confidentiality, e.g. concerning assurance of physical protection of a nuclear facility).

Transferring of expert discussion on the nuclear safety questions as have been discussed within the EIA process, i.e. questions solved in the documentation appraised or approved within procedures under responsibilities of the UJD SR when issued the official decisions No. 246, 266 and 267/2008 in last, to the platform of the UJD SR is a rational solution. Bi-lateral Austrian-Slovak agreement on questions of common interest in the nuclear area could serve, for instance, as an area for that. Delegates of the UJD SR as well as experts participating in creation of the nuclear safety documentation were actively participating in public hearings and consultations.

1.2.2. Relation to the final stage of radioactive waste and spent fuel management

The fact, that a solution of the final step of the spent fuel management (and management of radioactive waste non-disposable in existing types of repositories) is one of the key reservations from the side of enemies of peaceful use of nuclear energy, leads to the following reflections. According to contemporary knowledge, the final step cannot be anything else than disposal (the spent fuel itself, or eventually the spent fuel in form resulting from new approaches from its "burning" technologies, or high activity wastes from technologies of spent fuel treatment/reprocessing and/or low and intermediate radioactive waste long-lived) in deep geological repositories. Thus, the question is if commissioning of new nuclear facilities today and in future can be done without that option, or existence of what in the spent fuel and non-disposable wastes management chain should be satisfactory for commissioning of new nuclear facilities, respectively. The problem is more difficult because the liability of the state significantly changes in the fuel cycle chain (and it can also change in a given stage of spent fuel management with time): whereas "burning" of fuel in production of energy is a subject of business in the first plan (and the state performs authorizing and supervisory activities through regulatory bodies, according to the national legislation and international conventions), the state itself is primarily liable for assuring disposal of radioactive waste and spent fuel and for the repository post-closure activities (see the provisions of all atomic acts today and in past and the international convention in question).

In the reviewer's opinion, assurance of a long-term (tens of years) storage of spent fuel in individual nuclear facilities – spent fuel storages, eventually the storage of high activity wastes arising from the spent fuel treatment/reprocessing in individual nuclear facilities – high activity waste storage facilities, can be an answer to the question mentioned above. It could be assured in close collaboration of a spent fuel producer and the state. The assessment report concerned in that appraisal is written in that context. The reviewer considers the way of the given problem consideration within the process EIA and corresponding assessment report in question from the proponent side as satisfactory for the 3rd and 4th blocks of the Mochovce power plant commissioning needs.

At the same time it is necessary to say that non-solving the problem of the final stage of spent fuel management or conscious shifting of the solution into uncertain future is in the sharp contradiction with the principle of perpetually sustainable development. It is, at the same time, in contradiction with one of nine principles of the safety of radioactive waste management, which is only another expression of the sustainable development principle: radioactive waste shall be managed in such a way that will not impose undue burdens (including economical and social) on future generations. Basically, it is a consonance on the platforms of IAEA, EC, ENEC (the Slovak Republic is a co-hosting country of it), in conferences and seminars of experts and in expert communities that one cannot, at the renaissance of the nuclear energy actual or being supposed in the near future, make the same mistake (from the current view) as in the phase of nuclear energy development in the '60s and '70s of the last century. It was that the problems of "by-products" of the NPP operation, particularly financing and the solution of a post-operational phase and mainly the solution of the whole spent fuel and radioactive waste management chain, were not solved since beginning, in parallel with the construction of these. The need to solve post-operational phases of nuclear facilities since beginning is established legislatively today, as well as the framework for a solution of disposal, the solution itself is in the strategy documents.

Situation in the area of development of disposal of spent fuel in the Slovak Republic is not really encouraging. Some facts:

- The Slovak programme of deep repository development has been running since 1966. The Directorate of the Slovak Power Plants was the programme implementer, DECOM, Trnava acted under the contract as a coordination workplace that time. The top Slovak teams as well as teams from the Czech Republic, U.K., and experts from Switzerland participated in the programme. More than 70 million SKK were spent on various activities documented in tens of reports and studies (including the study on approaches to EIA within the activity in question). Determination of five localities suitable for a more detailed investigation can be considered as the most significant result.
- In spite of the fact that a few studies and reports were aimed at involving public (which, from actual point of view, seems to be the condition of repository implementation) and the annual progress reports of the programme destined for public were annually elaborated, a consequence of the implementer policy in this area is that the public knowledge on works within the Slovak deep repository development programme is practically zero.
- In 2001, the top management of the Slovak Power Plants decided to stop the programme. Since this time, the Slovak deep geological repository development has stagnated, except small activities of a group of specialists employed in the State Geological Institute of Dionyz Stur. As a consequence, the teams of specialists, who participated in works before the year 2001, have ceased to exist.
- Strategy of the back-end of nuclear energy approved by the Ministry of Economy and passed by the Government in May 2008 (the strategy is being updated at the present time) comprises so-called dual-track approach in the given issue. It means to renew development of the Slovak deep geological repository and, at the same time, to participate in international activities, which could lead to creation of supra-national infrastructure needed to develop a conjoint (international, regional, European, ...) geological repository. The Slovak Republic is significantly engaged into activities leading to institutionalization of the international repository issue.
- The mentioned strategy is not implemented into practice in spite of the fact that corresponding activities and financial tools of the National Nuclear Fund have been the parts of planning documents for a few years. The state-owned JAVYS company (JAVYS is an acronym of the: Nuclear and Decommissioning Union") presents its liability within the given area on one hand. However, on the other hand, it cancelled its application to the Fund in 2009 with reasoning that for its execution it does not have a justification from its shareholder. The shareholder rights of the state are carried out by the Ministry of Economy.
- The Slovak Republic remains only a state with a comparable structure of peaceful use of nuclear energy (with exception of the Russian Federation, Ukraine and Armenia), which has not created institutional conditions for the solution of the spent fuel and radioactive waste disposal. The current infrastructure is not consistent with *ratio legis* of corresponding provision of atomic acts being in force at the present time or in past. That is in spite of the fact that the study elaborated within the Slovak programme of deep geological repository development (positively accepted by reviewers from the Ministry of Economy and from the Nuclear Regulatory Authority) back in 1999 showed that establishing of the national agency for radioactive waste management (development and operation of repositories should be its minimal responsibility) is an imperative institutional condition for a solution of the back-end phase of the spent fuel management. The study proposed also a framework for establishing such an agency,

similarly as it was done in a more detailed form by participants of an analogous project financed by PHARE eight years later.

Finalization of the construction and consequent commissioning of new nuclear power resources or implementation of the energy security strategy of the Slovak Republic in the nuclear area is a good opportunity to put through a change in the given area, i.e. to try to put development in the given area to the conformity with a principle of perpetually sustainable development.

1.2.3. Radioactive releases and the clearance of low activity materials from regulatory control

During its normal operation, the nuclear power plant impacts on environment mainly by its gaseous and liquid radioactive releases, or by solid radioactive materials cleared from the regulatory control into environment, respectively. The regulatory framework for the environmental impact is represented by the following legislatively established requirements:

- *It is possible to release radioactive substances to atmosphere and surface waters if it is assured that an annual commitment of an effective dose in the critical group of public, as a consequence of that, will not exceed 250 μSv . This value is considered as a dose constraint for designing and construction of nuclear facilities. In case more nuclear facilities, which impact a dose of the same critical group, are at one site, the value refers to overall irradiation from all nuclear facilities at the site or in the region.*
- *Radioactively contaminated materials can be cleared from regulatory control and released into environment if an average annual commitment of an effective dose for individuals from the critical group of people does not exceed 10 μSv in any calendar year after release and a collective effective dose does not exceed 1 manSv at the same time. The compliance with this criterion shall be demonstrated; if an individual or collective dose is higher (for an individual dose maximally up to 50 μSv), the release can be permitted in case, when it has been demonstrated by an optimization study that such release is optimal from the radiation protection point of view.*

The values of liquid releases are also indirectly framed by maximum volume activities in surface waters in the water protection legislative provisions. A relationship between the values, as limited in these provisions, and radiological constraints is unknown. Analogous values do not exist in the air protection legislative provisions.

1.2.3.1. Releases

Radiological constraint 250 μSv (usually divided into 200 μSv for gaseous and 50 μSv for liquid releases) can be identified also in official decisions on the release limits. For the assessment and control of liquid and gaseous releases, the regulatory body responsible for radiation protection and, consequently, the Nuclear Regulatory Authority officially decide on the release activity limits; balance levels (annual releases) and reference levels (e.g. daily or weekly, or concentration, respectively; are intended for identification, investigation and

potential intervention at a releasing source, thus having the recording, investigation and intervention levels) Official decisions of the Public Health Authority of the Slovak Republic comprise also a monitoring performance framework and a framework for the assessment of radiological impacts.

The question regarding the rationale of derivation of a numerical value of release limits is answered by a quotation from corresponding official decisions of the Slovak Public Health Authority. It can be considered as correct from the purely juridical point of view. A relationship between the activity limits of releases and above mentioned radiological values is not known, or respectively: if the balance activity values were just as large as the limits approved by official decisions, the value of an effective dose of individuals from the critical group of people could not afar reach the legislatively established dose values (for the Mochovce power plants case it could be 4,47 μSv , i.e. 1,8 % - see, for instance, the Annex No. 4.1 to the appraised report). Interpretation of this fact, thus a statement that a radiological impact of the operation at the level of 100 % of releases from four reactors (real releases in a normal operation are the fragments from these values) will be low enough below the dose constraint for designing and construction of nuclear facilities, is correct. However, it leads to a question how the annual limits of operational releases were determined, if not by derivation from the constraint of an annual effective dose commitment for individuals from the critical group, or what values of this parameter they were derived from, or how one did attain to them? Further, it can lead to a statement that determination of activity release limits within the Slovak nuclear power plants is not in compliance with actual approaches to the issue, as they are, for instance, formulated in the IAEA safety standard „Regulatory control of radioactive discharges to the environment: safety guide. IAEA Safety Standards Series No. WS-G-2.3. IAEA, Vienna, 2000“, at least not in the optimization area in terms of the optimization ALARA principle. Formulation of the release limits is not even consistent with formulation of the same value in the Czech nuclear power plants.

The issue is more complicated in case of more discharge points at the site, i.e. in case of need of a reasonable division of the activity limits to particular discharge points (they are two gaseous discharge points at the EMO site; in spite of technological interconnections, there are three limits of gaseous releases according to the present approaches: for two stacks of the power plant and also for FS KRAO, owned and operated by another operator. The fourth individual limit will mingle with that later: for the storage of spent fuel). Therefore, it is not enough to derive activity limits for the given site. However, it is necessary to divide them systematically and reasonably into individual nuclear facilities and/or discharge points.

In years 1993-1995, the common working group of both regulatory bodies worked under auspices of the UJD SR devoting itself to the problem discussed just here. There was a continuation of activities of the working group worked beforehand under CSKAE (changes of metrological aspects in monitoring of releases as a consequence of new metrological legislation were the primary motivation for its establishing). Activity of the working group could serve as one of not many good examples of collaboration between two regulatory bodies: the Nuclear Regulatory Authority of the Slovak Republic and the Public Health Authority of the Slovak Republic. Activities of the working group were based on studies of the company MERIT, Ltd., Trnava. The studies were financed from the budget of activities supporting the UJD SR. Top experts from the Czech Republic and Slovakia participated in the working group activities (e.g. departed Ing. Bucina and Ing. Vladar) together with representatives of both regulatory bodies, national metrology and together with experts of both nuclear power plants involved in the area of releases and their monitoring. A consensual proposal for requirements of regulatory bodies concerning gaseous and liquid releases, i.e. the way of derivation and formulation of corresponding limits, monitoring requirements and requirements for reporting to regulatory bodies and others involved on releases during the passed time period, was the main output

from the working group. These outputs have never been implemented into practice. In the reviewer's opinion, the process leading to a renewed construction and commissioning of the MO 3,4 could be, among others, an opportunity to clarify the formulation of the values which were crucial from the assessment of an environmental impact of a normally operating nuclear facility.

The issue of releases is referenced in the assessment report in a few parts, with a different scope and not fully identically, which does not provide an easy survey of the report. In the reviewer's opinion, it would be sufficient to consider releases within the chapter B.II.1 and 2 of the standard EIA report structure as provided in the Annex 11 to the EIA Act. Instead of this, the issue is mentioned in the following parts of the report:

- In the chapter 1.5.3 of the programme framework, where a corresponding official decision of the Public Health Authority from 2006 is referenced (with small mistakes). This decision established the release limits and their monitoring requirements for the nuclear power plant EMO 1,2 with a statement that the permission is valid until November 1, 2011 and that a similar permission will be needed for an operation of the 3rd and 4th blocks of the NPP Mochovce.
- In the chapter 2.9 of the design framework, which deals with gaseous releases, there is established a radiological limit for releases ("an objective of the limits is to assure that releases of radioactive products (gaseous and liquid) into environment of NPP in a normal operation, and also by abnormal operational conditions they are such high that the impact of the nuclear facility at the whole site will not exceed the value of an effective dose 250 μ Sv/year for individuals from public"), and it:
 - Again cites the same official decision for EMO 1,2 as mentioned above (with a small mistake), directly two times: in the text and in the table,
 - Mentions the connection of a ventilating system of the FS KRAO to a ventilating system of EMO 1,2 with a note that the first one can be monitored also individually,
 - Presents the results of monitoring of values characterizing gaseous releases of EMO 1,2 since 1998.
- In the chapter 2.10.3 of the design framework which deals with the liquid releases and again cites the corresponding part of the official decision presented already in chapter 1.5.6 – in the text and in the table form. When supposing that level of tritium releases of MO 3,4 will be at the level of releases from EMO 1,2, the actual limit EMO 1,2 could be exceeded. This fact is left with no comment in this part (the fact does not have to interfere the radiological limit: as it is discussed above, the radiological constraint will be "filled" relatively to 1,8 % at the double of actual activity limits of EMO 1,2).
- In the chapter 2.10.4 of the design framework dealing, according to the title, with liquid radioactive wastes, or cleaning of waters, respectively. Nevertheless its large part deals with release of waters contaminated by tritium comprising again corresponding limits and consequently results of the liquid releases monitoring for 10 years (a note to the table No. 32: what is releasing is not "liquid radioactive waste" but "liquid release") and information in the tables No. 30 and 31 are again left with no comment.
- Releases are also handled in the chapter 2.11 of the design framework dealing with the assessment of doses of public with the assessment of an impact of releases from EMO 1,2 according to a pre-operational safety case. There is a useless comparison of the release impact with values of annual effective doses 1 mSv and 5 mSv, application of an undefined term "safety coefficient" and presentation of the value of risk equivalent to an effective dose for the critical group of people without any clarification.

- In the chapter B.II.1.2, where the limits of gaseous releases are mentioned again (and again with a small mistake regarding the presentation of the limit of aerosols content in gaseous releases), and an overview of gaseous releases during the last ten years are presented by graphical and table forms, with addressing the content of radionuclides with a half-life greater than 8 days.
- In the chapter B.II.2.2 where the limits of liquid releases from EMO 1,2 are again presented and the table No. 31 is repeated (now under No. 66), with considerations on the tritium content and its trend; and the following text: "Limit for the volume of releasing tritium (as determined by the above-mentioned official decision) is valid only for an operation of the blocks 1 and 2; The Public Health Authority issues a new limit for the tritium (and other radionuclides) volume in regard the operation of MO 34. A new limit for MO 34 will be, of course, of the same kind as for EMO 1,2; it is anticipated that EMO12 and MO34 will respect the authorized limits", which are basically trivial statements. The trend of releases for ten years is presented here, an isotopic composition of "fission and corrosion products" in liquid releases is discussed, named as "emission of the products (nuclides,...). One more attempt to clarify the "tritium problem" is also presented here: "Active emissions of the tritium radionuclides will be, after commissioning of the 3rd and 4th block of the NPP Mochovce, approximately double. Considering a low daily limit for releasing (1100 MBq), the released activity will be lower also in case when the limit is not enhanced". The reviewer only notes to such clarification that in the limits of liquid releases, at least as mentioned in antecedent parts of the document, no daily limit for release is presented.
- Inconsistently with the assessment report issue, in the tables No. 95 – 97 of the chapter C.II.6.5 named as "degree of pollution of surface waters and underground water", there are mentioned limited values for water released from RU RAO being 1,5 km away, as established by the water management body, limits of annual releases from RU RAO (discussion on advisability of the both values and limits overlap the frame of this appraisal) and, curiously, also the results of monitoring the soils at RU RAO. All of this is crowned with the following conclusion: " as it is mentioned in the part 2.10, the liquid waste arising in an operation of the NPP Mochovce is in compliance with the required limits" (!).
- The issue of releases is also mentioned in the chapter C.III.1.1 (Sources of radioactivity) by the reference of antecedent chapters. There is the table No. 107 which could present the "evaluation criteria for the assessment of probabilistic impacts of radiation and radioactivity. In fact, the table does not present any criteria – it only identifies the corresponding legislative provisions and non-specified guidelines of ICRP for the particular values.
- Limits of annual balance values of gaseous and liquid discharges are again listed right in the next chapter C.III.1.2 (by the way: this is the only part where they are presented without any mistakes), reference of the chapter 2.9.1 of the design framework for "annual limits, investigation levels and intervention levels at release of gaseous substances into atmosphere under conditions which are normal for EMO 12" is mentioned here at the same time.
- In the chapter C.III.1.5.1, the values of releases, on base of which the assessment of radiation doses for public has been assessed for an operation of 4 reactors, are mentioned. They are a double of values measured for EMO 1,2 in 2008 (table 110).
- Limits of releases for a normal operation of four reactors, obtained by simple doubling of actual limits for EMO 1,2 are presented in annex 4.1 "Assessment of a radiological impact of releases of radioactive substances from 4 reactors of the NPP Mochovce", particularly in its chapter 2.2.2 (Input data for

calculation of a radiological impact at 100 % of limited values for releases), or in the table 4.1, respectively.

The reviewer must state that other aspects of the impact assessment, e.g. non-radioactive releases, balances and the way of the radioactive waste management, etc., are presented in the report similarly.

1.2.3.2. Clearance of low activity solid materials from regulatory control

This issue is also mentioned in more parts. Nevertheless, it is impossible to identify what the proponent's approach to this issue is, for instance what his approach to demonstrate the compliance with established limit 10 μSv (see the provisions of the Governmental Order No. 345/2006 Coll., Annex No.3, part II, par. (1)-(9)) is.

2. COMPLETENESS OF THE ASSESSMENT REPORT

2.1. PROGRAMME FRAMEWORK

Additional to the structure as required in the annex No.11 of the EIA Act, two independent chapters were added, called "Programme framework" and "Design framework". Reasoning of this approach cannot be found in the chapter II. According the content of these chapters, it is possible to guess that the purpose of the first chapter is at first to show the need to complete the 3rd construction, it means putting MO 3,4 into operation. The reviewer considers this as reasonable despite the fact that there is no reference in the document related to the strategy of energy security of Slovakia, approved by the government in the Governmental decision No. 732/2008. In the next, following items can be found in the part "Programme framework":

- In the reviewer's opinion, presentation of the national legislative framework and also of the framework of EC directives is idle, and moreover with incorrect interpretation of the process aspects in the attached schemes. It is a pity, because when the proponent has already dealt with consideration on the legislative framework for the documentation and the process for EIA, he forgets the amendment No. 287/2009 Coll. of the Act No. 24/2006 Coll., which was published approximately one month before issuing of the EIA report. Just this novelization dealt with the issues which are discussed in the report: the issues of changes.
 - Relatively needless are also the references of other definitions of legislative prescriptions, which do not touch directly the EIA process: the construction act, Atomic act and other definitions in the table No.2 with the name "List of Slovak legislative framework". The list of legislative prescriptions is presented also in the Annexes 07 and 08 (with interchanged headings). In the list of the annex 07 "laws in the area of energy" (considered as nuclear) there is presented:
 - * a list of 6 international agreements and a convention,
 - * not a complete, respectively up-to-date list of 5 relevant instructions of European Commission,
 - * 5 Slovak laws with not updated act on public health,
 - * 5 governmental directives, out of which one is irrelevant (on high level waste and orphan sources), one irrelevant and moreover cancelled (on management of institutional waste) and one cancelled (on radiation monitoring network)
 - * 14 regulations, one with a curious name (on non-proliferation of nuclear weapons), other regulations of the UJD SR, without potentially relevant regulations of the Ministry of Health (on radiation monitoring network, on ensuring the radiation protection).
 - the "non-nuclear" legislative instructions are missing in the annex 07, which provide at the same time important legislative framework for construction and operation of nuclear facilities (e.g. instructions on waste management, instructions on protection of safety and health at work)
 - totally needless for the process and documentation of EIA is then the presentation of the list of "laws in the area of energy" (non-nuclear, as it is presented in the annex 08).
- conditions for operation of EMO 1,2 issued by the Public Health Authority, here having apparently only an illustrative character,

- information on a territorial system of ecological stability in relation to the territory where MO 3,4 is located,
- information on implementation of international conventions:
 - on responsibilities for nuclear damage,
 - agreements on general prohibition of nuclear tests,
 - an agreement on nuclear safety
 - the Euratom Treaty with a detailed description of the process and result of communication in terms of the article 41, respectively 43, which resulted into the need to complete the safety assessment with the scenario „crush of a small airplane with a bad intention”,
- in the frame of the discussion on the land-use plan, also the list of approvals for construction.

2.2. DESIGN FRAMEWORK

As for the part “Design framework”, practically for all parts of it, there is the space in the standard contents presented in the annex No.11 of the EIA Act for their presentation and discussion. The reviewer, for example, does not understand, what led the authors of the assessment report to the fact that they dedicated only some lines for a general description of the primary and secondary circuit in the part A.II.8 of the standard contents and the whole “Brief description of technical and technological solution” was basically moved into a separate chapter “Design framework”. On the other hand, some parts presented in the Design framework are then repeated, or written in a different approach in relevant parts of the report on the assessment itself (see for example the issue of releases, discussed above). The contribution of the Design framework itself, in the reviewer’s opinion, should be exclusively only in reasonable taking over the information from the documentation, according which the UJD SR issued its official decision No. 246, 266 and 267 in 2008. This means mainly to present what modifications are occurring in the nuclear power plant from suspending the construction, respectively in relation to original technical documentation for construction, respectively to that documentation which was the base for issuing an original approval for construction.

This information can be found in the chapter 2.1. of the design framework. Replacement of a former system of the technological process control and management with the system of the Siemens Company a long time ago, before official decisions from 2008, is mentioned here. Reference to the way of preservation of devices after construction suspension in compliance with technical document (not recommendations) IAEA TECDOC-1100 (1999) is also reasonable. The reviewer notes that there was already published a newer document IAEA „Restarting Delayed Nuclear Power Plant Projects (IAEA Nuclear Energy Series Technical Report No. NP-T-3.4, IAEA, Vienna, 2008), which collected the experience from this issue, including Slovak ones, at the time of writing of the assessment report. In the chapter 2.3., improvement of the MO 3,4 blocks efficiency as a consequence of new components of the secondary circuit is mentioned. The safety improvements of the power plant systems and components – together 5 measures – are listed in the chapter 2.4.8. The safety level of the EMO 1,2 is considered as originating here. Improvements regarding the accident prevention (5 improvements) and reduction of consequences of a potential accident (6 improvements) are – in respect of an original design –discussed in a more detailed way. Improvements lead to such consequences of accidents that it will not be needed to initiate corrective measures in the power plant vicinity. Consequences of

increasing maximum design earthquake are also listed in the same part, or calculations showed that modification of the concrete-reinforced construction will not be needed due to construction reserves in the original design. Recalculation of the input data for the seismic design of a technological device was performed within the nuclear safety demonstration and adequacy of originally delivered device in respect of the new requirements was proved.

Furthermore, a question of the pressure reduction system efficiency in the hermetic zone (barbotage system) at fast decreasing of pressure after a large accident LOCA is also mentioned in the same part. A conclusion here is that pressure after the LOCA accident in the hermetic zone in Mochovce gets back abreast of the sub-atmospheric values level for only few tens of minutes, so that the escape of radioactivity to environment will be stopped.

A consistence in approaches to nuclear safety with approaches worldwide already in the EMO 1,2. Four basic attributes of a new power plant are listed here:

- a simpler design for an easier operation and lower vulnerability against operational variations, with a broader use of passive and basic safety phenomenon,
- a decreased possibility of the active zone melting (boosted efficiency of the design in the area of prevention of the active zone melting accidents),
- a minimal impact on the environment, need of accident measures in the power plant vicinity is practically eliminated (advanced design efficiency in mitigation of consequences of highly improbable scenarios of the active zone melting),
- incorporation of the newest operational experiences from similar nuclear power plants.

Reflecting a continuing discussion on the need of containment in the power plants VVER, often led by the opponents' side without a clear definition of the discussion subject and its purpose, the chapter 2.4.9 is incorporated. It describes a system of the hermetic zone confinement and the barbotage system. Research programmes resulting into upgrading of the hermetic zone functioning are also mentioned.

The chapter 2.5 of the design framework represents a description of the fuel management. The construction of fuel elements and the geometry of their arrangement inside a reactor are described here. The chapter 2.5.2 deals with the spent fuel management. The spent fuel balance for all 8 blocks of the nuclear power plants is mentioned here. Presented figures are relatively in good compliance with other documents dealing with the spent fuel management issue. However, they are the estimations; that could be a reason why the sum of VJP elements arising in Jaslovske Bohunice and Mochovce is not identical with the overall amount. The mentioned spent fuel storage strategy is in compliance with the approved National strategy of the back-end of nuclear energy. The EIA process regarding construction of the spent fuel storage in Mochovce is also mentioned. However, according to the corresponding legislative provisions, the complete EIA process shall be repeated due to the shift of the construction date to the second half of the next decade. The particular sub-chapters are dealing with a description of the spent fuel storage (not disposal) at the reactor (2.5.3) and later in an autonomous dry type storage facility (2.5.4). The chapter 2.5.5 deals, after that, with preparation of deep geological disposal. According to the opinion of reviewer, it would be more reliable to "solve" this issue by reference to the national strategy of the back-end of nuclear energy. A fortiori that the final phase of the spent fuel management will not be directed by the proponent, but, similarly as in other countries and in compliance with the last sentence in this chapter, by the state. The procedure according to Art. 17 of the

EIA Act (assessment of the strategy documents with nationwide importance) was processed before the strategy approval, including the comments and consultations from the Austrian side.

The chapter 2.6 deals with the waste management. Concerning RAO, besides the terminological trips (conditioning/treatment; storage/disposal) there is an incomplete interpretation of the term “waste management” within the discussion on the inventory (but a reader does not obtain any knowledge on the inventory itself here; it is treated in the chapter B.II.3.2). The aspect of waste characterization, more and more important lately, is absent here, or the way of waste tracking from its arising to disposal is not considered, respectively. The whole chapter is written relatively unclearly, information is repeated or particularized in the following parts of document. Management of institutional waste, surprisingly including also the “measuring probes”, is mentioned here relatively uselessly. The part dealing with the ventilation system is also included here from not fully apparent reasons; perhaps because of the relation to the gaseous radioactive wastes. They are managed by their discharge after filtration or eventually after decay.

Intention to fix radioactive sludge in situ can be judged as commendable. In the reviewer’s opinion, this is a significant step ahead in comparison with already operating power plants. It indicates that MO 3,4 will be the first Slovak power plant, where the design approach to liquid RAO management is significantly changing in comparison with the VVER power plants, in compliance with the international practice.

The system of solid RAO selection and its next management, based on the dose rate measurement in selection devices, is described clearly. Nevertheless, the whole document does not unambiguously comprise the processes which lead:

- to a declaration of a respective kind of waste as non-radioactive,
- to a declaration of a respective kind of waste as radioactive material clearable from the regulatory control by its release into environment.

It is a difference between non-active waste (or potentially non-active) and radioactive materials releasable by their activity into environment (see the part 1.2.3.2 of this appraisal). It is also incorrect to speak about transient radioactive waste, which is, according to an incorrect approach in the document, radioactive materials clearable due to a low dose rate. The waste is transient because of the half-life, clearable because of contents of safety significant radionuclides (see, for instance, a new IAEA safety standard „Classification of radioactive waste: general safety guide. IAEA Safety Standards Series No. GSG-1, IAEA, Vienna, 2009”).

The part 2.6.6 (conditioning and disposal) starts with a curious statement that FS KRAO results from the concept of “disposal of radioactive waste arising in an operation of nuclear facilities and other workplaces including the sources of ionizing radiation” approved in 1994 by the Governmental decision No. 194. A reference to this outclassed document is not too happy, particularly because the approved national strategy of the back-end of nuclear energy existed at the time the report was being written. It is strange that approximately one and half page deals with conditioning of radioactive waste (the EIA processes for RAO conditioning facilities passed that time) and only approximately 8 lines deal with the disposal.

The chapter 2.7 concerns the inputs as well as the chapters of the part B.I of the standard structure. Both are similar by the scope and both transfer the identical or similar information. Incorporation of the chapter 2.7 into the design frame is senseless.

19 pages of the chapter 2.8 concern the legislative, technical and organizational aspects of BOZP and radiation protection of workers. In the already mentioned opinion of the reviewer, the assessment of these aspects is a subject of safety documentation and documentation of BOZP and corresponding procedures at

the state bodies, not a subject of the environmental impact assessment of the given activity. The legislative framework for radiation protection of workers is again listed in the chapter (2.8.2). The reviewer notes to this, that Act No. 355/2007 Coll., which:

- cancelled rather the whole former Act No. 126/2006 Coll. in the radiation protection area (precisely: it cancelled its clause I.),
- outcomes from recommendations of ICRP (No. 60, not 103, of course),
- outcomes from the common standard of IAEA and other five international organizations (International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, IAEA Safety Series No. 115, IAEA, Vienna, 1995), or from the Directive of the European Council No. 96/29/EURATOM.

is applicable rather in regard of the management of procedures. For special and numerical aspects of the radiation protection, the corresponding Governmental orders are in force, particularly the Governmental order No. 345/2006 Coll. Some legislative documents listed in the legislative framework are irrelevant to the professional radiation protection of the nuclear power plant workers: Governmental orders No. 340/2006 Coll., No. 348/2006 Coll., regulation of the MZd SR No. 528/2007 Coll.

The gaseous releases are a subject of the chapter 2.9. The reviewer's opinion on their limitation is in the part 1.2.3.1 of this appraisal. The system of ventilation and filtration is described in the chapter 2.9.2. The author needed to show here that calculated values of individual and collective doses (where in the legislative provisions are the limits of collective doses for releases from nuclear facilities?) are under the constraints established by the mentioned acts (in fact, these acts do not establish any limits) and the Governmental order No. 345/2006 Coll. The chapter 2.10 deals with the liquid releases. Balances of the waste waters, non-radioactive and radioactive characteristics of released waters are addressed in that time to the Hron river and to the Telinsky brook, which is not a part of the Hron basin. Opinion of the reviewer regarding the approach to radioactive releases in the chapter 2.10.3 or to a description of the liquid waste management written in the chapter 2.10.4 to discuss the "tritium problem", respectively, is provided in the part 1.2.3.1. It is necessary to observe that the way how the releases are treated in the parts B.II.1 and 2 of the assessment report makes the discussion in the design framework chapters senseless.

The chapter 2.11 deals with the consequences of releases, which is standard contents of the chapter C.III.1 of the EIA report. It is a mixture of notes on monitoring of gaseous and liquid releases, on clearance (without a remark that there are different approaches and criteria for the clearance of solid radioactive materials), information taken surprisingly not from the preliminary safety case of MO 3,4 but from the preoperational safety case of EMO 1,2. It is stated that "updated and completed assessment of radiological consequences during a normal operational status for all four blocks is mentioned in the chapter 6.2 Environmental framework". Such chapter cannot be found in the document, authors perhaps meant the annex 4.1 of the report, or corresponding parts of the chapter C.III, respectively. In the next, the results of calculations of effective doses for population are inscribed here, so that they were again and in better way repeated in many parts of the assessment report, e.g.: C.III.1.5, annex 4.1, methodologically also in the chapter 5.7 of the annex 5 called "By thematic blocks".

Supposed balances of solid radioactive waste are provided in the chapter 2.12 with two tables, which have an identical title but substantially different contents.

The chapter 2.13 assesses the industrial safety (under the title "non-nuclear malfunctions and incidents"). The reviewer does not fully understand its importance in the assessment report. The chapter 2.14 is another

case. It deals with radiation consequences of industrial accidents and qualitatively briefly assesses the consequence of burning of bitumen (very theoretically, it can occur in an adjoining nuclear facility FS KRAO). The second event here is a "risk to lose a control over the stored concentrate" (many issues are discussed here, e.g. storage of solid radioactive waste, highly active by the power plant consideration), but it can be only hardly considered as anything else than an incident/accident according to legislative provisions on nuclear and radiation safety. In addition, the inscribed analysis generally ignores the principle "tank inside the tank" and the assessment is concluded by a curious sentence that "the environmental impacts can be assessed as negligible or minimal (on personnel in the service)".

The chapter 2.14 seems to be an extract from a preliminary conceptual decommissioning plan. It generally ignores the recommendation coming from experience gained at shutting-down of NPP V1 that it is better to shut-down both blocks at the same time. The statement in the text, that "alternative of deferred decommissioning with safe enclosure of the hermetic zone for 30 years does not provide significant improvement of the radiation situation, because the half-life of critical radionuclides is approximately 30 years", is also not fully correct. The true is that ^{60}Co ($T_{1/2}=5,3$ year) is the dominating radionuclide here, which means that the radiation situation after the protective storage should be certainly improved. For mysterious reasons the chapter 15.1 is added here, which has nothing to do with decommissioning and which is a true copy of the chapter 2.12.

The reviewer also does not fully understand the rationale for showing that SE, a.s. is a holder of a certificate according to ISO 14001:2004 at the end of the design framework, from viewpoint of the scope of the report.

2.3. COMPLETNESS OF THE ASSESSMENT REPORT

The rest app. 300 pages of the assessment report are written in similar spirit and quality. The reviewer regards commenting such a document by addressing individual manifolds, mistakes, incorrect terminology, and incorrect formulations as contra productive. It is evident that the Slovak translation of the report was issued without its editing, as it has been already written in the introductory part of this appraisal.

It was stipulated in the assessment scope (ref. No. 1277/2009 - 3.4/hp, Bratislava, on May 29, 2009):

- to work off the alternative which was inscribed in a submitted intention, besides the zero alternative (status if the proposed activity was not implemented), in the next assessment of an impact of the proposed activity,
- requirement to elaborate all points as listed in the annex 11 of the Act No. 24/2006 Coll. accordingly to nature of the proposed activity,
- to answer questions, comments and recommendations within the assessment report, as they were required in the standpoints of regions of Austria and Austrian public, mainly:
 - a description of possible significant environmental damage based on the implemented project, i.e. population, fauna, flora, soil, water, air, climate, material goods including architectonically valuable buildings and landscape as well as an interaction of the listed factors,
 - a description of possible significant impacts of the proposed project on environment as well as an impact on health and safety of people in consequence of the project facilities, exploitation of natural reserves, a probability of the accidents occurrence, emission of harmful pollutants,

- incurrence of annoyance in the working and outer environment, the management of spent fuel and various kinds of nuclear waste;
- a description of measures for preclusion, reduction or even redressing the significant consequences of the proposed project on environment;
- altogether 53 specific requirements.

The structure is considered in the chapter II of the assessment report. It is the fact, that the **formal structure of the EIA report consistently follows the structure as it is prescribed in the annex 11 to the EIA Act**. The first table of the assessment report named "Correlation between SoA (this abbreviation is not listed in the abbreviations list, but it means the "scope of assessment") and the EIA report" describes how 53 specific requirements are incorporated into the assessment report.

- The requirement 2.2.4 relates to the geology and seismicity. It is required to go from the IAEA safety standard not published yet, which is not too happy (on the other hand, it has been in one of the last stages before publication, so from the matter-in-fact it could be all right then). The requirement is answered by a reference to the chapter C.II.2.3; the given issue is also discussed in 7 lines of the chapter 2.4.6 of the Design framework (rather uselessly). The reviewer considers the seismic resistance solution in the assessment report as satisfactory. In spite of that, questions referring to derivation of the basic seismic characteristics of the Mochovce power plant site, as they had been used as input data for improvement of seismic resistance of safety significant objects, devices and components, were discussed during the public hearing. During the public hearing, the information was provided that foreign methodological assistance and regulations were exploited within the activities of home specialists (from the proponent side or from the UJD SR) in relation to the seismic resistance of EMO (and EBO, in parallel). Entirely four IAEA missions were organized (1993, 1995, 1998, 2003). Besides this, the IAEA organized the Technical cooperation projects for the UJD SR needs (SR/9/002 a RER/9/035), which were focused specifically on elaboration of technical guides for the programme of seismic reevaluation of the NPP Mochovce. The last IAEA mission relatively positively appraised the works performed by the SE, a.s. expert suppliers within evaluation of seismic characteristics of the EMO site. Conclusions of this, together with additional information of SE, a.s. that recommendations of the mission were completed, were the base of information presented on the public hearing: the seismic characteristics of the Mochovce site were elaborated at the level of expertise commensurate corresponding the level of current knowledge of this issue worldwide.
- The requirement 2.2.5, and also 2.2.14 – 2.2.17 concerned the yield of the useful water source, or the sedimentations in the water reservoir in Velke Kozmalovce, respectively. It is solved by a reference to the chapter C.II.6.1, or mainly to C.II.6.1.2. The reviewer considers the solution of a given problem, as it is described here, satisfactory. There is only a small error that the volume of the reservoir is not presented in the chapter 9 (as it is written in the scheme of manipulation with water from the reservoir), but in the tables No. 89 and 90 and in a corresponding text (more generally: repetition of the same information in more tables and also in the accompanying text does not increase transparency of the report). Also clarification of the consequences of a lower supply of the reservoir is satisfactory. The given issue has been also a subject of some comments from the Greenpeace side, dated as 25/09/2009. The design solution of assurance of the steady power plant cooling is based on the use of

water being in all technological systems of a double-block after cutting-off from the power operation. According to the balances, volume of such water is sufficient to ensure the power plant cooling for 30 days (41 days in winter, 26,5 in summer). Taking into account the time which the operational personnel has within such a scenario, it is realistic to consider partial resumption of raw water supply and refilling of water stockpile in the NPP site for reserve refilling of water into the system of technical significant water. An analogous solution was applied also in the NPP EMO 1,2, where an operational manual for such a case has been elaborated. Activities on the blocks have been inscribed in the operational manual in such a way that the limits and conditions of a normal operation were met in a maximum possible degree within 10 days. Information on the plan of measures for the heat removal within 10 days cut-off listed in the chapter C.II.6.1.2 of the report is based on this operational manual. It is necessary to note that information given in the Assessment Report, in the chap. II.6.1.2, about the time of autonomous resistance of the NPP due to an interruption of a raw water supply is not complete because it does not specify an after-cooling scenario to which it relates. The interruption of a raw water supply from the water reservoir in V. Kozmálovce is not the most unfavorable event in terms of ensuring a safe NPP after-cooling which was taken into account during the safety analysis of JE MO 3,4 project. As the most unfavorable event it is possible to give, for example, a seismic event which will make the raw water charging system also non-functional, or a combination of a seismic event with a postulated leakage of a coolant from the primary circuit. During analysis of the NPP's after-cooling in such scenarios only such water was taken into account for reserve charging of water into the system of important technical water which was available in those devices of the double unit that were qualified as resistant to the effects of a seismic event. Transport of water in the track tanks is a further reliable mode of reserve charging of water which is required for NPP cooling. In the JE MO 3,4 project an installation of specific connecting valves on the piping of appropriate systems is considered for this mode of cooling water charging (system of the technical water important and the system of super-emergency charging of steam generators). After-cooling by air is a technical nonsense.

- the requirements of 2.2.18 - 2.2.24 are related to releases. A separate section at the beginning of this appraisal is dedicated to releases. Places in the environmental impact assessment report, which deal with the releases, are shown in that section. 2.2.18 requires including data about the expected activity in the effluents released into the atmosphere and into the surface water during a normal operation - it is done in several parts. It will also include the operating conditions at the operating limits level (in particular the limits of the coverage of fuel leakage, leakage of the primary circuit and secondary circuit). In fact, a debate on the relationship between releases and operating limits is not provided in the relevant sections. Releases are factually given rather by the way of cleaning systems operation (see the chapter 2.6.2 and 2.6.3 of the Design Framework). In the reviewer's opinion, the requirement 2.19 is not sufficiently explained in the assessment report, despite the mentioned fact does not interfere with a given annual effective dose limit 250 μ Sv. Requirements 2.20 to 2.22 were fulfilled in a sufficient way in relevant parts of the report. The requirement 2.2.24 asked to assess the cross-border impact within the scale of assessment on, at least, the dose of abroad critical population group and also mentioned the need for compliance with Article 37 of the Euratom Treaty (see recommendation from the European Commission No. 1999/829/Euratom). Cross-border impacts are discussed in the Part C.III.1.5.3 of the assessment report. It should be noted that according the request of the Hungarian experts and Austrian party, the data about cross-border impacts of severe accidents considered in the MO 3,4 project were prepared and provided. The report discussed only the impact on the border of "protected zones" (2-3 km). Information was developed on the basis of data contained in the MO 3,4 preliminary safety report.

Information also notes that the cross-border impact, expressed in terms of effective dose values for the exposed population for a period of 7 days from the occurrence of the accident, caused by a sequence initiated by BLACKOUT (which has higher radiation impacts) is about 4.3 μSv at a distance of 35 km from the crash unit (Hungary), like approximately 0.83 μSv at a distance of 100 km from the reactor unit (Austria).

- The requirement 2.2.25 claims to include an analysis of the operational risks and a model assessment of influence of selected emergency situations – accidents on the environment and inhabitants' irradiation, to include prevention measurements of possible influences of an accident with activity release, and identification of a place where this information should be provided. The authors solved this problem by a link to the chapter 2.4.8 of the Design framework, however the required information is not provided here. The chapter C.III.13 distinguishes between a normal operation, design events and over-design events, accidents and heavy accidents. The information on the influences of a normal operation and design events is given in the chapter C.III.1.5.1 and 1.5.2. However the influence of design events is mentioned in the chapter C.III.1.5.2, only simplified by means of the assessment of a normal operation with releases at the edge of approved limits. Radiation influences of the proposed activity on inhabitants in consequence of the NPP MO 3,4 design accidents are given in the report, chapter C.III.1.5.4. Calculated doses due to containment accidents are given in the Tab.119 (LOCA) and the Tab.120 (PRISE – steam generator lid breakaway). Data provided in the report corresponding with the details given in the Preliminary safety report on NPP MO 3,4. Radiological consequences from heavy accidents on inhabitants are not mentioned nor assessed. Information on radiological consequences of severe accidents analyzed within the project NPP MO 3,4 was provided on the public hearing including above the mentioned impacts on Hungary and Austria.
- The answer to the requirement 2.2.26 should be the chapter 2.4.8, eventually 2.2 of the Design framework. The fact is that not all modifications are given here (see the relevant official decisions of the UJD SR), it is more or less a brief summary of changes that are brought by the EMO 3,4 project.
- The requirement 2.2.27 claims to complete a list of particular waste forms produced during the NPP MO 3,4 construction, their volumes and waste management approaches. As an answer, a link to the part A.II.2 is given, which makes no sense. Waste management is referred to e.g. in the chapter 2.6.7 of the Design framework, but even in this part the construction waste management is not explicitly addressed.
- The requirement 2.2.28 claims to mention the data on inputs and outputs of an implemented activity and to propose monitoring of contaminants as well as measurements to eliminate their negative influence. Above mentioned aspects are consistently described in the assessment report. Regarding this requirement the reviewer noted that releases of the Mochovce power plant are mentioned in the assessment report. If radioactive releases are concerned, their volumes and activities are given, and consequences are calculated. These are deeply below radiological limits. When the optimization principle ALARA is taken into account (approach that reduces the dose to an acceptable level), it can be stated that no other measurements have to be taken in addition to the project to eliminate a negative influence of releases. Even in case of accidents that are discussed in the chapter C.II.1.5.4, limit values will not be exceeded in a distance 2, eventually 3 km, which are named variously („mandatory limits“, „radiologically acceptable limits“, „limits of acceptability“, „prescribed limits) whereas the meaning of them is not fully clear from the text.

- The question of spent nuclear fuel management, which is the core of the requirement 2.2.30, is discussed adequately in the report, as mentioned in the introduction of this expert appraisal. This statement is valid also for the sludge management, which is the core of the requirement 2.2.31.
- The requirement 2.2.32 claims to consistently assess the influences of activities on human health nearby NPP Mochovce according to selected demographic and health indicators, including social and economic indicators, quality of life and acceptability for inhabitants living in affected districts. The report contains a comparison of health status data of inhabitants in Levice, Dunajská Streda and Senica districts. Health status represents an incidence of cancer at time prior to EMO 1,2 commissioning and after. The reviewer essentially agrees with the conclusions that a trend of registered illness occurrence is equal, despite that he is not fully satisfied with principle differences explanation. Statistics data from the districts Levice, Dunajská Streda and Senica on a cancer incidence obtained prior the EMO 1,2 commissioning compared with the data after its commissioning has clearly shown that there is no negative influence on health status of people living in the Levice district. Although the selected form of data presentation from the national cancer registry does not recognize various kinds of cancer, no epidemiologic study in the world has proved an influence of the NPP operation (comparable with the Mochovce NPP) on thyroid cancer, leukemia or other cancer diseases. One can agree with the conclusions without any reservations. The report rightly states that it is not possible to distinguish mortality due to natural reasons and due to existence of the Mochovce NPP because utilization of a calculated annual effective dose to assess a cancer risk gives a result of 1 case per 100 million people. Concerning the social impacts assessment, these results are not mentioned in the report. In the report there is a chapter C.II.11.4 inadequately called "social analysis". In fact this chapter represents a way of communication with public and quite a wide scope of polls results on nuclear energy results.
- The requirement 2.2.33 claims to deal with influences of decommissioning, which is adequately solved by means of a summary of the preliminary conceptual decommissioning plan (with a possible exemption of clearance of radioactive materials to environment). It is worth mentioning that pursuant to § 20 section (2) of the Atomic Act, the conceptual decommissioning plan will be elaborated early enough, prior to termination of the operation in a way that complies with requirements on documentation of the EIA process.

2.3.1. Foreign requirements

Next 20 special requirements on a scope of the assessment have reflected requirements on the assessment report from abroad and have been delivered to Ministry of Environment after the intention publication. In the text below, it will be reviewed how these requirements have been incorporated into the assessment report.

Certainly, the process of a transboundary assessment pursuant to § 47 of EIA Act is not terminated by publication of the assessment report with incorporated requirements. The proponent has not elaborated a separate document according to § 47 section (1) of EIA Act, eventually its annex no. 15. There are English, German, Hungarian and Polish versions of the assessment report issued with annexes, and as well an executive summary (annex X of the assessment report). This documentation comprises all aspects that belong to a scheme given in the annex no. 15 of EIA Act. However, this documentation is given in more

details than required. Next procedures and conclusions of the transboundary assessment are given in the proposal of a final conclusion (see § 48, section (1) of EIA Act).

2.3.1.1. Requirements of Poland

Poland required (see the requirement no. 2.2.34 of the Assessment scope specification) to take into account all aspects of nuclear safety for the proposed activity. This requirement is connected with mentioning particular data on how to manage and provide information on a heavy accident (emergency response). The Proponent refers to the chapter 2.4.8. of the Design framework, where safety improvements are mentioned including those having an impact on a probability and consequences of accidents. However, there are no details provided on an emergency response given there. Emergency response organization, including its technical aspects, is given in the part C.IV.4.2. This information ends by an organization at a national level. International aspects of this organization pursuing to international treaties are not discussed in this part of the assessment report.

The outcome of a consecutive communication with Polish partners is a letter of the general director of environment protection from October 10, 2009, which comprises following:

- Who of the Polish side was involved into a process,
- Based on the assessment report there is a statement that nuclear safety in Poland will remain stable both in a case of normal operation or an accident,
- The Republic of Poland does not submit any other comments or reservations concerning the planning completion and operation of a topical nuclear power plant,
- 6 comments on Polish text comprehensive summary are concerning: spent nuclear fuel storage, liquid radioactive wastes management, Kozmálovce dam water retrieving, a special system of gases cleaning,
- Notification about mistakes of terminology resulting in information discordance,
- The fact that consultations between state nuclear regulatory bodies took place on the basis of bilateral treaties.

The Republic of Poland is not interested to participate in transboundary consultations pursuant to Article 5 of the Espoo convention on the Environmental impact assessment in a transboundary context.

2.3.1.2. Requirements of Hungary

Requirements 2.2.35 and 2.2.36 are concerning information how MO 3,4 will reach a maximal level of the nuclear safety valid nowadays and how design and over-design accidents are solved. It was required to determine limits for leakage from the hermetic zone (designed leakage) and as well, which another safety measurements are available (e.g. a system of accident localization, a shower system, a hydrogen burning system) and what preventive influence might these measurements have in case of leakage from a primary circuit. The answer of a proponent was a reference to the chapter 2.4.8 of the Design Framework. However, not all details are given there; some information on this topic is provided in the chapter 2.4.9 of the Design framework.

The requirement 2.2.37 is concerning seismic stability and is adequately solved by a link to the chapter C.II.2.3.

The requirement 2.2.38 claims to include the data on releases, their characteristics and distribution possibilities, and based on meteorological information, to define an area affected by the proposed activity. The answer is given in a number of parts within the document that concerns releases. However, the requirement no. 4.1 is not solved, which seems to be the most relevant to the reviewer. This topic of releases is discussed in more details in the chapter 1.2.3.1 of this expert appraisal.

The requirements 2.2.39 and 2.2.40 are practically the same and are concerning a nuclear fuel life cycle, eventually environmental consequences of the fuel cycle. They are solved by a link to the chapter 2.5 of the Design framework. The current status in a spent nuclear fuel management and assumed future evolution are given in the Strategy of back end of nuclear energy, which is approved by Ministry of Economy and has been deliberated by the Government with a positive conclusion. Discussion of this topic is partially mentioned in the chapter 2.5 of the Design framework and as well in the chapter 1.2.2. of this expert appraisal. Facts:

- Life-time of a long-term storage facility in Jaslovské Bohunice is considered until 2037 (regarding seismic stabilization and compaction of a storage, which has influenced operational life-time, and prolongation of a spent nuclear fuel storage from 10 to tens of years, the EIA process was undertaken).
- Erection of a new long-term storage facility is being currently prepared (dry type, the storage is performed in transport-storage containers, the EIA process was undertaken as well, however due to legislative reasons it will have to be repeated).
- The Slovak Republic has not taken a decision on the final procedure of spent nuclear fuel disposal so far, so according to the Strategy of back end of nuclear energy so called “double approach” will be applied (development of an own national repository – gaining information for the final decision to develop the Slovak repository versus engagement in activities aimed at an international repository). A relevant political decision supported by the SEA process could be done at the end of the decade.

In the last of Hungarian requirements (2.2.41) it was required to describe a monitoring network in detail and consider possibilities of official Hungarian bodies’ (those responsible to prevent damages) access into an on-line system of radioactivity measurement nearby the nuclear power plant Mochovce, Slovakia. This point is solved in the assessment report by a link to the chapter C.II.17.1, where the topic is described in details, equipment utilized as well as results of environment monitoring are given. Detailed results are given in the annex 4.2 of the assessment report, where complete information on radioactivity monitoring nearby NPP EMO is published for years 2005-2008.

Requirements of Hungary and the answers were clarified and completed within the public hearing and as well, consultations between the Proponent and concerned institutions of Hungary. Their outcomes were summarized in a “Standpoint of Ministry of Environment and Water of Hungary on two new reactor units of the NPP Mochovce commissioning and environmental influences” on December 18, 2009, where Hungarian representatives:

- stated similarity of influences of EMO 1,2 with the NPP Paks,
- accepted a calculated dose within the Slovak-Hungarian boundary area, which seems to be insignificant, as well they accepted the way of an accident influences assessment within the area 2-3 km from the NPP Mochovce,
- stated that based on available technical literature and site visit during consultations with experts, the scope and outcomes of micro-seismic monitoring are favorable. As well they stated, that no probabilistic

safety analysis was elaborated concerning an earthquake and that this is not obligatory up to the level 1. The outcomes of a re-assessed seismic risk analysis were included in the basic design, their technical parameters are out of scope of the environmental impact assessment. Therefore they have to be taken into account together with the design requirements defined by authorized bodies and corresponding regulations.

- informed about a sub-programme Mochovce within the monitoring programme RADMAN. In this programme radioactivity on the Hungarian territory is being monitored within a distance of 80 km from the NPP Mochovce. They stated that influences of MO 3,4 emissions are insignificant and not possible to distinguish from the background variations.
- concerning the air protection they stated that radioactive burden of inhabitants due to gas releases in a distance over 35 km will not be measurable,
- concerning water protection they stated that radioactive emissions will not have negative influences on the inhabitants. They stated that a total (it means including releases into atmosphere) annual effective dose of a member of a critical group of people (inhabitants living in the confluence of the Hron and Danube rivers) was assumed 4,3 nSv, which can be neglected,
- stated, that the Environmental impact assessment does not analyze the influences of cooling water discharging into the Hron river from the point of view of nature and region protection. They noticed that there are legislatively protected areas, particularly Natura 2000 within the radius of 50 km from NPP.
- stated, that concerning emergency situations management, Hungarian authorized bodies have an on-line access to information provided by remote monitoring stations and an off-line access to radiological information on situation in Slovakia,
- summarized standpoints of Hungarian municipalities and non-governmental organizations,
- proposed to publish the data from 40 monitoring stations within the area up to 20 km from the NPP Mochovce to Hungarian authorized organization to enable establishment and operation of at least three own radiological monitoring stations within the radius of 30 km from the NPP Mochovce and assure an independent exchange of data from aerosol collectors operated by Austria within the territory of Hungary and Slovakia,
- proposed that relevant questions to be discussed and implemented within Slovak-Hungarian commission settled by the Slovak and Hungarian Nuclear Regulatory Bodies.
- proposed to assure continuous monitoring of radioactive releases pursuant to a quoted Hungarian legislative document,
- finally they stated that after completion of information and documents in the course of technical consultations, the outcomes of the environmental impact assessment report are acceptable for Hungary.

2.3.1.3. Austrian requirements

12 Austrian requirements were applied within the scope of the assessment. In the requirement 2.2.42, it was claimed to describe installations and operational conditions in more detail. This requirement was duly answered within particular parts of the Design framework (2.1-2.4).

In the requirement 2.2.43 it was claimed to complete information of nuclear fuel, utilization conditions (a type, enrichment, number and status of fuel assemblies) operational conditions and burn-up. This was duly answered in the chapter 2.5 of the Design framework.

The requirement 2.2.44 concerning the RAW management, including its environmental impact, is answered by a Proponent by means of a link to the chapters 2.6, 2.9 a 2.10 of the Design framework. As mentioned above, these themes are discussed in the report many times in various parts, occasionally with some mistakes. If a reader succeeds to go through 500 pages of the assessment report and another pages of annexes, and if they are familiar with the RAW management, then they could make a picture about how these problems are solved.

The requirement 2.2.45 claims to confirm or disprove considerations on an intention to increase a power outcome by 22%. This is solved by a link to the chapter 2.3 of the Design framework "Efficiency increasing of EMO 3,4".

In the requirement 2.2.46 the Austrian representatives claim to include detailed technical descriptions of primary and secondary circuits planned modifications as well as to describe important modifications of approved design documentation in detail, as given by the firm Golder (2008, page 100 of the intention). They claim to analyze improvements from the safety point of view that should be supported by appropriate results of a safety analysis. As well, they claim to pay attention primarily to significant safety topics, not only in connection with possible transboundary influences, particularly:

- severe accidents (measurements to prevent the negative impacts have to be included) ;
- Increasing of the hermetic zone tightness and implementation of a system of design accidents localization – barbotage towers (containment and a barbotage system) ;
- A possible seismic event in a locality;
- Integrity of a reactor pressurized vessel;
- Reliability of a control system (criteria I & C).

This requirement is solved in an introductory table of the assessment report by a link to the chapter II.2.4.8 (probably the chapter 2.4.8 of the Design framework is concerned) that is named "Safety improvements for the MO 3,4 design". Apparently, it is retrieval from safety documentation, where one can see an ambition to address discussed aspects in respect of a given requirement. On the other hand, integrity of the reactor pressurized vessel is not mentioned in the text at all. As a matter of fact, publication of the report has not minimized Austrian questions on these topics. They were persistently explained in public hearings and consultations. Finally the process proceeded at the Nuclear Regulatory Authority within bilateral consultations aimed at nuclear safety of nuclear installations in Slovakia.

The next requirement (2.2.47) is related to one particular aspect of a previous one: seismic stability. It is required to explain why maximum horizontal acceleration was increased up to 0.15 g in respect to the fact that the proposed activity is implemented in a seismic area. A consistent answer is in the text of the chapter C.II.2.3 of the assessment report on a probabilistic assessment of seismic risk and consequences.

The requirement 2.2.48 claims to assess durability of the nuclear facility as an intended air crash. This is consistent with a similar requirement of the European Commission, in which it is specified that a small air crash should be considered. The answer should be given in the chapter 1.6.4 of a programme framework which is inappropriately named "Duties towards the European Commission within the Euratom Treaty". The topic of a given safety scenario was discussed on public hearings and consultations of experts. General

information was provided on a public hearing with the intent that analysis of consequences of the intended air crash in the MO 3,4 area was performed for totally 12 buildings that are important from the nuclear safety point of view. More than 60 conservatively selected impacts were analyzed. In accordance to IAEA recommendations, the safety analysis of the air crash were aimed at global effects on buildings, local effects on construction components, vibration effects, secondary effects of fire and fuel explosion and in current cases also at radiation effects. As well, information was provided on achievement of analysis goals to the intent that the nuclear power plant MO 3,4 is capable to safely shut down the reactor and dissipate residual heat from the reactor in any of such situations (if required additional modifications of MO 3,4 could be applied). As well, exposure consequences of inhabitants concerning all relevant cases were insignificant when compared with limit values utilized for a design accidents assessment of MO 3,4. The ÚJD SR is an authorized state body that co-operates with SE, a.s. on implementation of the European Commission recommendations regarding nuclear safety. Performed analyses are reviewed and evaluated by the ÚJD SR within the context of the Official Decision no. 266/2008, which solely prescribed implementation of mentioned recommendations of the European Commission. The details on the performed safety analysis are kept secret by the proponent because they belong to confidential data.

The requirement 2.2.49 concerns fire protection approaches and description how deficits of original design were solved (recommendations of IAEA, 1999). The answer is given in the chapter 2.13 of the Design framework, where in the section "Accidents related to installations" the whole genesis of fire protection approaches is described. Increasing of fire safety in the MO 3,4 design comparing to EMO 1,2 was reinitiated by a new legislation of the Slovak Republic that took effect after EMO 1,2 commissioning. The regulation of Ministry of Interior SR no. 94/2004 Coll. and the regulation of the ÚJD SR no. 50/2006 Coll. are concerned in this term. New approaches are in compliance with a new safety guide „Protection against Internal Fires and Explosions in the Design of Nuclear Power Plants. IAEA Safety Series No. NS-G-1.7, IAEA Vienna, 2004“, which was issued prior to an assessment report elaboration, so that a reference to a previous standard ("revised safety guide IAEA no. 50-SG-D2) mentioned in the assessment report was not relevant.

The requirement 2.2.50 regards detailed and complex clarification of a process, which will follow an assessment scope definition. This issue has to be discussed in the chapters 1.4 and 1.5.4 of a programme framework. The EIA process is described in the chapter 1.4. This description does not consider a possibility to prolong the term of this expert appraisal elaboration. As well, it does not consider a transboundary assessment. The chapter 1.4 ends by a statement that a "final standpoint will be enclosed by a proponent to application for nuclear installation commissioning pursuant to the Atomic Act". The reviewer remarks to this statement that the requirement to enclose the final standpoint of the EIA process is not explicitly formulated in relevant provisions of the Atomic Act and its executive regulation. This is more likely logical ending of a situation, when:

- the EIA process for a given activity must be implemented (not only according to a relevant EU directive but also due to the EIA Act amendment no. 287/2009 Coll., the reviewer noted realizing that this amendment can not affect ex post),
- forthcoming procedure at permitting body is just the mentioned procedure.

The section 1.5.4 of the programme framework in the section "Commissioning of a nuclear facility into the operation under § 19 of the Atomic Act" inscribes again the final statement as a part of submitted documentation.

The requirement 2.2.51 is related to the financial covering of nuclear damage. Apart from the fact that this issue relates to the impact on the environment indirectly, it is answered in the section 6.1 of the programme framework. There is listed an attempt to explain a relatively confusing situation in various forms of acceptance of relevant international conventions and their additional or joining protocols. It is listed how the issue is covered by the Slovak legislation. Key information is in the conclusion of the section: there is a proposal of a new Act, which would resolve explicitly the issue, prepared. The Act would be approved this year.

The last two requirements of the Austrian side have a general character, if they require:

- to finalize other relevant comments and recommendations of the Austrian side viewpoint.,
- to carry out a consistent analysis of all other comments arising from the viewpoints of process participants from the side of origin and also of affected sides submitted to the intent according to a national act, the Espoo Convention and the Bilateral Agreement between Austria and the Slovak Republic. Take eligible comments from the viewpoints into account in the assessment report.

Such formulation of requirements could result and also resulted in the fact that the EIA process is transformed into a debate about the relevance or legitimacy of comments in terms of the environmental impact assessment, or to the question whether discussions about aspects of nuclear safety and the conclusions from them should or shouldn't be a part of that process, respectively.

The given issue is also a topic of reviewer's considerations in the section 1.2.1 of this appraisal. It is needed to realize that bilateral consultations, where the Slovak side is represented by the ÚJD SR, were and will be performing independently of the EIA process in the long term. These consultations, topics, which the Austrian party uses in its viewpoints within the EIA process, will be discussed and explained. Development in the public hearing and consultations confirm apprehensions formulated in a former section. Quality of communication with the Austrian party was influenced by such a delivery of over 200 thousand pre-printed and then signed public opinions where citizens of Austria introduce their opinion that the following points in the environment impact assessment process should be taken into the account:

- missing containment (protective cover),
- open questions about the seismic resistance;
- consequences of conserved equipment parts aging
- unresolved questions in the case of an aircraft crash to the NPP,
- lack of fire protection,
- insufficient safety reserves of a barbotage bubbler condenser,
- electrical wiring problematic set up in the VVER-440/213 design,
- unresolved questions on the radioactive waste disposal.

The reviewer must express his admiration about the mass interest of the Austrian population about nuclear safety questions, some technically very special (e.g. issues of the bubbler condenser safety reserves). But he must also express his astonishment at point about unsolved issues of disposal of radioactive waste if he also realizes that this solution is on a qualitatively higher level in Slovakia than the solution of the management of institutional radioactive waste in Austria. The reviewer does not have any knowledge on solving disposal of this kind of waste in Austria. Institutional wastes are stored without specifying the end of storage and starting of disposal, which is not consistent with the principle of perpetually sustainable development.

The development in a given issues was relatively hectic in last months. The consultation minutes dated 24.-25.11.2009 state that „it is confirmed, that the ÚJD SR is a competent authority for proceedings on the construction act and Atomic act for licensing nuclear facilities in all steps of lifetime except the license on the siting (where the ÚJD SR is a forced participant of the procedure, the reviewer’s note)“. The consultation concerned 15 subjects:

- missing of a non-nuclear variant in the assessment report,
- finance coverage of responsibility for nuclear damage,
- spent fuel management and its interpretation in the assessment report,
- seismicity, seismic resistance,
- increasing of an electric output,
- component ageing during stopped construction, or need to substitute old components, respectively,
- requirements for the MO 3,4 design from the point of view of 3rd generation reactors,
- pressurized containment/full range containment/ the hermetic zone,
- severe accidents,
- terrorist attack by plane,
- new gadolinium fuel and coherent safety aspects,
- design lifetime of the power plant,
- integrity of a pressured vessel,
- a concept of fire protection, keeping with safety standard IAEA NS-G-1.7,
- an access right to the court concerning the EIA process.

Conclusions of consultation states, that:

- during the consultation all Austrian questions and comments were answered as it is mentioned in the minutes. The Austrian side declares continuation in next monothematic consultation concerning above-mentioned issues in the minutes;
- both sides agreed that the Austrian Espoo contact place will deliver an official written statement to the Slovak Espoo contact place till December 15, 2009.

First of monothematic consultations – expert seminar on „severe accident concerning MO 3,4“ – proceeded in a frame of a bilateral intergovernmental agreement on „questions of common interest in the field of nuclear safety and ionizing radiation protection“ on December 15, 2009 (it was the 19th meeting). There were discussed 14 subjects sent by the Austrian side in July 2009. The minutes state that some questions were not fully answered. The reason was that some questions were not concerned by the subject of seminar and detail answers to these will be known before putting the power plant into the operation (it will be solved in the preoperational safety case – the reviewer’s note). These were, for instance, concerned to:

- a design solution of the system of emergency cooling of a reactor pressure vessel (reactor cavity flooding),
- a problem of a crash of a „big plane“ (information was not given),
- a source term for calculation of behind boundary impacts (stayed open).

The Austrian side desired:

- to obtain acceptance criteria with a specification of values,

- to continue in discussion on the capture of melt inside the reactor pressure vessel (in-vessel retention).

A list of initiating events for a safety assessment according to the ÚJD SR safety guide was handed to the Austrian partners. At the end of the meeting the Slovak group signaled openness to organization of next expert meetings, but noted the need to finalize the EIA process, so that the discussion could focus on expert discussions. On the basis of the Slovak side request, the Austrian partners have promised to send a report of its external consultants till the end of January 2010.

The final event in this area was the letter also from Austrian partners from December 2009, which inter alia says that Austria considers that the responsible authority, Ministry of Environment of the Slovak Republic, will wait to proclaim the final statement until four monothematic consultations themes are explained, so that, if necessary, it will take the recommendations resulting from these consultations into account.

Reviewer's conclusions to fulfill the requirements of the Austrian side as they were formulated in the assessment scoping and to consecutive discussions between the Austrian and Slovak sides

The reviewer cannot agree to bundle the final statement of the Ministry of Environment with conclusions of both sides' expert consultations in the following fields:

- seismicity and seismic resistance,
- safety cover (containment),
- severe accidents,
- pressure vessel integrity.

The reviewer's reasons are as follows:

- mentioned issues are related to nuclear safety. They are discussed in the safety documentation. This documentation served as a basis for the Nuclear Regulatory Authority official decisions No. 246, 266 and 267 from 2008. They will be also discussed in the safety documentation drawn up for an operation permit request during an appropriate permission procedure.
- additional questions of the Austrian experts at the severe accidents seminar were, for example, related to a detailed design of some equipments for severe accident management used in the MO 3,4 design. These detailed questions of the Austrian partners evidently go beyond the environmental assessment area. In addition, their solution is an output of the executing design of these equipments. Therefore they can be given to the Austrian partners after elaboration of an executing design of particular equipments so far as it will be agreed in the framework of regular bilateral negotiations.
- other substantive reasons are aspects of each of the four themes discussed in the Section 6 of this appraisal.

Mentioned questions were, are and will be subject of periodic negotiations of the Austrian expert authorities since 1993 in the Czech Republic and Slovakia, as they are the Austrian interest in the field of the nuclear power plants safety.

These reasons lead the reviewer to formulate the statement that:

- it is possible to proclaim the final statement of the Ministry of Environment and thus finish the EIA process without an announcement of the Austrian experts satisfaction in regard of safety-technical solutions discussed within the four mentioned areas (see above),
- in terms of approaches to nuclear safety in the European Union to solve safety issues of MO 3,4 (and so: thereby indirectly solve also some aspects of a potential environmental impact) during permission procedures of the Nuclear Regulatory Authority and during its supervisory activities as it is defined in legislative provisions of the Slovak Republic.

3. STANDPOINTS ACCORDING TO ART. 35 OF ACT NO. 24/2006 COLL.

3.1. SUPPLEMENT TO THE ASSESSMENT REPORT

Ministry of Environment, referring to the provision of Art. 35, par. (6) of the EIA Act, which states:

"The proponent shall provide, pursuant to par. (5), to the concerned Authority necessary additional information to the Assessment Report on activities, which he possesses, on request. "

asked the proponent on October 1, 2009 to supplement the Assessment Report by responds to comments of seven standpoints of the involved public, NGOs and civil associations with the fact that the amendment may present also an analysis of comments on various objections delivered in the standpoints.

The par. (5) of the same article states:

„The concerned Authority can request, on the basis of the standpoints to the Assessment Report given in the sections from 1 to 3, the proponent to supplement the Assessment Report within 14 days from the end of the deadline according to the subsections from 1 to 3, at the latest.“

The Supplement to the Report sent to the Ministry of Environment on November 2, 2009 is in form of one extensive table (78 pages) in which the proponent (column "answers") responds on the comments. There are the comments:

- from Association Slatinka, resp. Society of Slatinka friends – 3 comments
- from Ing. Križan – 32 comments
- from Association Energy 2000 – 1 comment
- from Association "For the mother Earth" – 21 comments
- from Greenpeace Slovakia – 35 comments
- from Greenpeace represented by Mr. Jan Haverkamp – 101 comments.

In this part of appraisal the reviewer will address the adequacy of the proponent's responses to the comments. It must be noted that just at the beginning many of the comments reflect non-systematicness by elaboration of the Assessment Report, which matters also to the reviewer. The commenting people often react in the table to a given topic on the first occasion when they meet it in the text. However, the given topic is often elaborated in more detail and more correctly in other parts of the report (for releases and assessment of their impact – see the part 1.2.3 of this appraisal – the best dealing with them is in the Annex 4.1 of the Report). The reviewer does not also react on the comments related to incorrect terminology, language and grammar level of the text of the Report – in principle he agrees with them.

3.1.1. Comments of the Slatinka society, or Association of the friends of Slatinka

According to the supplement table, the two associations have submitted three identical comments. The answer to the first is acceptable. The response to the second question does not answer the question concerning the impact on the river Hron ecosystems. The given answer contains a statement that the "1st and 2nd unit of MO have been in operation for 10 years. During this period monitoring of impacts to the environment has been performed. Results of this monitoring show no measurable values which should refer to deterioration of the environment around the NPP and there are not registered any indicator changes of the aquatic ecosystem of the Hron river." The next part of the answer states, that "the SE EMO and the state control and supervisory bodies perform measurements in a certified laboratory." The reader will not find out which of "indicators of the aquatic ecosystem" will change. An answer to the third comment is only general. It was reasonable to publish what are "the proposed new technological measures to improve the efficiency of technological units and thereby to reduce the amount of pollution discharged into the environment." This publishing should be done either by an explicit indication of these technological measures (along with a relationship to "the amount of emitted pollution") or by a reference to the relevant part (parts) of the assessment report, at least. The proponent had a need to discuss problems of inadequacy of cooling water at the end part of answers (although no question was related directly to this problem). He does it by quite an acceptable manner, though a better explanation of the cooling water adequacy is mentioned in the section 6.9 of this appraisal.

3.1.2. Ing. Križan

It is a pity that the proponent, during elaboration of the response to the comment No. 7 of table, had not studied the Official Decision of the ÚJD SR No. 79/2009 and its justification. The reviewer lacks a clear and exact indication of the provisions of national or European legislative regulations or other acts that demonstrate the need of the EIA process after the construction license was issued for the given activity.

Comments 8-11 reflect antinuclear opinions of the commenter. These comments are answered also by existence of two additional chapters in the Assessment Report: the programme framework and the design framework. Both frameworks might be an added value of the Assessment Report, if they concerned strictly the things they were intended to be used for, i.e.: the integration of MO 3,4 construction in the Slovak energy system, eventually the legislative framework for this integration, description and justification of new approaches to the design. Other answers to the comments are adequate. Maybe a debate about the zero alternative is an exception. This debate should have been carried out at the beginning of the EIA process. The reviewer considers that a clear approach should have been adopted in this question. It should come out from the EIA status within the overall process. In the time when the most of the activity/construction is already completed, any analysis of the zero variant impact seems to be contra-productive.

The comment 12 combines two quite unrelated matters. An impact on population health is assessed in the report. Concerning the requests to evaluate indirect risks (i.e. risks from decommissioning of NPP and management of spent fuel and waste not allowed to be disposed in the existing repository) the answer is not concrete enough and does not state that the given issue is a subject of the nuclear power back-end strategy

within the existing legislative framework. This Strategy passed the SEA assessment according to a provision of Art. 17 of the EIA Act.

As a response to the comment no.13, the reviewer notes, according to his personal experience, that a separate chapter dealing individually with each requirement is a much better solution than a table, where special requirements are incorporated (with a few errors - see the section 2.3 of this report).

Comments no.14-19 reflect the problem that is discussed in the section 1.2.1 and also (better, for relevant aspects, as in the supplement) in the section 6.3 and 6.7 of this report. Also at this point, the reviewer has to regret that no one from involved stakeholders clearly clarifies a relationship between the documents, the EIA processes and nuclear safety. This is done only at the end of the EIA process, when it is clear, that a significant proportion of comments in the EIA process is just about nuclear safety issues. References to the documents and processes about nuclear safety in the table are adequate somewhere, but somewhere they are not. The claim, for example, in a response to the comment "in the report and in the intention the analyses of nuclear power engineering major hazards as: inherent safety hazards, environmental hazards, health hazards, the hazard of proliferation ... is missing" that "this requirement is beyond the EIA scope and it is about the nuclear safety, which is covered by the NRA SR and the Public Health Authority" the reviewer considers as inadequate response in terms of environmental and health hazards.

The comment no.20 was answered in the frame of the comment no.12. The reviewer notes (in addition to the considerations in the section 1.2.2 of this appraisal) that in the documents dealing with the development of Slovak deep geological repository programme two studies addressed to the harmonization of EIA process with the development of deep geological repository can be found (trying to solve, for example, when and at what level of document developing it is reasonable to introduce the EIA process, what degree and number of variants could be considered and so on).

Comments no. 21 and 22, except of interpretation of an anti-nuclear attitude, reflect the fact that implementation of MO 3,4 into the framework of an energy security programme is insufficiently targeted. The reaction in the table is sufficient.

Either a response to the comment no. 23 cannot be considered as adequate. The proponent could, for example, formulate such a response as described in the section 6.7 of this appraisal or join the response with a significantly better response to the "related" comment no. 25. The comment no. 24 is essentially the same as the comment no. 14. It is unusual that in response, the proponent states everything else, except referring to the publicly available (www.ujd.gov.sk) official decision no. 266/2008, in which the NRA SR approved "implementation of changes on classified equipment affecting the nuclear safety of the nuclear facility 3rd and 4th unit of the Mochovce NPP during construction period " in the extent that explicitly listed 120 parts of the initial design documentation.

Also the comment no. 26 is about the questions concerning nuclear safety, and therefore it is not answered (see the section 6.4 and 6.11 of this appraisal). The comment no. 27 and also the more detailed comment no. 28 are identical to comments no. 12 and no. 20 - see there. The reviewer notes that considerations in the comment no.28 that seem to be detailed and professional, in some aspect reflect the lack of commenter's knowledge in the field of principles for the safe management of radioactive waste (consideration on institutional control or on permanent environmental burden in case of repository located in the area) - see "The Principles of Radioactive Waste Management. IAEA Safety Series No.. 111-F. IAEA, Vienna, 1995". Also the response to the comment no. 28, the reviewer does not consider satisfactory.

The comment no. 29 and corresponding response reflect quite a chaotic concept of the assessment report in the field of radioactive waste. The answer is inadequate: radiological inventory, as well as an overview of the other characteristics of radioactive waste can be done in advance, of course, with an adequate degree of uncertainty. In principle, the reviewer agrees with that part of the comments regarding to the release of solid radioactive materials into the environment (see the section 1.2.3.2 of this appraisal). An answer, referring to the legislative, says nothing about today applied practice in releasing (EMO 1,2) which will be, after commissioning of MO 3,4, probably almost the same. As already mentioned, to link the release of radioactive material from the operation of NPP with the category of transient RAO together is misunderstanding in an approach to this category of radioactive waste.

In response to the comment No. 30 there is again a reference to the assessment of nuclear safety. In this case, this may be acceptable; concept of liquid RAO management in the section 2.6.3 (and also in 2.6.1) of the assessment report may be, according to the reviewer's opinion, considered as adequate to the needs of the environmental impact assessment.

Comments no.31 and 32 - gaseous releases reflect the fact mentioned in this appraisal in several parts: one thing is assessed unequally in more parts within the report. The subject of the comment is really discussed in the section C.III.1.5 (not C.1.5 as indicated in the table), respectively in the annex 4.1. The impacts of leakages during severe accidents are not assessed in the report. Therefore, additional information was provided on the public hearing. See the section 6.2.3 of this appraisal. Note of the reviewer to an incorrect statement of a commenter on independence and credibility of monitoring of releases is that it creates an impression that "I believe only results which I measure". The fact that uncertainties (errors) of monitoring measurements are not stated is on one hand the shortcoming of the report, but in the reviewer's opinion it is not correct to consider it as the cause of untrustworthiness. In the reviewer's opinion the system of measurements developed and used in the Slovak Republic would ensure credibility of the results. The system is based on the only one legal framework for such relative terms as "independence" or "trustworthiness": the standards of metrology.

Requirement in the comment no. 33, for completing the discussion about stochastic effects of releases or leakages, the reviewer considered to be inadequate, as well as a response on it. The reviewer cannot imagine well enough how the commenter wants to implement the discussion about the stochastic effects of releases into the assessment report. An analysis of data which assesses the effects of ionizing radiation on the human body is in the scope of activities done by a reputable international group of experts. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) may be considered as an indisputably independent institution. UNSCEAR has already published 13 comprehensive reports summarizing information about possible human exposure levels and corresponding observed effects. The issues of tumors are mainly discussed in the report published in year 1994 (and its annex - Annex A "Epidemiological studies on radiation carcinogenesis") and in the report published in the year 2000 (annexes - Annex I "Epidemiological evaluation of radiation-induced cancer and Annex J: Exposures and effects of the Chernobyl accident). Generalization of the data for the stochastic effects led to a conclusion that for the low-doses it is possible to describe dependence between a dose and additional occurrence of consequences for a human as proportional - but this is possible only in a small doses range. Studying the effects of very low doses, it is necessary to rapidly increase the number of monitored people – which can not be reasonably obtained (expressed in simplified terms - in the surrounding of NPP there is not a sufficient number of people to obtain a relevant sample for proving a statistical occurrence of doses effects). Considering higher doses, the proportionality would be affected by deterministic effects. Linear non-threshold extrapolation of the effects

of small doses, based on the linearization, is a very conservative method that in the range of low doses has not been experimentally demonstrated. In practice, for the need of radiation protection the hypothesis of linearity and non-threshold postulate is adopted as currently the best possibility for generalizing the current knowledge. In the field of small doses, there is a low probability of a real hazard undervaluation; the real hazard is usually overestimated considering the mentioned approach.

In the evaluation process specific indicators are used - risk factors which reflect the expected genesis of a particular type of tumor or death because of tumor genesis. The factors are used to assess the danger for people exposed by ionizing radiation in various activities leading to the exposure. The increase of tumors emergence risk is not statistically demonstrated in other geographic areas with significantly higher values of dose rates from natural background as anywhere in the SR - in areas with a high content of radioactive substances in geological structures for example in Brazil or India (Annex G, UNSCEAR 2000). Series of studies and surveys, with special attention on leukemia, was focused on increase the emergence of malignant tumors in the population living near nuclear power plants. But neither study convincingly confirmed that the increase in the number of cancer disease really occurred. (the chapter A-IV, Annex A UNSCEAR, 1994).

The reviewer also considers the response to the comment 34, requiring a description of whole process of gaseous releases monitoring, inadequate. There is written in a response that "Total activity and isotopic composition of releases are measured. A detailed description goes beyond the EIA scope." The content of such a response is unsatisfactory indeed. In contrast with the proponent, the reviewer has to answer the following question: what should already be in the process of the environmental impact assessment more important than a detailed description of monitoring procedures on the interface of facility and environment and interpretation of their results (than a demonstration of adequate accuracy and precision of measurements).

An answer to the comment no. 35, by referring to the Annex 4.1 (should be also be a reference to the Annex 5.4 - 5.7), the reviewer considers as adequate. The comment no. 36 discusses the impacts of severe accidents; this is one of the aspects already discussed in the comment no. 31. See also the section 6.2.3 of this appraisal, respectively the Annex no. 5.9 (methodology for estimating the consequences). The proponent could use a reasonable interpretation of the problem rather than a special-purpose interpretation of the Annex no. 11 contents of the EIA Act.

The comment no. 37 discusses the adequacy of the disqualification of the zero option from the assessment, arguing that the completion is, in terms of investment cost, not usually reported. The reviewer considers the comment no. 37 as a publication of anti-nuclear opinions of the commenter. The reviewer, in consensus with the proponent, does not agree with this approach; reinvested costs are not the only one aspect for the disqualification of the zero option. Is it completion itself, which is obvious at first sight.

The comment no. 38 summarizes all the previous ones and it results in the proposal not to implement the proposed activity.

During the expert appraisal preparation, the Ministry of Environment received, at the end of November 2009, a letter from the commenter, responding to the supplement part of the assessment report and stating that "No comment, which I wrote, was precisely and sufficiently replied and discussed. If the answer was written, it did not relate to the comment, but it was only a reference to the text in the report with small modifications". In the final part of the 30-page letter the commenter again suggests non-implementing the proposed activity. The letter, which also does not contain only factual or relevant but also emotional parts,

the reviewer considered inadequately strong. On the other hand, the reviewer expressed his dissatisfaction with the overall level of a response to the comments in the Supplement, respectively his dissatisfaction with the fact in what way the individual aspects (for example releases and their consequences - see the section 1.2.3 of this appraisal) were discussed in the assessment report.

3.1.3. Energy 2000

The only comment of Energy 2000 (No. 39 of table), as transposed to the Supplement, consists of three aspects:

- Disagreement with referring to the environmental studies from the 80-ies. To this the reviewer notes (generally, without knowing the studies as Energia 2000) that assigned safety reports have specified in principle the same legislative purpose and content as the current EIA documents (see also the section 1.2.1 of this appraisal).
- A construction permits issued in 1986 is not reliable to respect. The reviewer does not agree even with this comment. The legal system after the political changes in 1989 must have been built on a principle of continuity of the law. In other words, either considering the fact that the construction permit was issued "under the pressure" (which is legally only a non-justified opinion, or it is supported only by the fact that another political system was in the country at that time, respectively), there is no legal reason for disobedience to the construction permission.
- Issues of impacts on the surrounding climate are answered sufficiently by referring to the section C.III.4.1.2 (not C.4.1.2 as mentioned in the supplement).

During the expert appraisal preparation (December 17, 2009), the Ministry of Environment received a letter from Energia 2000, which expressed dissatisfaction with the answers in the Supplement. After reviewing the letter of comments to the assessment Report from September 19, 2009, written by Energia 2000, the reviewer has to state that the Supplement does not really deal with many aspects of these comments. These are (listed also in the case if the reviewer considers the comments as factually or terminologically incorrect or meaningless):

- Doubts about the competence of the Golder company on developing the report because the company plans to mine the uranium rocks in Slovakia,
- There is a need for a legal validation of certificates according to ISO 14001:2004 (specification in the report is completely unnecessary - note of the reviewer)
- An unfounded attack upon the AEA Technology (U.K.), which should have to be the author of one of mentioned environmental studies and misrepresentation of its activities in an unrelated process of A1 reactor hall decontamination in Jaslovské Bohunice,
- Interpretation of changes introduced by Act no. 24/2006 Coll. compared with the previous EIA Act (due to MO 3,4 !) and interpretation of the Atomic Act - strictly incorrect,
- Issues of the spent nuclear fuel further management,
- The interpretation of integral storage in Jaslovské Bohunice issues and spent fuel management issues after a final shutdown of V1 NPP is very incorrect - both problems are not a subject of the impact assessment process,

- An absurd statement that the A1 NPP building is the repository of high level waste with exhausted capacity and, next to that, there is the request for the PSA and PRA assessment for MO 3,4,
- An absurd comment concerning the management of spent fuel near the reactor - for the MO 3,4 case and, next to that, there is statement that challenges independence of the NRA SR (with an unbelievable and largely false substantiation that "it was created from the staff that was in operation during the A1 NPP accident"),
- An unnecessary and unfounded discussion "about the environmental contamination after the accident at A1 NPP in Bohunice", which is out of the assessment scope - in this case referring to quite a significant number of EIA processes and documentation about the different activities done at Jaslovské Bohunice is considered to be sufficient,
- A mistaken consideration about the releases limits, in which the statements about the releases themselves with the effects of individual radionuclides to a human body (in the context of Energia 2000 considerations relating to the tritium, it is good to pay attention to the value of its biological half-life) and with limits for concentration of radionuclides in food are mixed together,
- Incorrect considerations on a monitoring plan of the environment components,
- Consideration of lack of cooling water for NPP,
- Incorrect considerations of a tritium radiation impact are stated again,
- A mistaken consideration that the profits from electricity production are in hands of a private company and the state has to "unreasonably (!) provide expensive activities of the radioactive waste management"
- Problems of seismic resistance.

In a letter dated December 2009, Energia 2000 gives a notice on seriousness of the risk of "colloidal water pollution without a sedimentation process in the reservoir V. Kozmálovce" which, in their opinion, could lead to "the result that considering the combination of misfortune coincidences could lead to another reactor accident as in A1 NPP in Jaslovské Bohunice". In a letter dated December 2000, Energia 2000 does not respond to the answers on their requirements, but they highlight the points in the Supplement table which was written by other commenters.

The reviewer understands well aversion of the proponent not to deal with unsubstantiated and meaningless considerations of Energia 2000, but not to react to them at all is probably not the best solution. Except this statement also the reviewer suggests non-dealing with Energia 2000 comments because:

- statements and comments are often unfounded and factually meaningless,
- deal with comments of other commenters, which are responded in other relevant parts in the assessment report.

3.1.4. For the mother Earth

The response to the comment no. 40 is not the answer. The reviewer adds that the legal justification why the construction permission (by the official decision of NRA SR no. 246/2008) was issued without EIA process being overrun was already published - see the section 1.2.1 of this appraisal. Comments no. 41-43 are answered satisfactorily. Regarding comments no. 44, respectively no. 47, it is a fact that the shipment

details are confidential (especially transportation time); the reviewer does not fully understand the obstacles for not publishing a simplified description of a spent fuel transport container.

The reviewer considers a response to the comment no. 45 to be satisfactory especially after public hearing where the details about this case were provided. See also the section 6.1 and 6.4 of this appraisal.

Responses to comments no. 46, 48 and 49, the reviewer considers to be satisfactory in context of the information discussed on the public hearing (a deliberate attack by a small plane, see also the section 6.1 of this appraisal). The comment 50 is identical with Ing. Križan's comment no. 36, respectively no. 31, including the reviewer's reaction.

From the comment no. 51 it is not clear if the commenter discusses non-radioactive or radioactive releases (or both, but in this case an implication about the contribution to global warming or climate change is not correct). The answer deals with non-radioactive releases and it is satisfactory. Regarding the radioactive releases, they are discussed in many parts of the assessment report (see the section 1.2.3 of this appraisal).

Responses to comments no. 52 (and related no. 58: issues of an insufficient amount of cooling water / water regime of the river Hron), no. 53 (and identical no. 59 concerning the interpretation of information from the National Registry of Patients with Oncologic Disease), no. 54 (and identical no. 60 referring to compensation of damages caused by a nuclear facility operation - but this issue is, in principle, not related to the EIA process - reviewer note), no. 55 and no. 56 (disposal in a deep geological repository) are answered satisfactorily. Answers can be also found in other parts of the Supplement, they were also discussed on the public hearing and some of them are even discussed in this appraisal (e.g. the section 1.2.2 and 6.9).

Response to the comment no. 57 - the need to assess the probability and potential impacts of an accident with release of RA to the environment, by referring to the safety documentation, is not fully satisfactory in the Supplement. See the Section 6.2.2, 6.2.3 and 6.3 of this appraisal.

3.1.5. Greenpeace Slovakia

The first comments of Greenpeace Slovakia concern the formal issues of the process. A response to the comments no. 61 is consistent with substantiation of the official decision of the NRA SR No. 79/2009. Another comment (no. 62) reflects the fact that the two language versions of the assessment reports are not identical. In the response it is noted that the final summaries of both language versions are completely identical, as shown in the final German language summary (responding to questions of the Austrian party). In the reviewer's opinion, the discussion on whether the language versions of the document or the final summaries are identical, respectively what are the consequences for not being identical is counterproductive. They should be identical. The comment no. 63 (the same as the comment no. 41) is related to informing of the Tlmače town citizens and it is responded sufficiently. To the comment no. 64, the reviewer has no statement because the mentioned internal document of SE he does not know. Even the comment no. 65 is considered to be non-relevant for the reviewer. The answer is acceptable.

The comment no. 66 about the cooling by air is also technically irrelevant and is identical with the comment no. 42 which is mentioned above. Also further comments (no. 67, 68, 69) have been already discussed above (comments no. 44, respectively. 47, 43, 20). Similarly comments no. 70 and 71 (no. 45), no. 72 (no. 47). Part of the comment no. 73 repeats the comment no. 48. A response to a part of the comment, where

it is stated that the activity limits of tritium in liquid releases "is based on expert assumptions or judgments that are outdated," is the same as the statement: "limits for liquid releases are defined by the Slovak legislation and by a relevant permission of the Public Health Authority. An assessment of the current valid legislation is not the issue for SE." A statement of the reviewer to the issue of releases limiting is given in the section 1.2.3 of this appraisal.

Response to the comment no. 74 is acceptable. The reviewer adds that it is difficult to make an analysis and comparison of non-nuclear and nuclear energy sources in the scope of the continuing EIA process. The reviewer supposes that this could be done in the process of definition of national energy strategies and supporting SEA processes. The reviewer also assumes that in these processes the impact of construction of new energy sources to a climate change was evaluated (the comment no. 75). The comment no. 76 expresses disqualification of the zero variant in the report. The fact is that the statements in the section C.II.18 are not written the best way. But there is an effort to say that from the beginning it was clear, that in the area there would be four units. It means that the zero variant, taking into account the current status of the 3rd and 4th units completion, is difficult to consider. Finally, in this case, the concept of one variant assessment was adopted by the Ministry of Environment at the right time, in the reviewer's opinion.

A subject of the comment no. 77 is the energy security strategy of the Slovak republic adopted last year. In parallel, according to statements of the EIA Act (§ 17), the SEA process had to be done and mentioned issues could be discussed there. A response to the comment no. 77 is quite acceptable.

The comment no. 78 was discussed above (see comments no. 17, respectively no. 50), also comments no. 79 (no. 51), no. 80 (no. 53,59) and no. 81 (no. 54,60). Comments no. 82-85 are related to relations of the proposed activity to a deep geological disposal. The statement of the reviewer to this task is written in the section 1.2.2 of this appraisal. As for comments and responses mentioned in the table, not all of them can be accepted. For example, the statement that "... responsibility for the fuel cycle back-end part is still the responsibility of SE ...", which is not in accordance with § 3, para. (9) and (10) of the Atomic Act - considering the disposal. The reviewer feels the need to respond to the part of the comment no. 84, where the commenter requests the investor "to be committed to funding of the deep geological repository in case the money paid to the National Nuclear Fund will not be sufficient for financing this task. To this statement no reaction was written. The requirement is based on unfamiliarity with the National Nuclear Fund Act. Exactly: SE, a.s. could not commit themselves to do this because within SE contributions, paid to National Nuclear Fund, also the need for financing the disposal of spent fuel from MO 3,4 units is and will be taken into account. The reason is that it is not a part of so-called historical deficit. One of the main theses of Act no. 238/2006 Coll., as amended, and one of the main motivations of the mentioned act approval at the time of SE, a.s. privatization was the requirement to legislatively ensure that SE, a.s. contributions will not cover the historical deficit. This fact is clearly stated in the mentioned act; historical deficits should be covered with the payments of transmission and distribution system operators. It should be noted, that one part of the historical deficit is related to the spent fuel disposal from V2 NPP from the period of operation 1985-1994 (i.e. at time when the financial contributions to Fund had not collected). For additional information see the Part III of the Strategy for the nuclear power engineering back-end part.

The comment no. 85 was discussed (see no. 56). Also comments no. 86 (no. 16, 17, 25, 46, 57), no. 87 (no. 26) and also the related comment no. 88 (no. 36, 46, 50, 57, 74, 78) were discussed. To the last comment the reviewer notes is that the INES scale is not the means to assess the risks of accidents but it is a tool for reporting and communication about the accidents. The comment no. 89 is related to the construction of a

reactor shaft, probably in terms of its resistance against seismic events. Issues of seismic resistance were explained in detail at the public hearing, it is also mentioned in the section 6.10 of this appraisal.

A response to the comment no. 90 is answered satisfactorily. The reviewer also considers the range of 50 km for the assessment of some impacts, as described in the Section C. VII of the assessment report, reasonable.

The reviewer considers the response to the comment no. 91 also as adequate and there is no reason, in his opinion, to assess the cumulative environmental impacts of two nuclear localities in Slovakia.

The comment no. 92 reflects an unclear statement in the field of relations between the safety documentation and EIA documentation (see the section 1.2.1 of this appraisal). It is also partly philosophically incorrect: solutions adopted in the design documentation and assessed within the safety documents (logically, there is a feedback between them) lead to acceptable (according to legislative regulations) levels of environmental and / or health impacts, respectively risks or hazards.

Comments no. 93 and 94 are related to the issue of sufficiency of cooling and additional cooling water. They are answered in response to the comments of Slatinka associations, respectively in response to comments no. 58 and 66; also in the section 6.9 of this appraisal. The comment no. 95 is a combination requesting the assessment of whole fuel cycle (to be answered adequately) and there is a lack of "variant solutions ... amount of raw- material in severe accidents, basic epidemiological data, basic data and an assessment of impacts on the nature and much more." Those issues are commented in responses to specific comments.

3.1.6. Greenpeace international

Comments no. 96 and 97 are about the quality of the report. Reviewer has to note to the responses, that compliance with the provisions of the law is a necessary precondition, which says nothing about the quality of the document. The reviewer agrees with both comments related to quality of the assessment report. In the comment no. 96, in the reviewer's opinion, a lot of topics are missing ("a proper detailed description of the human and natural environment in MO 3,4 surroundings, possible consequences, alternatives to the project, impacts of the initial and final phase of the nuclear fuel cycle including management of high level radioactive waste, security issues (e.g. protection against a deliberate attack), etc.). Many of these topics refer to already discussed comments, some of them (the spent fuel management) are in the Strategy for the nuclear power engineering back-end part.

The comment no. 98 relates to compliance with the relevant EU directive and the Aarhus Convention. The reviewer is convinced that the structure of reports, respectively the national EIA Act is in accordance with EU directives (more exactly: inconsistencies, but they are not related to the structure of the assessment report, were resolved by the Act No. 287/2009 Coll.) Regarding the non-compliance with the Aarhus Protocol, this is not specified here. It will be discussed in a comment, where the Protocol is specified. The reviewer considers the comment no. 99 to be a useless dispute about the exact meaning of the words: a discussion if by using the word "mainly" the scope of the assessment is limited, or if the word "ambient" means / does not mean the same as "living in surrounding", is counterproductive.

Comments no. 100-102 are related to the needs for completion of MO 3,4 in accordance with the government approved strategy documents for ensuring sufficient sources of electricity production (see

responses to the comments). Developing of the second document (The energy security strategy of the Slovak republic) was supplemented by the SEA process. Discussions on this issue could / had to happen in that time; now they can be considered as closed governmental (political) policies and strategies. The reviewer, however, lacks in the report (in the programme framework, where just this issues should be its primary content) a more explicit description of the connections between MO 3,4 completion and both strategic documents.

The comment no. 103 specifies non-compliance with the Aarhus Convention. It is mainly about the already discussed question about the time when the EIA process is implemented. The reviewer is able to identify himself with the opinion that the EIA process has a sense, if it takes place before the proposed activity (or, as cited in the Aarhus Convention: "... in the early stage of the project just before the moment when in its implementation process the irreversible steps are made."). However it would be good to consider, at least at a national level, to what extent the EIA process, framed by the act to the level of the contents of relevant documents and to the trials, fulfills the initial tasks today:

- to be the means of objectification in a decision-making process, with an adequate place for the assessment of environmental impacts in this process,
- the means by which the proponent can convince the public about the eligibility of its expertise and interests.

Experience in the nuclear field is that the meeting of these aspects is an exception. The EIA process is often implemented only after relevant decisions of the proponent and the proponent's primary purpose is to fill the letter of the act that, for example, says nothing about how to set establishing of alternatives (see also: P. Salzer, Senčáková E.: EIA Processes in the Radioactive Waste Management in Slovakia - Eight Years of Experience. Proceedings of ICEM'03 held in September 21-25, 2003, Oxford, England). To trigger the process is often an approval procedure of the Building Authority. In the particular case the position of the Ministry of Environment became a trigger of the process. Completion of the EIA process is, from the formal point of view, probably taken into account in the next step of the power plant licensing process - the commissioning authorization.

According to the reviewer at the moment, it is reasonable to close the EIA process. The vast majority of questions and comments in the process concern nuclear safety, so it is reasonable to continue the discussions on nuclear safety issues on the ground of the national nuclear safety supervisory authority, respectively on the ground of the makers of the design and safety documentation, or on the ground of a complainant. Assuming that commenters want a professional and substantive debate on these issues and not on simple opposition to nuclear energy, then this is, in the reviewer's opinion, a more sensible solution, than to pass the problem into the environment of the judiciary.

To the Comment No. 104. asked whether this document is the continuation of an old design or rather a new design gives diction and the justification of the decisions of the ÚJD SR No. 246, 266 and 267/2008. The issue of the analogy of a nuclear facility with generations of nuclear facilities, as the world embraced, was actually explained on the public hearings in accordance with an explanation in this appraisal (section 6.7).

No. 105. as already mentioned, the issue of compensation for nuclear damage is only marginally related to the problems of the environmental impact assessment. It has been repeatedly explained that a new separate act is being prepared in 2010. Any eventual comparison of the considered nuclear power plant accident to the Chernobyl accident is considered to be inappropriate and unfair.

To the Comment No. 106, the reviewer notes that a requirement to assess the impact of a small aircraft (malicious) actually meets the European Commission recommendations. This issue was discussed in the comment No. 71. It was explained in detail at the public hearings and treated also in the section 6.1 of this appraisal. Categorization of MO 3,4 in the generation of nuclear reactors is discussed above and in the section 6.7 of this appraisal about the over-design accidents, it is discussed in response to several comments (e.g. No. 88) and also in the part 6.2.3 of this appraisal.

The reviewer considers a response to the comment No. 107 to be adequate. The comment 108 was answered above (No. 93.94, respectively. An opinion on the Slatinka associations is at the beginning of the table, No. 58.66). Also the answer here (and in the part 6.9 of this appraisal) is adequate. Also the Comment No. 109 (seismicity) has already been answered and discussed above. In the assessment report, this issue is discussed in detail in the part C.II.2.2 and 2.3. In the opinion of the reviewer, a response to the comment No. 109 is adequate.

The comment No. 110 deals with a relationship between nuclear safety and the EIA process. From the commenter's side the comment is a wordplay - concretization of the safety system is described on several pages around the page 64 of the assessment report. Information was also specifically mentioned on the public hearing, on the consultations, they are also subject of the whole section 6 of this appraisal. Comment No. 111 all the same. Consideration that "because these safety enhancements are apparently still pending, it is not possible to conclude that they fulfill their purpose. This will be assessed after their completion, when their effectiveness will be analyzed" is devious: the assessment report is about to take information from the preliminary safety report. The requirement to make completion of the EIA process by the evaluation in implementing safety improvements supports the commenter's approach to the discussion dealing with the implementation of the Aarhus Convention. A hint, in which direction improvements are going, contrary to what the commenter claims, exists: it is the published Decision of the UJD SR No. 246, 266 and 267/2008.

The Comment No. 112 again deals with the inclusion of the installation in the x-generation. This has already been discussed in the comment above. See also the section 6.7 of this appraisal. The reviewer considers the explanation in response to public hearing to be appropriate.

Other questions reiterate issues already discussed above, or in other remarks. The commenter created the comments during reading the text. Their repetition is, inter alia, the image of a relatively unsystematic approach to those issues in the assessment report, particularly in the Design framework. Issues stated in the Comment No. 113 are the same as in the Comment No. 104. The same applies to the Comment No. 114-120, which was answered in many parts of the above part of the assessment, during the public hearings and consultations, see also the section 6 of this appraisal.

Discussion of MOX fuel in the Comment No. 121 is unnecessary - MOX fuel will not be applied in this facility. The reviewer, however, to some extent agrees with the commenter's findings here and in other comments regarding the "PR tone" of many formulations, particularly in the design framework of the assessment report. It is what the proponent should really avoid.

Comments No. 122-125 are related to the spent fuel management off the reactor. Their Slovak translations are again terminologically deplorable, so the reviewer must only guess from the context whether it says about storage or disposal. Legislative regulations in Slovakia do not recognize the term "temporary dispose". The reviewer considered replies to the comments to be sufficient. The reviewer's point of view is expressed in the section 1.2.2 of this appraisal.

To the Comment No. 126 the reviewer noted that the terminology is meaningless not only in English, but also in Slovak mutation of the assessment report. To the overall response to the Comment No. 127 the reviewer notes that for the Bohunice conditioning center, which the incinerator is a part of, was the EIA process implemented during that time. Periodic evaluation of the safety of this nuclear facility has recently taken place under the provisions of legislative regulations. The environmental impact assessment during a 10-year operation is a part of this periodic evaluation.

The comment No. 128. The reviewer does not know why the English word "reasonable" in the ALARA principle was translated as "real". Comment with no reaction in the response, does not in principle assail the principle of ALARA, rather it is an image of recent discussions about the differences between "reasonably achievable" and "reasonably practicable" (sometimes abbreviated as ALARP). The reviewer in relative accordance with the commenter notes that while almost in every document about nuclear safety / radiation protection we can read about the application of the ALARA principle (in nuclear facilities there are ALARA working groups / committees), a specific method of application is hardly to be found anywhere.

In the Comment No. 129 the reviewer disagrees with the answer of the proponent, which is limited to finding that "the provision of required information is beyond the EIA process.", and sees no problem in disclosing the information (perhaps except the contract terms). Handling of waste during an operation should be dependent of final stages of waste management.

Comment No. 130 represents an often discussed issue of sufficiency of water for cooling. The proponent, however, does not answer to funding source of the dam V. Kozmálovce, respectively on a suspicion of the state's financial support.

To the Comment No. 131 the reviewer again states that questions regarding the safety and health protection at work and radiation protection of personnel are not a subject of EIA, but a subject of the safety documentation. Exceptions are the situations where the corresponding aspects can become parameters in finding an optimal variant, but this is not the case of this assessment report.

Comments No. 132 and 133 are related to releases. They demonstrate not the best treatise on these issues in the assessment report (see the section 1.2.3.1 of this appraisal). The response gives a reasonable reference to the Annex No. 4.1, where the matter is described the best. The reviewer does not fully understand whether the answer to a query about the current debate on the effective doses of tritium (but also without an explanation or a reference) is finding "value of tritium is well below the ICRP limit." The comment No. 133 discusses the problem of "filling" an annual discharge limit of tritium in liquid releases, which is insufficiently explained in the report. On the other hand, finding that "the tritium problem raises serious concerns" is more of emotional than substantive technical nature. A reply to a comment in the spirit of "never mind, the ÚVZ will issue new limits for all four units if necessary" is insufficient: on what basis the ÚVZ will issue them. The reviewer, as discussed in the Section 1.2.3.1 of this appraisal, would like to finally become aware from what and how the limits were derived, and how the numerical balance and reference limit values of releases were derived.

Comments No. 134 and 135 deal with the impact assessments of releases. If we look apart from unnecessary emotional statements of the commenter, it is possible to agree with the material content of the comments, but the case is not described well in the report. Again, it will probably be the best, in agreement with the response, to look at the methodology for estimation of the population dose stated in the annexes. On the other hand, the reviewer misinterpreted the term "critical group of people" and combines it with the health implications and epidemiological data. Crown to those two comments and to responses to them is

given by the text in the response to the first of them, which the reviewer does not understand at all (literal quote) "Comments of the author's opinions are described in the safety documentation."

Neither response to the Comment No. 136 is satisfactory. It reflects an approach that many issues of the back-end of the nuclear energy are described in the assessment report, but a reader cannot find an infrastructure layout of the issues in the report. Then there can be no wonder that the commenter interprets this in his own way, in this case, incorrectly. Is the proponent aware of the fact that the responsibility for decommissioning of nuclear installation is in Slovakia not explicitly addressed (the fact that NPP A1 and V1 are being decommissioned by JAVYS is rather the result of historical development, respectively. privatization of SE, a.s., not a result of pre - legislative - provided system)? There are more of such infrastructure uncertainties in the national system of nuclear energy back-end (and so far the problems were solved after they had become an acute problem). This is one of the motivations why Trustee Council of NJF is preparing an amendment of the NJF Act, which should not only address financing of activities but also inseparable ZČJE infrastructure issues.

The comment No. 137 again deals with establishing of alternatives. If this is a breach of law, EU directives and the Aarhus Convention is a legal issue to tackle beyond this report. The reviewer, in accordance with the considerations in the section 1.2.1 of this appraisal, believes that the commenter's claim that "the environmental analysis of the project EMO from an earlier period, which would meet the criteria set by the Aarhus Convention, the EU Directive on EIA and the current Slovak law the EIA does not exist" is not entirely correct. Acceptance of the initial safety report in the early 80's was a condition of the location of all the four blocks at the EMO site. According to the provisions of the Civil Construction Act and its implementing regulations, also according to the statements of the regulatory authority CSKAE at this time, its purpose, and thus the contents were very similar to the current documentation elaborated within the EIA process.

Also Comments No. 138 and 139 repeat complaints commented above. The complains cannot be responded differently than by the existence of politically accepted energy strategies, out of which the strategy of energy security was also accompanied by the SEA process.

To the Comment No. 140 the reviewer notes that the costs are indicative (and it is really good-humoured that in the nuclear parts the costs are calculated at precision of one Euro). The reviewer considers the method of cost estimates in the assessment report to be adequate to its purpose.

Aspect of the Comments No. 141 to the report was explained at the public hearing like it is in this assessment report (the section 6.2). The comment No. 142 is a purposeful speculation, which the reviewer does not agree with.

In the Comment No. 143 and 144 the problem of cooling water sufficiency was discussed several times. The same comment, the same answer. A response to the Comment No. 145 is inappropriate. If it is true what is written in the response, the problem should not be written about at all. If it was written about, there should not have been a problem to give required information.

Also the Comment No. 146 is a proof that the writers of the report in their writing style did not consider the potential objections to the text too much, especially from opponents of nuclear energy. The answer can be considered satisfactory.

It is quite possible to agree with the Comment No. 147. It was really possible to proceed in the way that the author of the reports first looked at the national directive if foreign directives were not available. Justify the use of Canadian guidelines by organization's experience from there may be right, but it was desirable to do

what the reply says: that of the Canadian guidelines illustrate good practice (if this is true). Another comment No. 148 shows that this idea did not occur in the authors' mind. The reviewer is sure that the considerations should be based on similar Slovak legislation although it is possible that the variable has the same value. Moreover, according to the commenter, the Canadian value is outdated. This creates a problem of adjudicating the issue (see also the section 1.2.3.1 of this appraisal) if it is reasonable and proper to associate the releases limits, which should be clearly derived from the dose parameters (but there are not - see above), with limit concentrations of radionuclides in waters (surface water, groundwater, drinking water) where discharges are headed. These limits are the only legislative and unrelated (or the connection is unknown) with dose parameters. Both kinds of limits appear, for instance, in the limits and conditions for liquid releases of the Czech nuclear power plants.

The Comment No. 149 (again with the wrong terminology "storage/disposal" or "storage/disposal") is satisfactorily answered in a reply, see also the section 1.2.2 of this document. The reviewer notes that the reasons of a present trend in the Yucca Mountain do not have technical or regulatory origin, but purely political origin. The project slowly ceases to be the most advanced, the torch apparently takes a deep geological repository project in Finland. The reviewer's claim that "currently there is not a functional deep geological repository of waste from the nuclear industry anywhere in the world" is not true. First: some states dispose all of its RAW deep underground. These are only low-level short-lived RAW so far (see a definition as the UJD SR Regulation No. 53/2006). Secondly: there exists a deep geological repository where wastes that are non-disposable in surface repository type are disposed: WIPP (Waste Isolation Pilot Plant) in New Mexico, USA. It would be good if the two sides of the dialogue on radioactive waste embraced international terminology and in particular: distinguished between radioactive waste and spent fuel (possibly like the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Notification of Ministry of Foreign Affairs SR No. 125/2002 Coll.).

The comment No. 150, like No. 90 deals with the definition of the radius of the impact assessment area. Cross-border aspects of the effects were specifically mentioned at the public hearings and are specified and in the part 6.2.3 of this appraisal. The reviewer notes again that the comparison of the consequences of Chernobyl accident with the consequences of over-design accidents of the concerned nuclear facility is technically misguided.

The comment No. 151 discusses the same topic as the comments 49, 51, 74 and 79. The comment is adequately answered. The comment No. 152 refers again to the Slatinka dam, the comment No. 153 concerns of a sufficient capacity for cooling.

The commenter is wrong about the Comment No. 154. At this point of the report there is the description of fauna and flora (the section C. II standard outline). What the commenter requests should be stated in the Part C. III. (and the Comment No. 187 is related to it). The concerned chapter is there, but it is poorly developed. The same explanation is true for the comment No. 155. What the commenter quite reasonably demands should be the part C.III.8.0. But it is not there. The reviewer notes that currently only a few states exist where designers of nuclear facilities deal with an aesthetic side of the construction, or its integration into the countryside (France, Japan, perhaps the U.S.A), respectively.

Comments No. 156, 159, 182, 183 and 174 also relate to inhabitants' health in the nuclear facility vicinity. The case is discussed in the Section 2.3 of this appraisal (a specific requirement of 2.2.32), also Comments No. 53 and 59 are related to the case. It is a pity that the assessment report did not use more of the document, which is quoted in response to the Comment No. 182.

Responses to the Comments No. 157 and 158 are missing.

To the Comments No. 160 to 163 the reviewer notes that the commenter, as mentioned above, does not distinguish between the information about a present condition (C. II) and the impact on it (C. III). The problem is that it is mixed in the assessment report, too. If the mentioned part only defined factual data, it would be acceptable for the reviewer.

Comments No. 164-167 and 170 respond to the chapter C.II.11.4 that does not accord with the chapter title - social analysis. See also the section 2.3 of this appraisal (to the specific requirement 2.2.32). The reviewer agrees with the Comment No. 168. The issue of social impacts is also given in the Chapter C.III.16.0 "Other effects" (see the Comments No. 189 and 190).

Content of the Comment No. 169 has been commented several times in this appraisal. The reviewer agrees with the comment No. 171.

The reviewer's opinion on application of the ALARA principles, which are the subject of the comments No. 172 and No. 179, is in response to the comment No. 128. The reviewer agrees with the Comment No. 173. There was not a problem to add the information about the results of a pre-operational monitoring. Regarding the Comment No. 174, the reviewer repeatedly believes that joining the interpretation of monitoring releases or constituents of the environment during a normal operation and health of the population is factually impossible in practice. He responds to the Comment No. 177 the same way. The other requirements of the comments deal with the impact of design changes on releases.

Systematic and comprehensive consideration of this subject is not stated in the report. The comment No. 175 asks questions relating to whether it is correct to assess the impact of releases on the environment constituents only through its influence on humans. The reviewer agrees in principle, besides its conclusion. The consideration above does not mean that "without such data it is not possible to assess the justification of all releases of radioactive materials" and certainly not that "the principle of maintaining safety should be concluded that without the above mentioned data it is not impossible to approve the project." However, the proponent's answer is inadequate in this case.

The reviewer cannot agree with the comment No. 176. The assessment does not consider the situation when there would not be a nuclear power plant in the site, but the status, when MO 3,4 would not be built on the background of operating plant EMO 1,2.

The issue dealt with the consequences of severe accidents, according to the wishes of the commenter in the Comments No. 178, 180 and 181, partly also 188, is the subject of the preliminary safety report chapters. It was presented at the public hearing in accordance with the section 6.2.3 of this appraisal and it was also a subject of a bilateral monothematic expert seminar on the UJD SR in December 2009.

The reviewer also agrees with the Comment No. 184 (and also with the Comment No. 192) to which the proponent did not basically react. Generally it is true that monitoring contributes to the impact assessment a posteriori, and it is not a solution of effects assessment a priori. The Comment No. 192 includes the criticism of the fact that the assessment report does not reflect remedies in the case that intervention levels will be recorded during the monitoring. The reviewer agrees with that remark.

The reviewer considers a response to the Comment No. 185 to be appropriate. The reviewer disagrees with the Comment No. 186; a criticized approach in the assessment report is satisfactory for the given purpose. A sentence criticized in the Comment No. 188 is in that part of the assessment report unnecessary: the assessment of the impact on protected areas and their buffer zones should be stated in the chapter, not the

impact on geological environment. Authors should review every sentence of the text carefully in terms of its vulnerabilities, which apparently did not happen. Criticism of the undue formulation is entitled indeed, but this whole issue takes a different address than the contents of the chapter. The reviewer, however, does not understand what in this criticism is unclear to the proponent.

The comment No. 191 criticizes an approach of the chapter No. 18 of the assessment report. This chapter is a qualitative summary of partial impact assessments in the report. It refers to the methodology specified in the Section C. VII of the assessment report. This methodology is rather a qualitative theoretical discussion how an own complex assessment should be done. Actual impact assessment approaches stated in C. VII. are, in the reviewer's opinion, applied very narrowly. On the other hand, approaches stated in C. VII are, simply put, just another expression of the outline in the Annex 11 of the EIA Act. Formally speaking, an actual assessment was made with an effort to comply with the outline, rather than the procedure described in C. VII. The reviewer considers a response to the Comment No. 191 to be objectionable.

The comment No. 194 concerns the zero option, which approach is discussed in many parts in this appraisal above. The comment No. 195 also responds to the previously debated establishing of an alternatives issue - Ministry of Environment agreed with the assessment of a single variant. In light of this fact the response of the proponent seems to be curious: "alternatives and their selection are included in the report".

CONCLUSION

The supplement is a proponent's response to the comments of NGOs, individuals and civil society organizations that (except Friends of Slatinka) represent the opposition to nuclear energy to produce electricity. Many comments and objections to the assessment report, particularly in the second half of the extensive table in the supplement, have a rational basis and the reviewer agrees with them. Structure of the comments and the way of answering them reflect that development of the assessment report has not been systematic. Therefore, the best response to comments made in the first step would be to adjust and clarify the assessment report itself, so that:

- Slovak and English versions of documents would be identical,
- one issue would be described in a clear and comprehensive manner in the document in a single part, and the guide should be an outline according to the Annex. 11 of the EIA Act,
- the programme contained the reasons how the implementation of action fits the needs formulated in the Energy Security Strategy SR,
- the characteristic features of power plant design, changes and potential environmental consequences of these changes were appropriately and clearly set out in the design framework, they had to be based on documentation which led to the official decisions of the UJD SR on the given activity in 2008,
- documents do not contain any typing errors, incorrect and nonsensical wordings,
- only the relevant legislative provisions and decisions of supervisors are accurately and precisely cited in the document.

3.2. OTHER STANDPOINTS

3.2.1. Foreign

3.2.1.1. The Czech Republic

Ministry of Environment of the Czech Republic has sent several times (last time on October 9, 2009) letters with the same text which concludes that "Even though any authorities did not made any comments, we require that the Department of Environment CR will be kept informed of all steps in the EIA process and that the expert assessment of the proposed activities will be sent to us". In the annexes of identical letters there were sent attitudes of:

- Ministry of Transport CR,
- State Office for Nuclear Safety,
- South Moravia District,
- Municipal Office Uherský Brod,
- Municipal Office Vizovice,
- Municipal Office Vsetin,
- Regional Hygienic Station Moravian-Silesian District,
- Regional Hygienic Station South Moravia District,
- Czech Environmental Inspection, Regional Inspectorate, Brno,
- Municipal Office Breclav,
- Czech Environmental Inspection, Regional Inspectorate, Ostrava,
- Agency for Nature Conservation and Landscape CR, Protected land area administration Bile Karpaty, Luhacovice

3.2.1.2. Austria

Letter from the Austrian Federal Ministry of Agriculture and Forestry, Environment and Water Management (Abteilung V / 1) dated on October 22, 2009 is a summarization of the Austrian opinion on the assessment report. Ministry, in this letter, establishes the document "Completion of the 3rd and 4 Unit of the NPP Mochovce. An expert opinion on the environmental impact „of the Austrian Environmental Institute (Report 0236, Vienna, 2009) for the Austrian opinion.

The letter also summarizes the public opinions:

- from Vienna:
 - City Council Mag. Ulli Sima in the City government of Vienna
 - Vienna Ombudsman of environment as a plenipotentiary of the nuclear safety in Vienna

- additional 204 thousands of public opinions, which were delivered to the Office of the City government of Vienna. These are the opinions of private individuals as well as NGOs such as Greenpeace Central and Eastern Europe, the Green Club in the Parliament, the Austrian Association of Nature Conservation and Science and the Environment Forum
- from Lower Austria:
 - State of Lower Austria, represented by the Government of Lower Austria (DI Friedrich Rauter)
 - additional 320 opinions, which were delivered to the Government of Lower Austria Office. These are the opinions of individuals, municipalities, as well as NGOs such as Green Club in a local parliament
- from Burgenland:
 - 69 public opinions, which were delivered to the Burgenland Government Office.
- from Upper Austria:
 - State of Upper Austria, represented by the Anti-Atom plenipotentiary Radko Pavlovec,
 - additional 4350 opinions of Austrian public (individuals, municipalities as well as NGOs) which were delivered to the Upper Austrian Government Office,
 - additional 314 opinions of German public and 114 opinions from other states which were delivered to the Upper Austrian Government Office
- from Salzburg:
 - State of Salzburg, represented by the Salzburg Government (DI. Dr. Richard Sperka-Gottlieb)
 - additional 102 public opinions, which were delivered to the Salzburg Government Office, including opinions of the Austrian Association of Nature Conservation and Platform against Nuclear Danger
- from Styria:
 - State of Styria, represented by the plenipotentiary of the nuclear safety DI Kurt Fink
 - additional 19 positions of the public, which were delivered to the Styrian Government Office (not attached to the letter)
- from Carinthia:
 - 25 public opinions, which were delivered to the Carinthian Government Office, included opinions of Green Carinthia,
- from Vorarlberg:
 - 3 opinions of public, which were delivered to the Vorarlberg Government Office, included opinions of the Union for Vorarlberg Nature Conservation

Together 209,269 public opinions were delivered with an accompanying letter as an annex in boxes. Letter summarizes the points of criticism of the MO 3,4 project. In addition to the aspects referred in a note to more than 200 thousands opinions in the section 2.3.1.3 of this appraisal, the following complaints were mentioned:

- the reactor design does not meet the current state of reactor technology,
- an inadequate description of severe accidents and their impact;
- lack of alternatives to construction of nuclear power plant,
- EIA Act shortcomings of courts access,
- financial coverage requirements of nuclear damage.

Whatever the formal legal aspects of receiving nearly 210 thousands of Austrian public opinions were, the reviewer considered this fact rather as a form of massive anti-nuclear pressure and obstruction in the EIA process. Moreover, subject aspects of these positions have been repeatedly explained during the public hearing and bilateral consultations. Almost all of these aspects are also subject to repeated explanations commented in the previous section 3.1 of this appraisal. Many of these aspects are commented by the reviewer in the Section 6 of this appraisal.

Therefore, the reviewer will deal only with the documents of the Austrian Environmental Institute in this section. The document, which is the appraisal of the assessment report, provides comments on the four circuits of problems:

- aspects and progress of the EIA process,
- safety aspects of technical changes,
- issues of design and severe accidents,
- management of radioactive waste and spent fuel.

In addition, the document brings model calculations results of a hypothetical severe accident impact (on the assumption that the release of 12% for ^{137}Cs inventory occurs when considering an early confinement failure, thus the leakage of 14 PBq of ^{137}Cs . This value is obtained from the analogies with the Paks NPP and Loviisa NPP).

Finally, the document provides a commented list of 13 outstanding issues (opened after the presentation of the assessment report).

In the document there are discussed the following aspects regarding the EIA process:

- consideration of the requirements, which were worded to the intent in the assessment report. It is noted that not all requirements of the Austrian party were taken into consideration of determination of the assessment scope (hereinafter it is specified that this is a request to clarify the safety standards to be used to assess the safety, particularly with respect to those from the European Utility Requirements which should be met), and further, that the provided answers are not sufficient.
- It is reminded that the Austrian side lacks some information in the intent (lack of discussion on the implications of the design-based and severe accidents and on amount of radioactive waste and spent fuel management, or how these or related requirements were included in individual points of the the assessment scope (2.2.23, 46, 30, 43, 44, 39 – the reviewer's opinion to the following points - see the section 2.3 of this appraisal). It is noted that some information is still missing (safety-technically justified changes, spent fuel management, radioactive waste management, the issue of releases - specified in the relevant sections of the document).
- It is noted that there was inconsistency of performance information, discrepancies between intentions and assessment report with regard to the quantity of cooling water flow rate and enthalpy of coolant, discrepancies in the numerical data of irradiated fuel assembly quantities (in accordance with the reviewer - see the section 2.3).
- Also according to the reviewer, it is concluded that the different language versions of the general final summary (Annex X of the Assessment Report) are not identical.

- Establishing of alternatives. Ministry of the Environment based on a reasoned request by the proponent under Art. 22, par. No. 7 of Act No. 24/2006 Coll. in the letter No. 7451/2008-3.4/hp - 3, 4 of July 31, 2008 ceased the requirement of alternatives solutions of the given activity. According to the document text, the letter contains a clause that "if the comments to the received plan represented the justified necessity of other realistic scenarios development, this would be reflected in the further assessment process progress. Instead of a clear opinion, this formulation brings just another kind of uncertainty into the problem. A univocal opinion to an alternative type such as "yes/no" is shifted to the discussion what is within the scale of "justified need of other realistic options". After such a formulation there is no wonder that existence of just one variant is one of the key reservations of each commenter. A similar complaint is also given to an assessment of the zero option approach. A problem of establishing alternatives is discussed in several parts of this appraisal in the sections 2.3 and 3. The reviewer notes a continuous operation of the EMO 1,2 is within the scale of the zero variant. An opinion of the reviewer to a discussion of the establishing of alternatives is given in the Section 2.3 of this appraisal. It is based on the given time of the authorization process for the related equipment in the past, present and future, which the EIA process is atypically located in and it is based on an actual state of unfinished construction.
- The issue of financial coverage of responsibility for nuclear damage. The reviewer is convinced that this issue is adequately explained in the assessment report, in the responses referred in the section 3 of this appraisal and is adequately explained during the public hearing. Further he believes that this issue is not directly connected to environment impact assessing of the related equipment.
- The tabular summary summarizes again what the document lacks, regarding the requirements of the Espoo Convention and related directives of the EU (but not with regard to the requirements of the Slovak EIA Act, which is the proponent and all parties binding in the first plan to).

Considering safety aspects, information from the assessment report is discussed in the document, which relates to:

- A description of nuclear facilities, which are the following reservations mentioned in:
 - discrepancy in technical specification between the intention and the assessment report (electric power, coolant enthalpy increase, a coolant flow in the primary circuit, coolant outlet temperature),
 - omission of common systems with EMO 1.2
 - a method of a new fuel type implementation with gadolinium cladding and its comprehensive implications
 - uncertainty in the pronouncements of power, lack of information about the consequences of increasing power and about service life.
- The manner of safety-technological improvements implementation and their implications to the establishment of sectors, which the safety improvement should be dedicated to (prevention of severe accidents and their impact reduction, a safety analysis, fire protection, external events, the issue of seismic resistance, the use of safety standards). The case is discussed in the Section 2.3 of this appraisal. The reviewer also noted at this point, that the issue should really be the main (only) contents of the "Design framework", where relevant information can be actually found. However, this information is submitted in an unsystematic manner (some are also in other parts of the Assessment Report). As a

result of the mentioned fact, it was necessary to provide additional information during the public hearing, in the supplement to the report, in consultation. The part 6 of this appraisal is consistent with this information.

One of the main eligible objections of all commenters of the assessment report, also of the reviewer, is that severe accidents and their cross-border implications were not assessed. This fact was also the subject of a public hearing where information, which is consistent with the concepts of the main section 6 of this appraisal, was given. As mentioned above, the given issue was transferred to monothematic expert discussions that took a place within the scale of the bilateral agreement between Austria and Slovakia about the cooperation in matters of common interest in nuclear energy. It was a discussion in December 2009 that was dedicated to the mentioned topic (see the section 2.3.1.3 of this appraisal), bilateral consultations in the time of writing this appraisal were completed.

Regarding the issue of radioactive waste and spent fuel management, the document lacks an impact assessment of using new fuel on the safety of Spent Fuel Management. The context of this appraisal subject with further management of spent fuel is discussed in many parts, such as in the section 1.2.2. The document points out, in accordance with the reviewer, the problem of a balance limit value of tritium releases, which is in the assessment report vaguely described- see the discussion about issues of releases limited in the section 1.2.3 of this appraisal.

Chapter 5 of the document is devoted to a calculation model of consequences of a hypothetically possible accident for three types of meteorological situations. The results are not consistent with the figures set out in the section 6.2.3 of this appraisal, particularly in their interpretation. The reviewer disagrees with the interpretation of the Austrian document, translated into Slovak language, about the need for remedial (intervention) measures at page 45, (below the picture No. 2). It is said about the first meteorological situation that, "whereas the estimated dose for the first weeks is a very high proportion of the annual dose, it cannot exclude that the effective dose is reached as a result of the accident exceeding the protective limit in Austria (probably correct terminology is intervention values – the reviewer's note) to establishment of safeguard measures for the risk group of children, adolescents, pregnant women and nursing mothers". The reviewer notes to this fact that the whole philosophy of intervention implementation has nothing to do with "an annual dose" but with an anticipated evolution for the population in the first 7 days (apart from a transitional or permanent relocation - where assumptions are evaluated for the period of 30 days or the whole year) - see also the section 5.2.1.1 in the Austrian document. All considerations in this section are based on a model coefficient of the dose/¹³⁷Cs contamination, in which the value is considered to be $4.8 \cdot 10^{-8}$ Sv/Bq.m⁻². The cited document, which the figure was derived in, was not available for the reviewer.

Finally, the Austrian paper stated 13 "outstanding questions", which were gradually answered in the public hearing and consultation. Some of them have been and will be a subject to a further monothematic consultation with the ÚJD SR (see the section 2.3 of this appraisal), and these questions are also conceived in the reviewer's comments above and in the section 6 of this appraisal. They are:

- Discrepancies in the operating parameters of the EIA documents;
- Power improvement and the correlation of changes in operating parameters
- Power level that will actually be a subject to authorization for putting into operation and operation
- To which power level an electric power outlet is designed,
- Aspects of new fuel elements, allowing higher burn-up;
- Considerations for increasing the lifetime to 40 years,

- The issue of severe accidents,
- Information about the integrity of a pressure vessel
- Seismic resistance
- The concept of fire protection
- accidents initiated by external events – a crash of an aircraft in a bad faith
- Safety level of the power plant, meet the safety standards
- Consequences of the analysis of severe accidents impact, which were explained during the consultation in Vienna.

3.2.1.3. Ukraine

The Slovak Republic as the party of origin for cross-border EMO 3,4 project appraisal, sent a notice of the proposed activity through the contact points according to Article 3 of the Espoo Convention to all concerned parties, which the Slovak Republic has the border with. The letter with attachments contains all the necessary information in Slovak and English language in form of a paper copy and an electronic data carrier.

The concerned party Ukraine did not respond by the deadline of April 2, 2009 mentioned in the notice if it intended participate in the cross-border evaluation process of the environmental impact. On June 17, 2009 the Minister of Environment of the Slovak Republic received a letter from the Minister of Environment of Ukraine, including a request for a notice delivery about the activity under consideration - EMO 34. The Ministry of Environment responded to the mentioned letter on June 24, 2009, and pledged the Ukrainian side, to engage it in the assessing process within the assessment according to the EIA Act and under the Espoo Convention during the next steps, although the Ukrainian party fell behind the schedule.

Ministry of Environment of the SR sent the assessment report of EMO 3,4 (the letter dated on August 14, 2009. No. 1277/2009-3.4/hp) in the form of a paper copy and CD-ROM in English and Slovak language to surrounding concerned parties, including Ukraine. Ministry of Environment of the SR in an accompanying letter requested the parties to express whether they intended to participate in a public discussion of the activity MO 34 in the Slovak Republic, but also whether they would request consultations in the environmental impact assessment process under Article No. 5 of the Espoo Convention. Ministry of Environment of the SR received on August 25, 2009 a notice of delivery, for that reason Ministry considered Ukraine as an interested party which was actively involved in the cross-border assessment process. Despite the mentioned fact, Ukraine once again did not respond to the delivered message of the assessment nor it responded to the accompanying letter with a public participation proposal in a discussion and consultation.

On November 19, 2009 the Minister of Environment of the Slovak Republic received a letter from the Minister of Environment of Ukraine with a request for a delivery of notice on the activity under consideration - EMO 34, although Ukraine had already received the assessment report for the EMO 34 activity, which fully respects the requirements of notification, i.e. it matches all the questions required in notification. Ministry of Environment considered this request to be unfounded.

Ministry of Environment of the SR, in response to that letter of December 09, 2009, informed the Ukrainian side that the process of assessing the proposed EMO 34 activity had reached the stage when a team of experts had been appointed under § 36 of the EIA Act to evaluate the assessment process in the expert appraisal. Ukraine was advised that the entire assessment process in the Slovak Republic is time limited by the national legislation. Nevertheless, the Slovak party granted again an interest to provide all available

information to the Ukrainian side in remaining time till the end of the process. Slovak experts were ready to consult with the Ukrainian experts in the period to December 21, 2009, in case of Ukrainian interest.

Consultations took place on December 21, 2009, based on the intervention of the Ambassador of Slovakia in Ukraine at the Ukrainian Minister for the Environment office. The meeting resulted in stalemate. Ukraine from August 25, 2009, when it received the assessment report, did not inform public about the proposed activity and had no comment on the activity, while Ukrainian attitude was not announced to the Slovak Republic by any way. The Slovak Republic disagreed to return the assessment process, on the basis of inactivity and the current prescriptive approach of Ukraine, to the beginning i.e. to Article 2 to 7 of the Espoo Convention, because the Slovak Republic did not communicate with Ukraine in above standard way - by diplomatic mail, like an unsent notice, although the Slovak Republic did so.

3.2.1.4. Germany

On October 6, 2009 Ministry of the Environment of the SR received a letter from the German registered BUND clubs (Bund für Umwelt und Naturschutz, eV) and from BN (Bund Naturschutz in Bayern eV), which made "the sharpest objections to the completion of the nuclear power plant Mochovce 3 and Mochovce 4" with the following arguments in:

- "Mochovce reactors 3 and 4 do not correspond to the state of science and technology", where is referred inter alia about "the German risks study of nuclear power", indicating concerns that "whether these findings have been extended in the Soviet Union and its vassal states". Further, the decision to shut down operation and/or construction "of a similar construction" blocks of NPP Greifswald 1 to 8 is mentioned.
- "obvious lack of necessity and risk data", where it is stated that the documents submitted in the assessment of a cross-border do not include information about danger as a result of the operation, nor a compelling reason to finish the construction. There is a complaint that the document does not include data about the impact extent and likelihood of severe accidents. It is also stated that "conceptually weak aspects of VVER 440/213 did not allow the safety improvement (lack of containment, without redundancy of safety devices, lack of a cable management, fire protection, etc.)." and the lack of protection against external effects "particularly lack of protection against intended terrorist attacks".
- The omission of alternatives for energy supply.
- The view that the construction of nuclear plants worldwide is an economic risk.
- Reservations to the system of the Spent Fuel Management, which also reject the construction of a storage in Mochovce and the absence of national deep geological repository is considered to be the cause of cessation of production in the nuclear power plants.
- Finding that the EIA procedure is unlawful, where there is a protest against the fact that Germany did not participate in the cross-border assessment, "Mochovce is only 300 km away from the Bavarian border, and after the Chernobyl experience has shown that during reactor accidents such a distance is too small" and "in case of the east wind direction after a few days large parts of Bavaria would have to be evacuated. The illegality of the procedure is seen as the contrary between the Act No. 24/2006 Coll. and EU law (Directive 85/337/EEC).

The reviewer notes thereto that the answer to the first two of the complaints is the text of the Chapter No. 6 of this appraisal and the answer to the other two complaints is a national energy strategy, approved by the Slovak government. The issue of a relationship between spent fuel disposal and licensing of the nuclear power plants is discussed in the section 1.2.2 of this appraisal.

The reviewer does not share the view of the German side about incompatibility between EIA Act and EU directive, especially after the amendment of the EIA Act by Act No. 287/2009 Coll.

On January 29, 2010 the Ministry of Environment received a letter from the Bavarian State Ministry for Environment and Health, which, referring to Article 3 of the Espoo Convention and the EU directive No. 85/337/EEC, as amended, requires Bavaria to be included in cross-border assessments.

3.2.2. National

3.2.2.1. Standpoints of affected bodies

ÚJD SR (letter No. 1948/320-293/2009 dated September 9, 2009)

The Nuclear Regulatory Authority has no substantive comments to the submitted assessment report. However, the NRA SR recalled that under the section 31 of Act No. 24 /2006 Coll. the report should include a comprehensive finding, describing expected impacts assessment of the proposed activity including a comparison with the existing state of the environment. To meet the requirements of this provision, it is necessary to fill in missing information according to points a, b and deficiency elimination according to the point c) of the NRA opinion (a part of the Population impact).

The reviewer considers substantive and formal comments contained in the Annex of the NRA SR opinion to be reasonable and they should be taken into account (especially those in the part of the population impacts).

ÚVZ SR – Chief hygienist (letter No. OOZPŽ/6118/2009 dated August 27, 2009)

In the light of expected social benefits of the proposed activity and anticipated level of activity on the environment documented in the report, The Public Health Authority of the Slovak Republic supposes that the proposed activity "Mochovce Nuclear Power Plant 4x440 MW VVER, 3 Construction" can be accepted.

It is stated that the proponent took into account in the report the requirements, which the ÚVZ SR applied in the standpoint OOZPŽ/2371/2009 on March 11, 2009 on the intention of proposed activity and incorporated the required data and information in the report.

The Public Health Authority of the Slovak Republic further notes that after putting EMO 3, 4 power plant into operation, a continual and redundant monitoring of radioactive releases levels from EMO 3.4 in all the important items, at least in the range of the current monitoring introduced in EMO 1.2, will be necessary. Further also a systematic monitoring of the nuclear facilities complex impact on environmental components radioactivity and population dose load, including a model assessment of exposure, will be necessary.

The Authority also assumes: “final complex review of expected impacts published in the report could sum up environment and population load in the survey of the operation residual impact of the proposed action at least. This load will be a logical and necessary consequence of the proposed action and it can rise during:

- future radioactive waste management (operational and decommissioning),
- future spent fuel management activities,
- treatment or recycling of radioactive contaminated materials, which radioactivity will be as low as it can be recycled or otherwise released to the environment.”

This reservation is well-founded according to the reviewer. These asked data are not fully summarized and assessed. They are published in several parts of the report or in appendices. Some of the data is uncompleted, not exact or some data is missing (an approach for low radioactive material releasing – see the part 1.2.3.2 of this appraisal).

Regional Branch of Public Health Authority in Levice (letter No. D1/2009/02164 from September 4, 2009)

The Authority has no comments to the proposed intention.

Ministry of Economy of the Slovak Republic – departmental body (letter No. 3519/2009-3400 from August 28, 2009)

Ministry gave a positive opinion on the assessment report.

Ministry of Environment, Section of Natural Resources Geology, Department of Geological laws and contractual relationships (letter No. 43297/2009 from September 21, 2009)

The department of Geological laws and contractual relations have no reservations to the assessment report from the general conception point of view. However, the department submits four relations to the Chapter 4 C. II Characteristics of the current state of the appropriate locality environment, concerning to complete the map annexes of topographic units, geological and tectonic evolution of the territory, lithological composition, resolution of a NPP geology description and surrounding areas geology description, and inaccuracies in describing the geodynamic phenomena, mineral deposits and a seismic activity. Given the quantity of uncertainties in these chapters, it is advisable to revise the text by an appropriate specialist.

Ministry of Environment, Section of water and energy resources (letter No. 39809/2009 from August 28, 2009)

In a scope of the section of water and energy resources they have no substantive comments to the submitted report on the assessment of the proposed activity.

Ministry of Environment, Department of Management of environmental risks (letter No. 39614/2009 from August 28, 2009)

The department notes that the Mochovce NPP (according to the Act No. 261/2002 Coll. on the prevention of major industrial accidents and amending certain acts) is placed in the category A according to total of selected hazardous substances present in the plant (a major impact on the categorization for the Mochovce has hydrazine-hydrate - Levoxin). The Mochovce NPP has not reached the threshold of the Category B, even in case of doubling the quantity in a storage. In terms of a scope of the environmental risk management department they have no further reservations to the submitted assessment report.

Regional Environmental Office Nitra, Department of environmental components (letter No. 2009/00257 from September 8, 2009)

The Authority has no substantive comments to the report on the assessment of the proposed activity. In the next stage of approval and authorization the authority stands out for the implementation of measures to prevent, eliminate, minimize and compensate the influences of proposed activities on the environment proposed in the assessment report.

Slovak Environmental Agency Banska Bystrica (letter No. CZ3139/2009 from August 11, 2009)

The proponent accepted the comments that the agency applied in the standpoint to the intention of proposed activity No. CZ1150/2009 from April 14, 2009 and incorporated required data and information into the report. The agency has no further comments to the assessment report and recommends completion of the 3rd and 4th EMO units with an emphasis on compliance with legislative requirements set out in the Chapter 4.2 - Measures in case of operational events.

Nitra Self-Governing Region (letter No. ČZ – 24328/2009 ČS – 1941/2009 from September 11, 2009)

Nitra Self-governing region agrees with the scope of the of environmental impact assessment report without any comments.

District Land Office in Nitra (letter No. 2009/00325 from November 5, 2009)

It notes that in this case consent to withdrawal of agricultural land has already been given (MP SR issued under No. 10698/81-PV from December 10, 1981) and the investment does not increase the coverage area of an agricultural land and therefore there is no need for a new agreement of the District Land Office in Nitra.

Nitra District Office, Department of Civil Protection and Crisis Management (letter No. A/2009/12542/2 from September 7, 2009)

In terms of civil protection of the population, the department does not comment on the documentation.

Labor Inspectorate Nitra (letter No. 5041/38/2009/BOZP from September 18, 2009)

required in the Section 1.0 "Design Framework", Chapter 2.8.3 "Guidance and implementation of BOZP", to finalize the obligations of the employer:

- minimum safety and health requirements for the workplace according to the governmental order No. 391/2006 Coll.,
- minimum requirements for the provision and use of personal protective equipment according to the governmental order No. 395/2006 Coll.,
- protection of workers from risks related to chemical factors exposure during work according to the governmental order No. 355/2006 Coll.,
- minimum health and safety requirements to protect workers from risks related to noise exposure according to the Governmental order No. 115/2006 Coll. as amended by the governmental order No. 555/2006 Coll.,
- details of the work factors and working environment in relation to the categorization of the work and the terms of the proposal for inclusion of the work into categories in terms of risk by the governmental order No. 357/2006 Coll.

The reviewer would comment that the issue of BOZP (occupational exposure as well) is not included in the assessment of the environmental impact according to the EIA Act, unless it is a parameter for the optimal variant multi-criteria choosing. But this is not the case in this EIA process.

District office for road transport and roads in Levice (letter No. U/2009/02301 BC 10, evidence No. U/2009/005122 from September 10, 2009)

The Authority has no objections to the submitted report if the following conditions will be implemented:

- In realization the submitted plans for modification of the road No. III/51110 and No. III/05149 should proceed according to the Act No.135/1961 Coll. about the roads (Road Act) as amended, following the regulation No. 35/1984 Coll., as well as the appropriate STN.
- According to § 3 par. 2 of the Act No. 135/1961 Coll. about the roads (Road Act) as amended, a local government in matters of local roads carries out villages, as transferred state administration.
- When working outside a built-up area of the village in the road protection zone of the road No. III/51110 and road No. III/05149 be in accordance with § 11. par. 2 of Road Act to request exemption from work in a road protection zone.
- It is necessary to prove a positive opinion of the owner of regional roads of the Nitra Self-Governing Region, a manager of the regional road which is a Regional administration and maintenance of roads Levice, a. s. and the District Police Force Levice, the District Transport Inspectorate.
- The Authority requires submitting of documentation for zoning and construction proceedings for a statement.

Reviewer notes to this that the land and construction procedures have already been passed - see the section 1.1 of this appraisal.

District Environmental Office Levice, Department of environmental components (letter No. T2009/01301-002 from September 14, 2009)

The Office considered a report assessing the proposed activity and, concerning the given facts stated in the standpoints of the individual sections of the state administration, as an affected authority of the state administration, it gives a positive standpoint. The Office requires considering the inscribed comments

regarding possible new decisive facts in waste management and compliance with legislation in force related to nature and landscape protection in the next stage of the design documentation elaboration.

Slovak Water Management company, Regional Section Banska Bystrica (letter No. CS 104/2009 – CZ 12881/2009-220, 230 from September 11, 2009)

The opinion proclaims that the discharge permit of sewage into the Hron river is issued for conditions of the 1st and 2nd EMO unit operation by the Regional Environmental Office in Nitra under No. 2007/00029 dated on January 25, 2009 and valid until December 31, 2010. There is also noted that the authorized limit values of pollution in waters discharged in 2004-2008 (the Report tab. 54 and 55, pages 216 and 217) were observed. With the exception of indicator values in RL (105° C) in 2007, also complying with the permitted values is clear from those tables. "After completion of the 3rd and 4th EMO unit there will be an excessive increase of demands for water deliverable, and also in connection with the discharge of sewage into the Hron river, there will be a demand to ensure the required quality of surface waters behind the EMO waste water outlet". In this context, the Company should publish mainly the facts that are already stated in the opinion No. CS 34/2009 CZ 4645/2009-230, 220 from March 20, 2009 to the intention of proposed activity.

3.2.2.2. Standpoints of affected municipalities

Common Office Malé Kozmálovce (letter No. 310/2009 from September 17, 2009)

Malé Kozmálovce village and public have no comments to the proposed activity assessment report.

Common Office Veľký Ďur (letter No. 390/2009 from September 29, 2009)

Nobody from the village raised any comments to the report.

Common Office Nemčiňany (letter No. 456/2009 from September 24, 2009)

The opinion was not expressed, they only note disclosure of information to citizens about opportunities to comment to the EIA report.

Common Office Nový Tekov (letter No. 505/2009 from September 17, 2009)

The mayor asks to resolve a bridge building across the river Hron between the Starý Tekov village and the Nový Tekov village to serve as an escape route for residents of Nový Tekov in case of accidents. A similar comment is raised by Mr. Jozef Pacala, a citizen of the Old Tekov village (the letter of Ministry of Environment dated on September 3, 2009, the evidence No. 41357/2009).

Tlmače (letter No. 1137/2009 from September 21, 2009)

The town has no comments to the assessment report nor was not received the written opinion from the citizens.

The Common Office Kalná nad Hronom (letter No. 488/2009 from September 29, 2009)

The village has no principal comments to the assessment report, according to its statement from March 25, 2009. Since in this case it is a completion of facilities construction, community does not oppose the completion of the construction of the units 3 and 4 and supports the implementation plan.

The Common Office Starý Tekov (letter from September 24, 2009)

Citizens of the village did not comment to the proposed activity assessment report. The village agrees with the submitted document and they do not oppose the completion of the construction.

4. COMPLETENESS OF IDENTIFICATION OF POSITIVE AND NEGATIVE IMPACTS, INCLUDING THEIR CORRELATIVE IMPACT

Positive and negative influences of the completed and normally operated nuclear power plant MO 3,4 are summarized in the final part of the tables 132 and 133 of the Assessment Report. **The reviewer notes that these influences are in principle identified in completeness and correctly.** The normal operation positive impact is the impact on the socio-economic stability in the region as has been and is done in two Slovak nuclear regions so far.

Regarding adverse influences, only radiation loads of the environment components and surrounding residents may be practically included among them. It will be about twice of the current situation at the first view. This value is little significant according to an effective dose limit per year for a person from the critical group of population defined in legislation. Mentioned tables relate only to direct influences of the nuclear power plant operation. Among the indirect influences an additional production of non-radioactive waste, radioactive materials released to their low activity from institutional control (i.e. to the environment as non-radioactive), radioactive waste and spent fuel can be counted. According to the back end of nuclear power approved by the department authority, assessed in the SEA process and adopted by the Government, there is a national system for radioactive waste and spent fuel management setting in a satisfactory way to handle the required radioactive waste number and volume. The republican radioactive waste repository in Mochovce was originally set up, as to the capacity, for disposal of radioactive waste from operation of eight VVER nuclear power units (and acceptable waste from the A1 NPP decommissioning). Analyses of the repository long-term safety, which are used to develop waste acceptance criteria for disposal, are based on the fact, inter alia, that the impact of this facility on the environment and population in the future does not exceed current acceptable impact level even if the loss of information about the repository existence will occur in the distant future. Realized and upcoming storage of radioactive waste not disposable in an existing repository and spent fuel solves the management problem for a several tens of years. This time is still sufficient for technical, safe and institutionally controlled final stage of the management, which is disposal in a deep geological repository. Also in this case it must be kept that the impact of this facility shall not exceed the current acceptable impact in any year of its existence. The impact is obviously expressed by the effective dose limit per year per person from the critical group of population.

Another indirect impact is the need of nuclear power plant decommissioning, which can last for a period comparable to the operation of the plant. The decommissioning ends by disposal of waste arising from dismantling and demolition and by releasing the (former) power plant and/or its site after the plant demolition from regulatory control. The clearance can be unconditional or according to restrictive conditions (typically implemented as a restriction on construction of dwellings, growing of crops and breeding of animals for food production, and so on). Decommissioning of a nuclear power plant will be a subject of a separate EIA process, where the core document will be a conceptual decommissioning plan (in an appropriate structure). According to Atomic Act, this document has to be developed in advance before the final nuclear power plant shutdown.

The reviewer notes that in the system of the back end of nuclear power, as it is set out in Slovakia, the petitioner is not directly responsible for the final stages (disposal, in the current configuration neither

decommissioning). There is an acceptable system which is applied wherever nuclear energy is used for peaceful purposes: "polluter pays".

In addition to the influences of a normal operation, also the potential influences for abnormality events, design, and up design accidents should be included to the influences calculation. With the exception of the severe accidents issue and their consequences for local areas as well as for transboundary impacts, but which were explained at the public hearing and consultation - in the opinion of the reviewer in a satisfactory way, the assessment report discusses also the negative impacts – risks, in a satisfactory manner. Conclusions of safety assessments are interpreted by the need of intervention after the accident, if the population exposure values set in legislative limits should be achieved.

For completeness, negative impacts during construction should be mentioned (increased traffic, noise, waste from construction and installation). These influences will not take longer than when the MO 3,4 will be placed into operation.

Conclusion: All mentioned negative influences either real or potential, according to the reviewer, are acceptable as such, especially more at apparent social-economic evolvement of the region.

5. METHODS USED FOR THE ASSESSMENT AND COMPLETENESS OF INPUT INFORMATION

This is assessed in the assessment report, part C.VII. This section is a treatise of the methodology for assessing environmental impacts. The reviewer considers it reasonable and agrees with it. In the methodology description, it can be locally identified how this approach was used for the environmental assessment for the given activity. It means that generally correct methodology is linked with specific places in other parts of the report. The reviewer considers that it would be desirable to link much more the correct and useful methodology of „four-step assessment“ from the screening to assessment of residual impacts (see picture No. 65 of the assessment report) with the real actually performed assessment.

Another expression of the environmental impact assessment consistency is an outline of the assessment report itself. The outline truly copies the legislative outline provided in the Annex No. 11 of the EIA Act and which is formally and strictly observed in the assessment report. Fulfillment of individual outline points was done by factual data taken from databases, safety and design documentation, history of nearby NPP EMO 1&2 and their subsequent interpretation. The reviewer considers this satisfactory, taking the explanations at the public hearing and consultation into account. Moreover, the process is executed when its purpose cannot be adequately reasoned in the selection of an optimal variant of the activity.

Concerning the content of the input information used within the assessment report, the reviewer considers it to be satisfactory and corresponding to the position of the EIA process in the procedures that led to construction and completion of the MO 3,4 and will lead to its commissioning.

The problem is a non-systematic use of information, i.e. problematic information placement within the report. This makes the assessment report extremely indistinct, sometimes disparate in handling with the same information in different parts of the document. The solution is to not only provide a systematic ordered legislative outline, but also clearly assign the information to an appropriate part in the document and to provide processing and interpreting the given information in this single part.

6. THE TECHNICAL SOLUTION PROPOSAL

The Nuclear Safety Assessment of the MO 3,4 was conducted regularly by the ÚJD SR within the approval of the revised initial design. For purposes of the assessment, the ÚJD SR received submitted documents in an extent imposed by the Atomic Act No. 541/2004, Annex No. 1, Part B. The conclusions of the assessment are listed in the official decisions of the ÚJD SR No. 246, 266 and 267 from 2008. However, taking into account the fact that nuclear safety questions were repeatedly asked on the public hearing (or some of the comments were also received after the public hearing), brief commentaries on some of the most discussed issues are provided in this part of the appraisal. These commentaries are based on information given in the Preliminary Safety Report for the MO 3,4 and they are also consistent with explanations that were given during the public hearing process. The NPP is in a high stage of construction, commissioning is anticipated in 2013. Therefore, this section will be devoted to those aspects of the technical solution that have a relationship with nuclear safety and are subjects of expert discussions mainly with opponents of the MO 3,4 completion and commissioning.

6.1. ASPECTS OF THE STANDPOINT OF THE EUROPEAN COMMISSION ISSUED ACCORDING TO ART. NO. 43 OF THE EURATOM TREATY

Recommendations from the European Commission issued on July 1, 2008 (under Art. 43 of the Euratom Treaty) concerning completion of the 3rd and 4th unit of the Mochovce NPP, regarding the impact of aircraft, are accurately cited in the Article 1.6.4 of the Assessment Report. Also, the method and procedure for their application in the MO 3,4 design are described in the Report on page 50. More detailed information was required on this topic during public hearing and during the following meetings of specialists, respectively.

At the public hearing, general information was given that analysis of aircraft deliberate collision consequences had been done for total 12 building objects important to nuclear safety at the MO 3,4 site. More than 60 conservative selected collisions were analyzed. Analyses of the safety after the aircraft hit were in line with the IAEA recommendations. They were aimed at the global effects on construction objects, the local effects on the structural elements of buildings, the vibration effects, on the secondary effects of fires and explosions of fuel, and in reasonable cases, also on the radiological consequences. Also information was given that the objectives of the analysis were fulfilled because an ability of MO 3,4 to safely shut down a unit and remove the remaining heat from the reactor after this event (provided that, necessary adjustments of the design were proposed, where appropriate) had been proven. Also radiological consequences to public in all the cases were insignificant compared to the values used in the design accident analysis for MO 3,4.

The ÚJD SR is a competent Slovak national authority in the field of nuclear safety. SE, a.s. cooperates with the ÚJD SR in implementing the recommendations of the EC concerning nuclear safety. Performed analyses are assessed and evaluated by the ÚJD SR following its Official Decision No. 266/2008. This Decision obliges SE, a.s. to implement the EC recommendations.

6.2. RADIOLOGICAL CONSEQUENCES OF THE PROPOSED ACTIVITY TO PUBLIC

6.2.1. Radiological consequences of the proposed activity to public following the regimes of a normal and abnormal operation of NPP MO 3,4

Radiation doses to public as a result of normal and abnormal operational regimes of MO 3,4 are evaluated and discussed in several parts of the Assessment Report (see the section 1.2.3).

In the part C.III.1.5.2, a conservative assessment of radiation doses to public on the border of the authorized operation in normal and abnormal operation regimes is made. During the evaluation of annual releases of radioactive substances into the atmosphere and the hydrosphere from both twin-units (MO 1,2 and MO 3,4), doubled values of MO 1,2 measured discharges were used also in this subchapter. These values were increased by the simulation to achieve the maximum permissible level specified by the competent supervisory authorities. For such a case, a maximum annual dose at 4.47 μSv for residents in the vicinity of NPP was calculated by modeling. Discussion on this issue is given in the Section 1.2.3 of this appraisal.

Reasoning of causes which, in normal and abnormal modes of operation MO 3,4, may result in increased releases (up to the level of allowed values), stated by the authors on page 349 (entitled "Design operational events") is not described in a sufficiently clear way - see also the discussion of the problem in the section 1.2.3 of this review.

Critical comments on the monitoring methodology of releases as well as the methodology of computational public doses modeling, received by the Ministry of Environment after the public hearing, have no effect on the reliability of the calculated results of radiation doses to the population. The ÚVZ SR as the national regulatory authority for radiation protection (which stipulated the maximum permissible discharges of radioactive materials from the Mochovce NPP and which also obliged to monitor specified isotope in the discharges in order to estimate doses to public) reviews methodologies for monitoring the various isotopes in the discharges, and also methodologies for calculating radiation doses to public. These methodologies basically correspond to current international standards.

6.2.2. Radiological consequences of the proposed activity to public following the design accidents on the MO 3,4

Radiological impacts of the proposed activity to public in consequence of the MO 3,4 design accidents are described in the Part III, subchapter 1.5.4 of the Report. Calculated doses for events with enveloping radiological consequences are listed in the Tab.119 (LOCA) and the Tab.120 (PRISE – breakaway of a steam generator lid). Data introduced in the Report correspond to the data contained in the MO 3,4 Preliminary Safety Case.

6.2.3. Radiological consequences of the proposed activity following the severe accidents on the NPP MO 3,4

Radiological impacts of severe accidents to public are not evaluated nor introduced in the assessment Report. Information on the radiological impacts of severe accident sequences analyzed in the MO 3,4 project was provided in the frame of public hearing and was also the subject of monothematic expert workshop mentioned in the section 2.3.1.3 At the request of the experts from Austria and Hungary delegations, the data on cross-border impacts of severe accidents considered in the project MO 3,4 were elaborated and provided. The information was elaborated on the basis of data contained in the MO 3,4 Preliminary Safety Report. It introduces that the cross-border impact, expressed in terms of a radiation dose for 7 days from the start of an accident, for not sheltered population exposed to a sequence initiated by BLACKOUT (which has higher radiation effects) is about 4.3 μSv at a distance of 35 km from the crashed unit (Hungary) and about 0.83 μSv at a distance of 100 km from the crash unit (Austria), respectively.

6.3. *PROBABILISTIC SAFETY ASSESSMENT OF THE NPP MO 3,4 DESIGN (PSA)*

Probabilistic safety assessment of the nuclear power plants located in the territory of the Slovak Republic is required by the Atomic Act. Presentation of studies on the probabilistic assessment (the first and second level) is a mandatory condition for issuing the license, commissioning and operation of MO 3,4 (the Act No. 541/2004, Annex No. 1, C, letter J). Eligibility criteria for the results of a probabilistic assessment come out of requirements of the ÚJD SR Ordinance No. 50/2006 for new plants and are given in detail within the Guide BNS I.4.2 (including the definition of a large early escape), issued also by the ÚJD SR. The thresholds for the likelihood of the core melt (1×10^{-5} /year) and a large early escape (1×10^{-6} /year) introduced in this guide adopted also for the MO 3,4 project are in full agreement with international recommendations in this area, e.g. International Atomic Energy Agency (NS-G-1.2 and INSAG 12) or with European operators requirements (EUR Safety Requirements - Part 1).

Preliminary probabilistic analyses supplied by the future operator during the stage of the MO 3,4 Initial Design revision elaboration show that the resulting probabilistic targets are met.

In this connection, it should be noted that the following operator (in accordance with the recommendation of the Safety Committee established for the MO 3,4 Project) will provide an independent verification of the PSA results (IPSART, IAEA) before being submitted to the ÚJD SR.

6.4. THE HERMETIC ZONE (CONTAINMENT)

A design of the hermetic zone of MO 3,4 meets all requirements of the Slovak legislation for such equipment which is listed in the Regulation of the ÚJD SR No. 50/2006. It also meets the requirements of the IAEA for a design of such facility (IAEA NS-R-1) because the cited regulation of the ÚJD SR includes all relevant requirements of the IAEA for a containment design.

Measures taken in the MO 3,4 Project for management of severe accidents identified in the Chapter 2.4.9 of the Design framework ensure compliance with containment requirements issued by the Association of European Regulatory Authorities (WENRA Reference Levels, Part E) in 2008.

At public hearing, also information on containment leakage values was introduced. These values were used for an analysis of potential accidents: for a category of design accidents 6% of the volume per 24 hours for design pressure (which is 3 times higher than the expected leakage); for severe accidents 2% of the volume per 24 hours for design pressure (as the best estimate used in the assessment methodology for the consequences of severe accidents). Conducted analyses of radiological impacts have shown that with the level of MO 3,4 containment leakage equivalent to the EMO 1,2 level, acceptable radiation safety is reached for the population in the vicinity of the NPP. It is necessary to take into account that during accidents with large loss of primary circuit coolant a vacuum occurs in containment that eliminates the leakage of radioactive substances. In emergency modes where the containment and vacuum do not occur, the pressure in containment and consequently the release of radioactive substances reduction are secured by spraying of atmosphere in an automatic regime by a designed safety system (or in the regime of severe accident by a specially-designed system).

The pressure threshold of containment is designed to pressure 0.25 MPa (abs), which is used as a criterion for acceptance for a thermo-hydraulic analysis of events in the category of design-based accidents. For the management of severe accidents in the MO 3,4 Project, strength reserves of all containment structural elements (reinforced concrete of box walls for steam generators and a bubbler tower, bell jars above the devices in the box, bushings and doors) were analyzed by calculation. This analysis showed sufficient resistance of containment also at pressure of 0.35 MPa (abs) which is used for the MO 3,4 as an acceptance criterion for severe accidents analysis.

6.5. VACUUM-BARBOTAGE CONDENSER

During reviewing the safety of the original Russian design of the VVER 440/V213 NPP, international teams of experts (e.g. the OECD NEA Support group activity from 1992 or activity within the IAEA EBP Project - "Safety Assessment of VVER type 440/V213 type NPPs") have concluded that the strength characteristics of the pressure conditions in the vacuum-barbotage equipment resulting during emergency conditions have not been sufficiently demonstrated, and also that a reliable function of this device has not been sufficiently demonstrated due to absence of computer codes validation evidence based on performed experiments.

Joined activities of the VVER 440/V213 NPP operators in Central Europe (EDU, Paks, V2 and EMO 1,2 NPP's) for the functional qualification of this equipment were therefore initiated already in 1994 and they were also supported by the European Commission's PHARE programme and by the means of technical assistance

projects for countries in Central and Eastern Europe (TSO and CEEC): PHARE Project NUC 93428; PHARE/TACIS 2.13/95 BCEQ Project (Bubble Condenser Experimental Qualification), PHARE SK/HU/CZ/TS/08 (1998), TSO PR/TS/17 Project (2002 to 2003) - focused on technical assistance for supervisor authorities of the Czech Republic, Hungary and Slovakia in assessing the results of the PHARE/TACIS 2.13/95 and PHARE SK/HU/CZ/TS/08 (1998) programmes. In the final phase of qualification, operators of Bohunice, Mochovce, Dukovany and Paks NPP's agreed on a joint project TRILATERAL (HU-CZ-SK, from 2001 to 2003) in which they co-financed the implementation of additional experiments on trial equipment (EREC in Elektrogorsk, Russian Federation) aimed at modeling of transition processes of MSLB, MBLOCA and SBLOCA types.

For the major issues related to the qualifications of a vacuum-barbotage condenser, an assistance of the Committee on Safety of Nuclear Installations (CSNI) was secured, coming out from the initiative of the OECD-NEA since 2001. The Committee was established by the special Steering Committee (OECD-NEA Bubbler Condenser Steering Group) composed of supervisor representatives from the Czech Republic, Hungary and Slovakia, representatives of the operators in these countries and also from experts nominated by the GRS in Germany, IRSN in France, U.S. DOE and EU.

In conclusions of the project TRILATERAL all experimental and analytical results required for functional qualification of the vacuum-barbotage condenser were completed and they were submitted to the Steering Committee of the OECD-NEA. The Steering Committee confirmed an achievement of the qualification goals.

Comprehensive evaluation of the whole work carried out in the qualification of the vacuum-barbotage condenser was carried out at the end of the PR/TS/17 Project (November 2003) in the presence of supervisor authorities and representatives of the concerned countries and the deputy of the European Commission. His conclusions stated that the qualifications of the vacuum-barbotage condenser successfully demonstrated and provided that the operators had to follow the recommendations for strengthening some elements of the vacuum-barbotage condenser construction which were sub-outputs of qualifying projects.

Partial outputs of qualifying projects, covering requirements for strengthening of some elements of the vacuum-barbotage condenser design have been already reflected in the project of safety improvements of EMO 1,2 and are also fully reflected in the safety improvements project of MO 3,4.

6.6. THE REACTOR PRESSURE VESSEL INTEGRITY

An assessment of the reactor pressure vessel (TNR) integrity belongs to the field of nuclear safety and therefore an assessment of its results was not included in the Assessment Report. Themes of a more complex TNR integrity assessment were opened by an Austrian delegation at a meeting of Austrian and Slovak experts, which took place in November 2009 in Bratislava.

At this expert meeting information on the basic results of the assessment of the MO 3,4 TNR integrity was brought, which is introduced in the MO 3,4 Preliminary Safety Report. The assessment was conducted, based on the manufacturing documentation, in the phase of the revision of initial MO 3,4 design.

The results of strength analysis of the TNR integrity were commented that local variations of mechanical properties and material chemical composition of both MO 3,4 TNRs, which were detected, based on the test samples, do not affect the overall conclusions of TNR strength analysis. Low significant variations in mechanical properties of materials have been identified solely on the welded materials and only the

cylindrical part of the TNR outside the core (including a variation found in a stainless steel weld of TNR). Detected deviations were assessed by the authority supervision as eligible and were approved. It was also noted that in the view of the findings, observed variations of mechanical properties are parameters of MO 3,4 comparable or even better than those that were detected at EMO 1,2.

A limiting factor in assessing the integrity of TNR during a long-term operation of reactors is dominantly resistance of TNR against a brittle fracture. This issue was also discussed during the experts meeting and it was found out that the forecast of critical brittleness temperature increase for TNRs of MO 3,4 is satisfactory and favourable compared to the forecast originally carried out for TNRs of MO 1,2 (the value of critical temperature of brittleness on the inner surface of MO 3,4 TNR set for the designed period of 40 years of operation at nominal power reached max. 63.7 ° C for base material and for welded materials max. 87.4 ° C).

At the expert meeting, also information was brought, based on past experience that the advanced Project of verification samples was developed for MO 3,4. This allows to perform monitoring and evaluation of changes in mechanical properties of TNR materials with a higher precision during the operation.

In this context, it is necessary to add that the manufacturing technology of TNR for MO 3,4 (including requirements for interoperable control of product quality) was practically identical to the manufacturing technology used in the manufacture of steel for rings, pressing the bottom and lid, and in welding of all reactor pressure vessels manufactured by Škoda Plzeň. It is a total of 21 reactor pressure vessels of VVER 440. The integrity of one of the above mentioned TNRs (supplied for the Unit 1 from EMO 1,2) was assessed on the IAEA forum, based on initiative of Austria. The expert team nominated by the IAEA stated in its conclusions that the evaluation of the TNR had been carried out conservatively, and that by the integrity and resistance to the brittle fracture no insufficiencies were identified (... no concerns were identified with the integrity of the Mochovce Unit 1 TNR - see the report IAEA Expert Group discussions of negotiations in Vienna on September 14-18, 1998).

In terms of further detailed explaining on the technical level, which is proposed by the Austrian party to be implemented in the field of evaluation of the integrity of the TRN, it is important to note that pre-operational non-destructive inspections of TNR materials will be made only after completion of the Preoperational control programme (its development is currently in progress). A comprehensive analysis focused on showing that during the transition processes associated with the cooling of the core where there is no pressure-temperature shock, will be made only after completion of an executive design (to be able to consider real parameters of MO 3,4 equipment in the analysis). Mutual explanation of questions about the integrity of the reactor pressure vessel (within the range which was signaled by the Austrian experts on the expert meeting) should respect the general process of design and construction of NPP and cannot be considered as an obstacle for finishing the environmental assessment.

6.7. PROGRAMME OF THE SAFETY ENHANCEMENT AND THE NUCLEAR SAFETY LEVEL OF THE NPP MO 3,4 DESIGN

The safety enhancement programme of the MO 3,4 design is described in EIA report in the chapter 2.4.8 of the design approach. Additional information on a conceptual approach and on main fields, in which safety enhancement of the MO 3,4 design in comparison with the EMO 1,2 design was oriented, (safety level of this power plant was the start point of safety increasing), was introduced on each public consideration. The most important measures described in the EIA report were worked out as specific for the MO 3,4 design and their gross (specific) contribution to the total assessment is, besides deterministic assessment, identifiable, for example, as a contribution to reach high-flying acceptability criteria in the field of a probabilistic safety assessment.

To the disputation of the MO 3,4 design level comparison with the third generation NPP design, which are under construction in the present time, it is possible to add that the MO 3,4 design is comparable with some features of the third generation reactors such as: increasing of resistance against severe accident consequences, reduction of active zone melting probability under value 1×10^{-4} per year, minimization of radiation consequences to outside environment, increasing seismic resistance. The third generation reactors have a higher value of parameters than the MO 3,4 design in economic features such as; unit power output, fuel burn up, design life time, a design standard for licensing.

6.8. FIRE PROTECTION IN THE NPP MO 3,4 DESIGN

Increasing of fire protection in the MO 3,4 design took initiative by new legislative regulations in the SR, which came into power after putting EMO 1,2 into operation. It concerns mainly the following regulations: MV SR no. 94/2004 Coll., ÚJD SR no. 50/2006 Coll. and guide IAEA NS-G-1.7.

In compliance with the requirements and recommendations of these documents in the MO 3,4 design escape ways were revised, fire sections were re-evaluated in a design of building objects, new qualification of fire equipments in compliance with European norms was established (including seismic qualification). An expanded fire alarm system to all the buildings was expanded. Fire load in construction buildings was minimized by using fire non-proliferate cabling including fire protecting cabling for safety systems. Besides this, the power plant fire protection unit was equipped with new improved technical means.

6.9. COOLING OF THE POWER PLANT AT INTERRUPTION OF THE RAW WATER SUPPLY (AS A CONSEQUENCE OF UNFAVOURABLE WATER FLOW IN THE RIVER HRON)

The analysis of after-cooling of both reactor units under conditions of operative lack of raw water charging to the system of essential service water was performed in the MO 3,4 design. This system insures residual heat removal from reactors and from spent fuel storage basins and it also insures cooling of safety system components. Postulated initial reasons of such a scenario of a safety analysis were seismic event or long-time lack of feed self-consumption. The results of analysis were the reason to accept a new technical solution in design for reserve water charging to the system of essential service water. Power supply of the system of essential service water is insured by sources of emergency supply (DG), the system of reserve water charging to TVD is redundant and it uses pump aggregates driven by internal-combustion engine. Thus the long-time after-cooling of the power plant is reliably ensured also in case of lack of supply of an external electric net.

In a specific case when interruption of raw water supply from the V. Kozmálovce dam is caused by lack of water, the accepted solution in the MO 3,4 design for insuring reliable power plant cooling permits to utilize the water from all technological systems of both units MO 3,4 after outage of an output operation. The water capacity in sources is in emergency conditions satisfactorily balanced to ensure cooling of the power plant for the time period 30 days (in winter 41 days, in summer 26,5). Such a time period, which is available to power plant personnel, permits in mentioned scenario to consider partial renewal of the supply of raw water and water supply charging at the site of the nuclear power plant for reserve water charging to the system of essential service water.

Analogical solution of charging cooling water to the system of essential service water, which insures after-cooling of the power plant in case of interruption of raw water supply, is also contained in the MO 3,4 design. The nuclear power plant EMO 1,2 has elaborated an operation manual in case of lack supply of raw water. Activity description for such a case in this manual was elaborated in a way, which permits to keep limits and conditions for a normal operation mode for the time period of 10 days as much as possible. The information on the plan of the power plant measures listed in the chapter C.II.6.1.2. of the EIA report is based on this operation manual.

It is advisable to note, that interruption of raw water supply from the V. Kozmálovce dam from the point of view of insuring reliable after-cooling of the power plant is not the most severe event, which is considered in the safety analysis of the MO 3,4 design. For example, seismic events are considered to be more severe events (which eliminate the system of raw water supply), or combination of a seismic event with postulated leakage of the primary coolant. The analysis of after-cooling of the power plant in such a scenario takes into account reserve charging of water to the system of essential service water only with water, which is available in equipments of two units considered as resistant against a seismic event. The water transport in truck cisterns is the next reliable way of reserve charging of water for the power plant cooling. The MO 3,4 design considers installation of specific feeding armatures on the pipework system for such a way of charging of cooling water (a system of essential service water and a system of (super) emergency charging of steam generators).

The information mentioned in the chapter C.II.6.1.2. of the EIA report about a time period of autonomic resistance of the power plant at interruption of raw water supply is not fully complete, because the scenario of after-cooling referenced in the EIA report is not introduced. "Other way" of insuring water for reserve water charging to the system of essential service water in emergency conditions (the base information is mentioned) has not been explained in the public appraisal because it was not clearly questioned. Anyway, the reflection of Greenpeace about huge safety risk coming from lack of cooling water, which was delivered to MŽP SR after the public appraisal, does not open a new field which has to be involved in an analysis in the MO 3,4 design to demonstrate nuclear safety.

6.10. SEIZMIC RESISTANCE OF THE MO 3,4 DESIGN

During the public hearing, issues related to the derivative of basic seismic characteristics of the NPP site were discussed. They were used as input data for seismic reinforcement of buildings, equipment and components important for safety. On the public hearing, information was given that the Slovak Electricity Company in conjunction with the UJD SR solved this issue transparently and with continuous participation of international experts. The IAEA ensured organizational and technical choices and participation of experts from developed foreign countries too.

During the national experts activities associated with EMO seismic resistance (and even parallel EBO) methodological support and guidance were used, which provided a total of 4 IAEA missions, which were implemented in 1993, 1995, 1998 and 2003. In addition, from 2004 to 2005 the IAEA organized the Technical Cooperation Project (SR/9/002 and RER/9/035) for the ÚJD SR, specifically aimed at developing technical guidelines for a seismic review programme of the NPP Mochovce. In 2003, the last mission of the IAEA left a relatively positive assessment of the work performed in the evaluation of seismic characteristics of the site EMO by specialist suppliers of SE, a.s. Its conclusions and additional information of SE, a.s. that they were filled with the recommendations of this mission, were the basis for the information presented at a public hearing that the seismic characteristics of the Mochovce site were developed at an appropriate professional level of current knowledge of these issues in the world.

Such a position (after clarifying a number of detailed questions) was adopted by the experts from Hungary and it is realistic to expect that additional detailed explanation, requested by the Austrian side in the final position, cannot challenge this conclusion.

6.11. TECHNICAL TOOLS FOR MANAGEMENT OF SEVERE ACCIDENTS IN THE NPP MO 3,4 DESIGN

The equipment of the NPP MO 3,4 with technical equipment for management of severe accidents requires new nuclear legislation in the SR (Regulation UJD SR No. 50/2006 Coll.), but also certain detailed requirements were respected in this area. They were contained in a document issued by the Association of supervisory authorities of European countries in 2008 (WENRA Reference Levels, Issue E), because the

requirements of this document will be in time of commissioning of NPP MO34 into operation already reflected in the Slovak nuclear legislation.

During developing of the safety concept for the MO 3,4 design reinforcement against severe accidents the results of the PHARE programmes were used (PH 4.2.27a/93 Project, Project PH 2.06/94; Project PH 2.07/94), which were focused on a severe accidents area, which for the benefit of NPP operators, VVER 440/V213 in Hungary, the Czech Republic, and Slovakia, were funded by the European Commission. In addition, available experience of an analogue implementation project for the design reinforcement of Loviisa NPP in Finland due to severe accidents (where there the same type of reactor is used, including its location in the reactor shaft), was used.

Safety concept of the MO 3,4 design reinforcement against severe accidents is based on maintaining the molten corridors in the pressure vessel while cooling the reactor pressure vessel is provided by implementing heat to the water by its outer surface. For the implementation of safety features, to reduce the consequences of severe accidents, a total of 9 new systems was complemented to the MO 3,4 design (installations system to flood the reactor shaft; discharge system of bubbler canals on the shaft floor of the bubbler tower; rapid depressurizing of the primary circuit for severe accidents, an additional coolant supply system from an external source for severe accidents (to a spray system, on the floor of a steam generator box, to an open reactor, to the spent fuel pit); a suppression system of unacceptable vacuum in containment, an electrical power system reserved for severe accidents including a new diesel generator; a system of atmosphere control in the hermetic zone, a system for securing habitability of the unit control room during severe accidents, parameters monitoring and equipment control system for severe accidents) and in addition, to minimize the radiological consequences for people, ventilation system adjustments were made, designed for collecting, filtering and controlling discharge of radioactive substances leaking from the accident containment, so that the system was able to operate during severe accidents.

Pressure limits resistance of containment were proven by a structural analysis during severe accidents conditions (results are discussed in the Part containment) and requirements for environmental qualification equipment and designed systems to mitigate the effects of severe accidents were set.

The thermo-hydraulic analysis and subsequent analysis of the radiological impact on the population were carried out for 2 severe accident scenarios and these are - the scenario with initiated LOCA and the scenario with initiated BLACKOUT (total loss of electrical power). The results of the analysis showed that by use of newly designed systems there is (very unlikely) a possibility to achieve reduction of radiological consequences on people in the vicinity of NPP to the level below acceptable limits during severe accidents.

Analysis of the safety of MO 3,4 design reinforcement to the consequences of severe accidents was as a special supplement of the Preliminary safety case submitted to the ÚJD SR for review. He approved a proposed solution of the MO 3,4 design reinforcement against severe accidents in its Official decision No.266/2008.

7. ALTERNATIVES OF THE PROPOSED ACTIVITY SOLUTION

According to the status of the EIA process in question within the processes accompanying the siting, construction, completion and subsequent commissioning of MO 3,4, which is reflected in decision of the competent authority (Ministry of environment) who has decided, on the proposal of proponent, to desist from the assessment of alternatives, this part of that appraisal is irrelevant.

The zero option under the legal institution is definable as retention of MO 3,4 in the state as it is, not continuing in the construction and operation of next NPP EMO 1,2. Aware of that, this is not consistent with the strategic documents of the Slovak Republic, and considering that the construction permit to finish construction activities (precisely: to change the construction before its completion) was issued in 2008, and according to the current level of works, the zero option is factually disqualified.

8. PROPOSAL OF MEASURES AND CONDITIONS FOR EXCLUDING OR REDUCTION OF UNFAVOURABLE IMPACTS OF THE PROPOSED ACTIVITY

In principle, the reviewer agrees with the approach to this case as it is described in the section C. IV of the assessment report. He notes only that the monitoring executed by LRKO is an instrument of identifying adverse effects, not a measure of their exclusion or reduction.

The area-planning measure is the first one to eliminate or reduce adverse effects – the setting of a restricted area, or the protection zone (about 3 km around the plants) where permanent settlements are prohibited, respectively.

Regarding the adverse effects of the normal operation, these are (as expressed by an effective dose of an individual from the critical group of population estimated from the measured values of the released activity by the model calculations) so small that they do not require special arrangements and conditions for their further reduction or elimination.

Another aspect of exclusion or reduction of adverse effects is to maintain the operation within the bound of a normal operation by the operational rules (part of them are the limits and conditions of a safe operation approved by authorities of the state supervision) based, inter alia, on assessment of nuclear and radiation safety. The working quality management system is an instrument or action to maintain normal operation (i.e. no monitoring of environmental components, as written in the assessment report - see the note in the first paragraph of this part of the appraisal), which aims to:

- maintain an operated system in the given safety bound,
- to early register the variation from the stable safety functioning of the system at all operational conditions and provide the redress .

Regarding potential adverse impacts, i.e. impacts of incidents and accidents, the system of emergency preparedness is the means – a measure of their reduction or elimination. It is, as detailed in the assessment report, described in emergency plans (an internal plan and a plan for an area defined for this purpose in defined range around NPP). Organization of emergency response is clearly shown in the figures 63 and 64 in the assessment report. External emergency plan has two levels: regional and national. It counts with involvement of other state bodies and its implementation is managed centrally by the Central crisis headquarters of the Slovak Republic. A response organization to an accident at the national level comprises also the task of communicating with foreign countries about an accident, in terms of the international agreements.

The emergency exercises executed at various levels including international ones are also a part of preparedness for accidents.

ANNEXES

P.1 PROPOSAL for the final statement of the Ministry of Environment of the Slovak Republic