E X P E R T R E P O R T

on impacts of the project

“New Nuclear Source at the Dukovany Site”

on environment
according to Act No. 100/2001 Coll., on environmental impact assessment and on amendments to some related acts (Environmental Impact Assessment Act), as subsequently amended

(June 2019)

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author of expert report:

RNDr. Tomáš Bajer, CSc.
the holder of a certificate of competency for processing documentation and expert reports according to Act No. 100/2001 Coll., the certificate No. 2719/4343/OEP/92/93, the authorisation extended by the Decision Ref. No. 52153/ENV/15

collaboration:

Ing. Josef Tomášek, CSc.
the holder of a certificate of competency for processing documentation and expert reports according to Act No. 100/2001 Sb., the certificate No. 69/14/OPV/93, the authorisation extended by the Decision Ref. No. 37351/ENV/16

RNDr. Milan Macháček
the holder of a certificate of competency for processing documentation and expert reports according to Act No. 100/2001 Sb., the certificate No. 6333/246/OPV/93, the authorisation extended by the Decision Ref. No. 90668/ENV/16

the authorized person for processing assessments according to Section 45i of Act No. 114/1992 Coll., as amended, the Decision on authorisation Ref. No. 2396/630/06 as of 30.1.2007; the authorisation extended by the Decision of the Ministry of Environment Ref. No. 2882/ENV/17 154/630/17

the authorized person for processing assessments of impacts of major interference with interests of nature and landscape protection according to Section 45i of Act No. 114/1992 Sb., as amended pursuant to Section 67 of this Act; the Decision of the Ministry of Environment on granting the authorisation Ref. No. MZP/2018/610/3550

Ing. Ivana Lundáková

the holder of a certificate of competency for processing documentation and expert reports according to Act No. 100/2001 Sb., the certificate No. 7232/876/OPVŽP/99, the authorisation extended by the Decision Ref. No. 34079/ENV/16

Ing. Jana Bajerová

Ing. Martin Šára

(June 2019)

Declaration:

I processed the expert report as the holder of a certificate of competency No. 2719/4343/92/93, issued by the Ministry of Environment of the Czech Republic in agreement with the Ministry of Health of the Czech Republic on 28.1.1993 according to Section 6 Clause 3 and Section 9 Clause 2 of the Czech National Council Act No. 244/92 Coll., on environmental impact assessment. The authorisation was extended by the Decision Ref. No. 52153/ENV/15.

Date: 14.06.2019 ***Signature:***

CONTENT:

Annexes:

Annex 1 – Expert report of the project impacts on sites of Natura 2000 system according to Section 45i of Act 114/1992 Coll., as amended

Annex 2 – Requested complementary documents according to Section 9 of Act No.100/2001 Coll., as amended:

- Annex 2.1.:
  - Documents related to the statement of the Regional Hygienic Station of Vysočina Region
  - Documents related to the statement of the Ministry of Environment, Department of Species Protection and Implementation of International Commitments and the statement of the Agency of Nature and Landscape Conservation, Regional Office of protected area Žďárské vrchy
- Annex 2.2.:
  - Explanatory documents concerning the issues of supplying technological water to nuclear facilities at the Dukovany site
  - Supplementing the explanatory information on radiation influences in the distance of 380 km from the NNS on Austria as required by the Austrian

party in the context of the consultation, namely for the source term “DEC, major accident, ground level leak”

- Annex 2.3.:
  - Supplementing explanatory documents concerning the issues of impact of ionizing radiation on fauna and flora related to the statement from the „”Joint opinion of Austrian Legal Representations for Environment and Nature Conservation” of 12. 1. 2018
  - Supplementing explanatory documents to the statement of “Ministry of Energy, Department of Nuclear Energy” of Republic of Poland of 8. 3. 2018 in relation to cross-border impacts of effective doses and committed effective doses

I. BASIC DATA

I. 1. Project name

New Nuclear Source at the Dukovany Site

I. 2. Project Capacity (Scope)

Project capacity: net electrical power output: up to 2400 MW_e

The subject of the Project consists in the construction and operation of the new nuclear source at the Dukovany site consisting of the nuclear units, including all the related civil engineering objects and technological systems (technological equipment), used for power generation and transmission and assurance of safety operation of the nuclear facilities.

The project will be executed independently of the existing nuclear facilities at the site (see documentation Chapter B.I.6.4. Specific data on other facilities at the site) so that it does not influence their operation and the level of their nuclear safety, radiation protection, the security of nuclear facility and nuclear material and coping with the radiation abnormal occurrence.

The project includes following components:

Power plant unit:	number of units:	up to 2
	type:	pressurised water reactor (PWR)
	generation:	III+
	net electrical power output:	up to 2400 MW_e
	design lifetime:	60 years

The above mentioned power corresponds to two units with net electrical power output up to 2400 MW_e (2x1200 MW_e) or one unit with net electrical power output up to 1750 MW_e.

The nuclear units include all the necessary civil engineering objects and technological equipment of the primary circuit, the secondary circuit, the tertiary (cooling) circuit, external plants and auxiliary plants, including all the related and induced investments for the project construction and operation.

Commercially available units of III+ generation will be used and none of the available projects complying with legal requirements is precluded. For the reference list of nuclear unit designs, see Chapter B.I.6.3. Specific data of the project. The nuclear unit supplier will be selected subsequently. Selection of the supplier is not part of the environmental impact assessment. Parameters used for the environmental impact assessment conservatively cover all the environmentally significant equipment parameters of all the prospective designs.

For area of location of nuclear units and related objects and plants, see drawings in Appendix 1.1 of EIA documentation.

Electric connection: electric power transmission: 400 kV overhead line (one per unit)

standby power supply of internal consumption: 110 kV underground line (two per unit)

Electric connection includes all the components required for the project construction, operation and connection to the network of the Czech Republic.

Electric power of each nuclear unit will be transmitted by means of the 400 V AC rated voltage overhead line to the reconstructed Slavětice transformer station. This transformer station is part of the transmission network system of the Czech Republic, it is under administration of ČEPS, a.s., and its reconstruction is not part of the project.

The standby power supply of internal consumption of each unit will be executed with two underground lines of 110 kV AC rated voltage from the 110 kV Slavětice switching station owned by E.ON.

For area of location of electric connection, see drawings in Appendix 1.1 of EIA documentation.

Water system connection:

- water supply: underground/overhead pipe mains
- waste water discharge: underground/overhead pipe mains
- rain water discharge: underground pipe mains and the extension of existing infrastructure

The water system connection includes all the water system equipment required for supply of the project with raw water and potable water, discharge of sewage and technological waste water and discharge of rain water.

Raw water will be supplied by means of the new or existing enlarged system of raw water supply from the Jihlava River (Mohelno Water Reservoir).

Potable water supply will be supplied by connection to the existing potable water supply system.

The waste water will be discharged using new pipe mains to the Jihlava River (Mohelno Water Reservoir). The

Rain water will be discharged to Jihlava River (through Skryjský stream to Mohelno water reservoir) mainly, part of rain water (from the berm of NNS site in the area of assumed cooling towers and from the construction site installation area above all) will be discharged to Olešná basin.

For area of location of the water system connection, see drawings in Appendix 1.1 of EIA documentation.

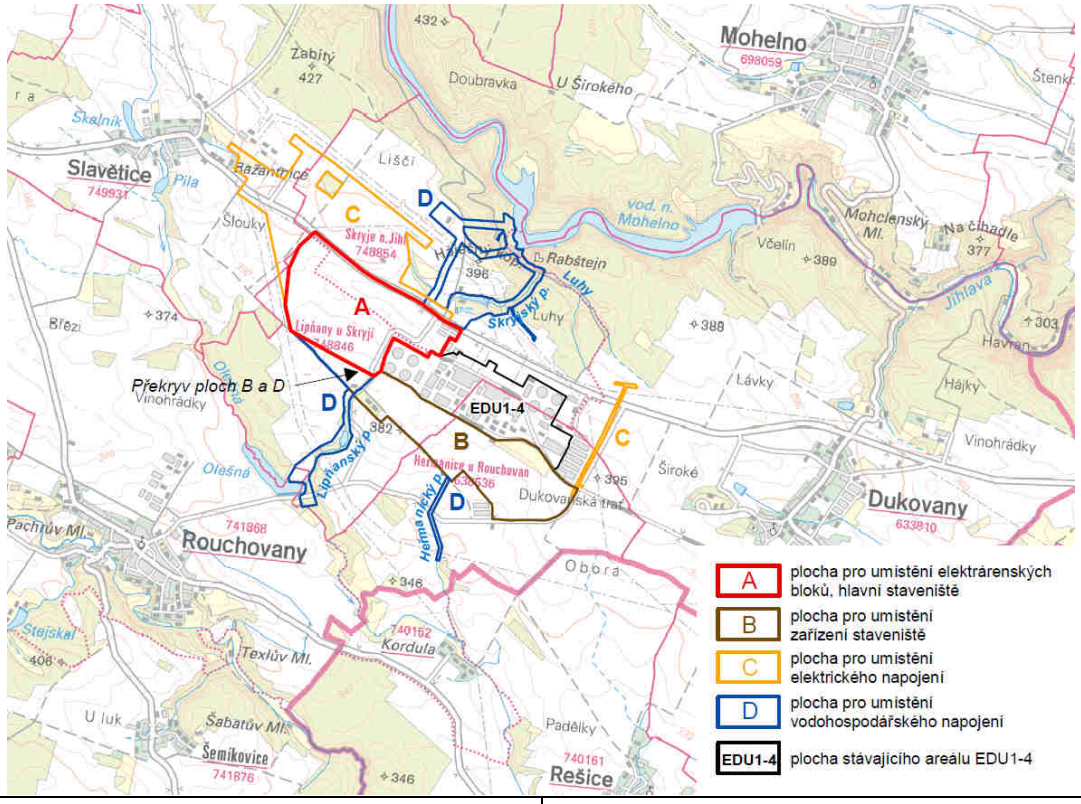
The project also includes areas and equipment for construction, i.e., main construction site and construction site installations, containing all the elements needed by the project contractor in the course of civil engineering or constructional works (outside the public infrastructure). The construction site installations will be situated immediately adjacent to the construction area. For area of location of the construction site installations, see drawings in Appendix 1.1 of EIA documentation

I. 3. Project Location (region, community, cadastral area)

The project is located on territories of the following territorial entities:

State	*Region*	*District*	*Community*	*Cadastral Area (C. a.)*
Czech Republic	Vysočina	Třebíč	Dukovany	(C. a.) Skryje nad Jihlavou (C. a.) Lipňany u Skryjí (C. a.) Dukovany
			Slavětice	(C. a.) Slavětice
			Rouchovany	(C. a.) Heřmanice u Rouchovan (C. a.) Rouchovany

For the general layout of the project location, see the following document:



plocha pro umístění elektrárenských bloků, hlavní staveniště	area for power units, main construction site
plocha pro umístění zařízení staveniště	area for site installations
plocha pro umístění elektrického napojení	area for electrical connections
plocha pro umístění vodohospodářského napojení	area for water connections
plocha stávajícího areálu EDU 1-4	existing EDU1-4 site

I. 4. Trade Company of the Notifier:

Elektrárna Dukovany II, a. s.

I. 5. Company ID of the Notifier:

04669207

I. 6. Registered Office (Residence) of the Notifier:

Duhová 1444/2, 140 00 Prague 4

Opinion of the expert report author:

The said Chapter includes all necessary information; no comments of team of authors of expert report.

II. ASSESSMENT OF DOCUMENTATION

II. 1. Completeness of documentation

The documentation of the project is processed in the breakdown according to Annex No. 4 of Act No. 100/2001 Coll., as amended and complies with requirements of the quoted Act in this regard.

The EIA documentation in the extent of Annex No. 4 of Act No. 100/2001 Coll. As amended was processed by the authorised person Ing. Petr Mynář (with a team of authors), who is the holder of certificate of competency, authorisation Ref. No. 1278/167/OPVŽP/97, the extension of authorisation No. 23110/ENV/16.

With respect to the actual content and extent of documentation, it is possible to assess the impacts of the projects on the environment and to finalize the assessment process according to Act No. 100/2001 Coll., as amended taking into account the project nature and localisation in the opinion of the author of expert report.

The actual documentation – Developer Data - shows basic data on the notifier of the submitted project in Part A. Data are submitted accordingly and adequately.

Part B – Project Data – describes basic characteristics of the construction a meets the formal requirements laid down in the Annex number 4 of Act No. 100/2001 Coll., as amended. As regards the substance, this Chapter is commented in other parts of the submitted expert report.

As regards Part C – Data on the State of Environment in the affected Territory may be considered sufficient in relation to the project in question.

Part D – Complex Characteristics and Assessment of project Impacts on Public Health and the Environment – contains almost all chapters of EIA documentation:

- Characteristics and assessment of the size and significance of assumed direct, indirect, secondary, cumulative, cross-border, short-term, medium-term, long-term, constant as well as temporary, positive as well as negative project impacts ensuing from the project construction and existence, used technologies and substance, emission of pollutants, waste management, cumulation of the project with other existing or allowed projects taking into account requirements of other legal regulations for environmental protection
- Characteristics of risks for public health, cultural heritage and environment at possible incidents, disasters, and abnormal conditions and anticipated significant impacts ensuing from them
- Complex characteristics of the project impacts according to Part D, Points I and II from the viewpoint of their size and significance including their interactions including a particular focus on the possibility of cross-border impacts
- Characteristics and the assumed effect of proposed measures on the prevention, exclusion, and reduction of all significant adverse negative effects on the environment and public health and the description of compensations, if they are possible with regard to the project or measures monitoring all possible negative impacts on the environment related to the project construction and operation, including measures concerning the preparedness for contingencies according to the Chapter II and responses to them

- Characteristics of forecasting methods, underlying assumptions, and evidence for finding and assessment of significant impacts on environment
- Characteristics of difficulties encountered at the documentation processing and of main uncertainties ensuing from them

Part E - Comparison of Project Solution Variants

The project is assumed in one (active) variant only both from the viewpoint of technical solution and from the viewpoint of location.

The submitted documentation contains further requested chapters F. Conclusion, G. Generally understandable summary of non-technical character, and H. Annexes.

Parts of the assessed EIA documentation are following annexes:

Annex 1 Maps and Layout Appendices
1.1 General Layout of Project Location
1.2 Ecological Relations in Territory

Annex 2 Assessment of Impacts on Population
2.1 Evaluation of Impacts on Public Health

Annex 3 Assessment of Impacts on Nature and Landscape
3.1 Biological Assessment
3.2 Nature Assessment
3.3 Evaluation of Impacts on Scenery and Shading of Surrounding

Annex 4 Assessment of Impacts on Surface and Groundwater
4.1 Evaluation of Impacts on Surface and Groundwater

Annex 5 Other Areas of Assessment
5.1 Evaluation of Radiation Impacts
5.2 Acoustic Study
5.3 Dispersion Study

Annex 6 Documents
6.1 Statements of Competent Offices of Development Planning to Project
6.2 Statements of Nature Protection Authority according to § 45i of Act No. 114/1992 Coll.
6.3 Information of the Ministry of the Interior of Czech Republic on the Protection System of Nuclear Facilities against Acts of Terrorism
6.4 Opinion of Radioactive Waste Repository Authority on Issues of Radioactive Waste and Spent Nuclear Fuel Management
6.5 Authorization Certificate of Documentation Authors

Opinion of the expert report author:

The team of expert report authors considers the documentation formally acceptable. It should be noted that the breakdown of chapters in Parts C.I, C.II, and D. does not comply fully to the breakdown according to Annex No. 4 of Act 100/2001 Coll. formally. However, data required by law are included in other parts of documentation.

Based on interstate consultations, public discussions, and public hearing of the project, the notifier was requested to supplement explanatory source documents to some project aspects that are summarized in the Annex No.2 of the submitted expert report.

In the opinion of the team of expert report authors, the mentioned explanatory source documents supplement or explain in more detail some project aspects and do not bring any such information that could influence significantly impacts on the environment and public health specified precisely by the documentation.

II.2. Correctness of data specified in the evaluation including used assessment methods

In relation to impacts of the project “New Nuclear Source at Dukovany site” on the environment, the team of expert report authors considers the documentation completeness as acceptable for assessing impacts on the environment and health of population as well as wording a draft of binding opinion on assessing impacts of the project execution on the environment (hereinafter “opinion”) for the competent authority – the Ministry of Environment – and to finalize the assessment process according to Act No. 100/2001 Coll., as amended by issuing a binding opinion on assessing impacts of the project execution on the environment. The extent and the level of detail of attached expert studies corresponds to the project preparation stage and some requirements of the team of expert report authors for supplementing and explaining are documented in Annex 2.3. of the submitted expert report.

A. Developer Data

This chapter states the basic data on the notifier: the trade company, the Id. No., the name and surname of the notifier.

Opinion of the expert report author:

Without comments. The chapter complies with the information required by law.

B. Project Data

B.I. Basic Data

The Chapter is divided to sub-chapters, the titles of which meet requirements set out in the law.

B.I.1. Project Name and its Classification according to Annex No. 1

The subject of the submitted expert report is the review of the project “New Nuclear Source at the Dukovany Site”. According to the documentation, the project corresponds to Point 8 (Nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kW continuous thermal load of category I. It is the project according to Section 4 Clause 1 Letter a) of Act. The respective office is the Ministry of the Environment of the Czech Republic.

Opinion of the expert report author:

No comments of the team of expert report authors from the viewpoint of the project classification.

B.I.2. Project Capacity (Scope)

Project capacity: net electrical power output: up to 2400 MW_e

The subject of the Project consists in the construction and operation of the new nuclear source at the Dukovany site consisting of the nuclear units, including all the related civil engineering objects and technological systems (technological equipment), used for power generation and transmission and assurance of safety operation of the nuclear facilities.

The project will be executed independently of the existing nuclear facilities at the site (see documentation Chapter B.I.6.4. Specific data on other facilities at the site) so that it does not influence their operation and the level of their nuclear safety, radiation protection, the security of nuclear facility and nuclear material and coping with the radiation abnormal occurrence.

The project includes following components:

Power plant unit:	number of units:	up to 2
	type:	pressurised water reactor (PWR)
	generation:	III+
	net electrical power output:	up to 2400 MW_e
	design lifetime:	60 years

The above mentioned power corresponds to two units with net electrical power output up to 2400 MW_e (2x1200 MW_e) or one unit with net electrical power output up to 1750 MW_e.

The nuclear units include all the necessary civil engineering objects and technological equipment of the primary circuit, the secondary circuit, the tertiary (cooling) circuit, external plants and auxiliary plants, including all the related and induced investments for the project construction and operation.

Commercially available units of III+ generation will be used and none of the available projects complying with legal requirements is precluded. For the reference list of nuclear unit designs, see Chapter B.I.6.3. Specific data of the project. The nuclear unit supplier will be selected subsequently. Selection of the supplier is not part of the environmental impact assessment. Parameters used for the environmental impact assessment conservatively cover all the environmentally significant equipment parameters of all the prospective designs.

Opinion of the expert report author:

No comments of author of expert report to the description of the project capacity and scope.

B.I.3. Project Location (region, community, cadastral area)

Region: Vysočina

Community: Dukovany, Slavětice, Rouchovany

Cadastral Area: Skryje nad Jihlavou, Lipňany u Skryjí, Dukovany, Slavětice, Heřmanice u Rouchovan, Rouchovany

Opinion of the expert report author:

No comments of the team of expert report authors from the viewpoint of the project location in the respective chapter of reviewed documentation.

B.I.4. Project Character and Possibility of Accumulation with Other Projects

No projects are notified in the territory involved that could result in significant accumulation of impacts with the project of the new nuclear power source.

The project is located in the Dukovany-Dalešice electrical power system, i.e. territory taking up the Dukovany Power Plant premises (EDU1-4), the Dalešice-Mohelno Waterworks, and the Slavětice Transformer Station. The project impacts will therefore interfere with impacts of these facilities.

There are four separate nuclear facilities in the EDU1-4 premises - the nuclear power plant, two spent nuclear fuel storages, and the radioactive waste storage. Therefore, all the new nuclear power source project impacts are assessed in their concurrent impact together with the other nuclear facilities or other facilities.

The Mohelno Water Reservoir will be used for the project in its existing form (as the raw water source as well as the waste water recipient), the respective concurrent impacts of other facilities at the site are taken into account in this case.

The electrical power of the project will be transmitted to the Slavětice Transformer Station that is part of the Czech Republic transmission network. The adaptation of this Transformer Station and of other transmission network elements related to the strengthening and increasing the reliability and effectiveness of transmission network operation and also to the connection of the new nuclear source to the transmission network is not part of the project. This is a separate project of another investor (the transmission network administrator - ČEPS, a.s.) that shall also ensure its assessment from the point of view of environmental impacts. All the new nuclear power source project impacts are assessed in their concurrent impacts together with impacts of the transmission system.

Further development of the territory involved will not be static and it is reasonably assumed that prospective new projects situated in the territory will be assessed from the standpoint of environmental impacts as well. Considering the current knowledge, it cannot be excluded that new spent nuclear fuel storage will be added to the site, at the time of its need and in case of a decision on its location at the site. It will be situated in the area for the NNS location or in the adjacent area. Part of its preparation will also be environmental impact assessment that is a separate project being subject to the assessment (Category I, Point 12 of Annex No. 1 to the Act) pursuant to the Act No. 100/2001 Coll., on Environmental Impact Assessment. This review will reflect the state of knowledge and the technical level at the time of the storage preparation and evaluate the possibility of executing the storage from the environmental viewpoint with regard to current contributing impacts in the area. However, possible contributing impacts of the storage are taken into account in this documentation at conceptual level.

Opinion of the expert report author:

No comments of the team of expert report authors. Other synergy or cumulative effects cannot be expected from the viewpoint of the project nature in the opinion of the team of expert report authors. The documentation assesses the operation of existing nuclear source, storages of spent fuel, and radioactive waste repository.

B.I.5. Justification of the project location and description of variants considered by the notifier specifying main reasons leading to the selection of the given solution including comparison of impacts on environment

The project location is analysed and declared in following strategy documents:

- The Territory Development Policy of the Czech Republic (approved by the Decree of Government of the Czech Republic government No. 276 of 15. 4. 2015),

- Vysočina Region Territory Development Principles (Update No. 1, Update No. 2, Update No. 3),
- Territory Plans of Dukovany, Rouchovany, and Slavětice communities,
- The National Action Plan for Nuclear Power Development in the Czech Republic (approved by the Czech Republic Government Resolution No. 419 of 3. 6. 2015).

The Czech Republic has two sites currently, in which operated nuclear power energy facilities are located and which have necessary infrastructure links for this purpose. These are Dukovany site (the site of the project location) and Temelín site. These sites are protected by the Territory Development Policy of the Czech Republic (2015) and territory development documents at different levels.

The approved State Energy Policy of the Czech Republic (2015) takes into account both these sites for the development of the nuclear power energy, while their technical and environmental limits as well as social and conditions at sites will be respected. Using both sites is thus not mutually exclusive.

With regard to the energy security of the Czech Republic as well as with regard to the overall social benefit, it is desirable from the perspective of the National Action Plan for Nuclear Power Development (2015) in accordance with National Energy Policy (2015) to immediately initiate the preparation for construction of one nuclear reactor at the Temelín site and one reactor at the Dukovany site as well as to protect potential risks by obtaining the required licences for the possible construction of two reactors at both sites.

In particular for reasons of maintaining power generation at the Dukovany site, the nuclear unit construction and start-up by 2037 is of crucial importance in order to ensure continuity of the nuclear power source operation and human resources in the site by 2037 when shut-down of the existing power plant is assumed.[1]. Therefore, as far as the Dukovany site is concerned, the National Action Plan recommends to continue immediately preparing the design with the variant of 2 nuclear units with follow-up construction of the 1st nuclear unit and the possibility of extending this to 2 nuclear units at this site.

With regard to detailed location of the new nuclear source at the Dukovany site, the area for the project location is based on the result of review of three alternative locations following up premises of the existing operated power plant Dukovany (EDU1-4): north-west of the existing EDU1-4 premises, south of the existing EDU1-4 premises, and south-east of the existing EDU1-4 premises. The area north-west of the existing EDU1-4 premises (Area A) was selected based on multi-criteria evaluation for the location, namely because of its suitability from the viewpoint of geological and hydro geological aspects above all and because the new source takes up the existing EDU1-4 premises and affects the landscape thus as little disruptive as possible at the same time. It will be also possible to use the continuity with the existing infrastructure efficiently here. The area south of the existing EDU1-4 area (area B) has been selected as a basis for the construction site installations, because of less appropriate basement conditions and more complicated supply of raw water and power outlet solution. Conditions of the supply of raw water and off-site power transmission solution are more

[1] This requirement is met by the conservative schedule of the NNS preparation with the assumed commissioning of NNS Unit 1 in 2035, see the documentation Chapter B.I.6.4.2. Schedule of Operation and Decommissioning of Nuclear Equipment at the Site

complicated in the area south-east of EDU1-4 similarly. Given the above views, the area north-west of the existing EDU1-4 premises (Area A) selected for the NNS location is optimal.

Location of the new nuclear power source at the Dukovany site is based on taking expected development of energy balances as well as safety requirements for location and operation of nuclear power facilities, availability of required areas, and infrastructure, operation, personnel and social relations into account. The Dukovany site represents effective and ecologically as well as socially optimal utilisation of available resources. Another potential location fulfilling these requirements is not available.

Survey of Variants under Consideration

The project is designed with one implementation variant consisting of construction of the new nuclear source at the Dukovany site. Selection of this variant is based on taking the following potential possibilities of the variant solution into account:

Variants of location within the Czech Republic:

The selection of the Dukovany site is based on taking availability of required areas and infrastructure and operation relations in the Czech Republic. The Dukovany site is one of the two existing sites in the Czech Republic equipped and certified for locating a nuclear power energy facility (i.e. Temelín and Dukovany sites). Using both these sites for new nuclear sources is considered in strategy documents (State Energy Policy of the Czech Republic Update 2015, National Action Plan for the Development of the Nuclear Energy in Czech Republic 2015). At the same time, maintenance of power generation continuity in the site (thereby also assurance of utilisation of the existing infrastructure and personnel relations) is taken into account with respect to the fact that the existing nuclear units of the Dukovany Nuclear Power Plant will gradually reach their useful life in a medium-term perspective. From these standpoints, location of the project at the Dukovany site represents an ecologically as well as socially optimal solution.

Variants of location within the Dukovany site:

Selection of location at the Dukovany site is based on planning data documents (Vysočina Region Territory Development Principles) taking spatial, urban, ecological, technical, and infrastructure possibilities of location of the new nuclear unit at the site into account. Geologic properties of the building site from the viewpoint of suitability of basement conditions are taken into account at the same time. From this standpoint, the location of the project at the Dukovany site is optimal.

Variants of capacity:

Selection of capacity (installed electric power) of the new nuclear unit is based on taking power of commercially available units with PWR type reactors and restrictions given by the site properties into account. The project capacity uses available sources effectively from this viewpoint and is consistent with conceptual documents (State Energy Policy of the Czech Republic Update 2015, National Action Plan for the Development of the Nuclear Energy in Czech Republic 2015).

Variants of technical solution:

Selection of the PWR-type, generation III+ reactor is based on taking the best commercially available solutions into account. The PWR-type reactors represent the worldwide most frequently used type of the nuclear power source (exclusively used in the Czech Republic) with a number of safety advantages and long-term operation experience (approx. 150 reactor years of operation in the Czech Republic). From this standpoint, the project represents the best available technical solution.

Reference variants (other methods of power generation and/or power saving):

Selection of power generation in the new nuclear power source is based on demand for this unit type, given by respective strategic documents of the Czech Republic (National Energy Policy Update 2015, National Action Plan for Nuclear Power Development in the Czech Republic 2015) and taking continuity of the nuclear power at the site into account. From this standpoint, the project represents a part of the fuel mix nuclear island. Other resources and tools of the energy policy (including savings) are not affected by this and are solved in respective connections.

Variants of follow-up systems (connection to infrastructure):

Selection of follow-up systems (infrastructure relations) of the new nuclear power source is based on the existing condition of the site where locations of the infrastructure resources and the existing networks are given. From this standpoint, the method of connection of the project to the infrastructure is predetermined.

Zero variant:

The zero variant represents the non-execution of the new nuclear power source at the Dukovany locality[2]. A selection of this variant would result in the non-utilisation of the Dukovany site and in the necessity of ensuring the required power at another site on the contrary. From this standpoint, this zero variant is therefore considered to be a reference variant with the result that its environmental impacts describe the existing condition of environment in the territory involved (or its development trends).

The project is based on the necessity of ensuring a reliable generation and supply of electrical energy in the Czech Republic.

Functions of all economy sectors and living conditions of inhabitants depend on the accessibility of electrical power. Possible deficiencies or faults in the power supply affect all society and may have fateful consequences. The public interest in the reliable power supply is generally acknowledged.

However, electrical energy is not a primary source of energy, it must be generated and transported to the place of final consumption. The project represents a production of electrical energy that:

- respects relevant international commitments of the Czech Republic,
- respects relevant the energy demand of the Czech Republic,
- respects and uses the available infrastructure efficiently.

[2] The zero variant is exclusively related to the project of the new nuclear power source. Therefore, it is assumed that operation of the other nuclear facilities at the EDU site (EDU1–4, ISNFS, SNFS, RWR) or outside the EDU site (e.g. in the ETE site) will continue.

The project is one component of multi-source energy mix and other tools of energy policy (including savings) in this context. It makes up thus one of sub-elements of the electricity system of the Czech Republic - not a direct exclusion alternative to other sources of electrical energy and tools of energy policy. Other sources and tools are and will be solved by their owners or operators in respective context.

Benefits for the society and an individual are considered in the project rationale, which takes into account procedures not using nuclear energy and ionising radiation at the same time.

The documentation indicates further:

- The justification for the need for the project in relation to international commitments of the Czech Republic
- The justification for the need for the project in relation to energy needs of the Czech Republic
- Multi-criterion analysis of power economics scenarios

Opinion of the expert report author:

No comments of the team of expert report authors to the mentioned chapter. Just a comment - the termination of gradual shut-down of the existing Dukovany NPP depends upon the real and approved lifetime in particular.

B.I.6. Description of technical and technological solution of the project including possible demolition works necessary for the project execution; the comparison with best available techniques, associated emission levels, and other parameters must be included in case of projects within the scope of Act on integrated prevention.

The documentation states the project Subject - indicated in B.I.2 of the Review already. Project Capacity (Scope)

This chapter describes further generally applicable data and requirements relating to the nuclear energy industry and nuclear power plants with PWR type reactors; requirements for nuclear safety; requirements for radiation protection; requirements for securing the nuclear facility and nuclear material; requirements for coping with radiation abnormal occurrence.

Specific data of the project - basic technical data of the new nuclear source are summarised in following points:

- power units with the PWR type, generation III+ reactor,
- net electrical capacity up to 2400 MW_e (up to two units, each with net electrical capacity up to 1200 MW_e or one unit with net electrical capacity up to 1750 MW_e),
- lifetime 60 years at least,
- existing commercially available project,
- project in accordance with the prescribed hierarchy of regulations and standards containing legal regulations of the Czech Republic as well as international safety requirements and modified for conditions of the site.

The documentation states further:

- Principles of safe use of nuclear energy
- Assessment of safety throughout the NNS lifetime

- Method of securing nuclear safety at a site with nuclear facilities operated already
- Program of life cycle management and ageing control
- Suitability of site for the NNS location

Selection of areas for the NNS location

Layout solution of NNS is primarily determined by the location of nuclear island, turbine hall and cooling towers. Then, the arrangement of other objects is adapted to logic operating relationships and to remaining free area in the territory after locating the main objects of NNS (nuclear island, turbine hall, cooling towers). The elevations of entryways to the NNS premises are adjusted to public road, similar applies to elevation placing of the NNS parking-site. Concerning the elevation and layout, the NNS premises are situated with regard to the design of waste and rain water treatment and outflow from NNS so that it would be possible to drain away these waters gravitationally to the catchment area of Skryjský stream (except part of areas, from which rain water will be drained away to the catchment area of Olešná).

Four alternatives of locating individual components of electrical energy production on Area A are considered:

- 2 NVA units[3], one cooling tower per unit,
- 2 NVA units, two cooling towers per unit,
- 1 VVA unit[4], one cooling tower per unit,
- 1 VVA unit, two cooling towers per unit.

Data on reference projects are set out further:

The power plant with PWR-units of the generation III+ can be supplied by a number of world-renowned manufacturers. The following designs are considered to be reference designs:

- AP1000 design Westinghouse Electric Company LLC (USA),
- APR1000 design Korea Hydro&Nuclear Power (South Korea),
- ATMEA1 design AREVA NP/Mitsubishi Heavy Industries (France/Japan),
- EPR AREVA NP design (France),
- EU-APR design Korea Hydro&Nuclear Power (South Korea),
- HPR1000 design China General Nuclear Power Corporation (China),
- VVER-1200E design Rosatom (Russia).

The power plant supplier will be selected in the next stages of the design preparation. Selection of the supplier is not part of the environmental impact assessment. Environmental as well as safety requirements for all the reactor types are the same and their impacts are considered in their potential maximum (it means that parameters used for impact assessment conservatively cover the parameters of the facility of all the prospective suppliers). The NNS vendor may thus be another manufacturer, too, the project of whom meets envelope parameters used for assessment of impacts on environment.

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[3] NVA - lower power alternative (up to 1200 MW_e)

[4] VVA - higher power alternative (up to 1750 MW_e)

Data on individual reference projects based on data presented by their vendors are set out in the documentation.

Technological solution

Primary part

The primary part consists of the primary circuit, safety systems (including containment systems) and auxiliary systems of the primary circuit.

Secondary part

Steam from steam generators (live steam) is carried to the turbine set (the turbine and the generator) in the secondary circuit and is used for the generation of electrical energy. After passing the turbine, steam is cooled down in the condenser . Pumps of condensate system carry the steam condensate through the low pressure regeneration for the purpose of degasification to the feed-water tank and through the high pressure regeneration using feeding pumps back to the steam generator.

Providing a reliable supply of feeding water of appropriate quality, pressure, and flow for steam generators is the basic purpose of condensate and feeding systems. The regeneration system helps to increase the efficiency of conversion of thermal energy to electrical energy.

External cooling circuits

Non-essential service water system. Cooling of intermediate cooling circuit in the engine room or of consumers in the secondary part is the task of non-essential service water system. Heat is removed in the atmosphere generally through cooling towers of circulating cooling water system, however, it can removed also using independent cooling towers.

Circulating cooling water system. The circulating cooling water system serves for the heat removal from turbine condensers and other technological equipment of the secondary part that are not cooled with the help of intermediate cooling circuit of the engine room or non-essential service water system in the atmosphere using cooling towers. The system consists of pumps and wet cooling towers with natural draught of Iterson type. The system is continuously blown-down to maintain an appropriate chemical regime. The blowdown is carried to the wast water system. Dimensions of a cooling tower depend on the unit power and the number of cooling towers.

Chemical regime of external cooling circuits. Chemicals used in cooling circuits (including the system of essential cooling water) can be divided to biocides, algicides, hardness stabilizers, inhibitory corrosion inhibitors, dispersing agents, and chemicals used for pH adjusting. Their application depends heavily on the site and is subject to strict legislative requirements. Although chemicals are not dosed to external cooling circuits in EDU1-4 currently and the chemical regime is controlled by water exchange, their use cannot be excluded at the NNS.

External operations

External operations of the power plant ensure the necessary support and supply of media for primary and secondary parts of the power plant. Apart from systems listed below, they include normally also systems of storing and supplying chemicals, technical gases, compressed air, chilled water, oils, lubricants, and fuels.

Water supply system. The system of water supply ensures raw water supply to the power plant. The system is described in greater detail in the documentation in Chapter B.I.6.3.4.6. Water connections and systems.

Cooling water treatment and chemical water treatment. The system of cooling water treatment serves the treatment of raw water for purposes of open cooling systems and the chemical water treatment ensures the production of demineralised water for purposes of recharging primary and secondary circuits and other systems of the power plant (for example intermediated circuits, hot water pipeline and the like). It can generally be assumed that water pretreatment and treatment systems will be based on methods that are common at water treatment in energy industry currently, such as clarification, decarbonization, filtration, ultrafiltration and the like and further on using ionex technology, reverse osmosis or electro-deionization for the production of demineralised water. Although cooling water is not treated in EDU1-4 currently, its use cannot be excluded at the NNS. Arising sludge will be concentrated and disposed of in compliance with requirements for waste management inactive waste.

Potable water supply. The system of drinking water supply ensures drinking water supply to the power plant. The system is described in greater detail in the documentation in Chapter B.I.6.3.4.6. Water Connections and Systems.

The system of waste water, groundwater, and rain water management ensures draining rain and ground water and cleaning and draining waste water from the power plant. The system is described in greater detail in the documentation in Chapter B.I.6.3.4.6. Water Connections and Systems. Sludge resulting from water treatment (raw water, waste water) will be handled as a non-radioactive (conventional) waste. The system of handling this waste is described in the documentation in Chapter B.I.6.3.4.5. Conventional waste handling

Electric systems

The electric systems ensure power transmission to the network as well as operating, standby and emergency power supplies for internal consumption, including the systems essential from the standpoint of nuclear safety. The main task of the electric systems is to ensure the prescribed qualitative and quantitative parameters of power supply that will enable the correct function for the technological systems being power supplied, and in case of the systems essential from the standpoint of nuclear safety, they will also enable reliable performance of all the prescribed safety functions.

The operator of the transmission system, ČEPS, a.s. Company, is responsible for ensuring a reliable transmission system operation pursuant to the Energy Act. The operator of the transmission system ensures further system services, such as e.g. maintaining the electricity quality, maintaining the power balance in real-time and the like. If an unbalance between the electricity production and the consumption occurs, the electricity frequency in the transmission system deviates. The NNS can help to solve this condition by providing support services so that parameters return to rated values. Basic support services include the primary and secondary control of frequency. The primary control serves for instantaneous compensation of unbalance between the electricity production and consumption by reason of failure of source or consumption. These are collective support services for the entire synchronously interconnected area, which is almost the whole continental Europe in case of the Czech Republic.

Instrumentation and control systems

The main task of Instrumentation and control systems (I&C) is to ensure maintaining specified operation parameters of technologies in accordance with project criteria and limiting conditions of safe operation of nuclear power plant, automatic starting safety systems in case of their exceeding, and providing other necessary supports at controlling emergency conditions.

The project will be provided with I&C system to such extent so as to enable the monitoring, measurement, recording, and control of the operating parameters essential for assurance of nuclear safety under normal and abnormal operations and under emergency conditions.

A high degree of automation will be applied in the I&C to minimise the human factor error and to limit its possible consequences, they will be based both on computer means and on means using other principles, and they will use state-of-the-art, however proven, technologies.

Control and operator workstations

The power plant will be monitored and controlled by the attendance (operators) from the main control room under all the conditions. The operators will have sufficient resources for control both in the main control room as well as at the back-up workplace according to the design aspects for coping with normal and abnormal operation and under emergency conditions.

The main control room will be designed so as to make possible safe access and stay of main control room staff in all project states of the nuclear facilities (NNS as well as other nuclear facilities at the site) including conditions of severe accidents of any nuclear facilities at the site.

The power plant will be equipped with a back-up workplace (emergency control room) for situations when the control from the main control room is not possible (it is uninhabitable e.g. by reason of fire). The back-up workplace of the main control room will be separated sufficiently from the main control room with viewpoint of physical, lay-out, fire protection, functional, and electrical solutions and will be designed so as facilitate a safe access and stay of the main control room staff in situations, for which the back-up workplace is intended by the design.

Fire protection system

The main task of the fire protection is to ensure the protection of health and life of individuals, the property and the environment against fires and their consequences. It is required in cases of nuclear facilities that the project proposal of the fire protection ensures that it will not be made impossible to fulfil basic safety functions due to the emergence of fire, explosion or fire with a subsequent explosion on the nuclear facility.

The fire protection of NNS will be ensured through applying the defence in depth approach. The fire retarding approach will be applied wherever possible. In cases when conflicting requirements of nuclear and fire safety occur and it is not possible to apply the fire retarding approach, the fire affecting approach will be applied.

Civil engineering solution

Concept of Power Plant Civil Engineering Design

The power plant civil engineering is on principle divided into the following parts:

- civil engineering objects of the primary part (nuclear island),
- civil engineering objects of the secondary part and of the external cooling circuits (conventional island or turbine island),
- civil engineering objects of external facilities and other objects.

Operational solution

Nuclear Fuel and Spent Nuclear Fuel Handling

The fresh nuclear fuel is transported to the power plant directly either by rail or by road in transport casks. The fresh nuclear fuel is stored in the power plant in dry fresh fuel containers in the fresh fuel storage. Before transferring fuel in the reactor core, the relevant part of fresh fuel is positioned to storage positions under the water level in the reserved part of spent nuclear fuel pool. The fresh fuel storage is designed to protect the stored fuel against external events, such as earthquake, flood, extreme climatic events etc. Equipment needed for handling and equipment for fuel control a for its safe storing are part of fresh fuel storage. Fresh fuel is stored in the power plant in the amount that respects the need of nearest planned refuelling in the reactor, possibly with a needed reserve.

Since fissile properties of nuclear fuel change during the reactor operation, it is necessary to replace used fuel assemblies with fresh ones after several years of operation. Replacement of used fuel assemblies in the reactor is usually performed in cycles during shut-downs (every 12, 18, or 24 months). A part of fuel only is replaced at the refuelling (while the location of part of fuel assemblies in the reactor core changes), complete fuel is replaced thus over a number of years (in 4 to 6 years typically).

After having been removed from the reactor, spent nuclear fuel is moved to the spent nuclear fuel storage pool. It is located either next to the reactor in the reactor hall or in the auxiliary building of fuel storage that is connected with the reactor hall by means of a transport corridor. The size of the storage pool meets the requirements of storing spent fuel produced in the course of 10 let years of reactor operation at least and provides throughout the period also an additional free space for storing all fuel from the reactor core, if it were necessary to empty it completely and possibly further free storage capacity. Fuel is stored in the pool under a layer of water with boric acid content and in a compact grid that contains integrated material for neutron absorption (steel with boron admixture mostly). This arrangement ensures permanent subcriticality, screening, and removal of heat arising from the decay of radionuclides contained in the spent nuclear fuel by a good margin. Radionuclide composition of spent nuclear fuel depends on the initial amount of fission material and on the amount of energy extracted from the fuel in the period of stay in the reactor core that is called “burn out” generally. After having been removed from the reactor, spent fuel contains approximately 95.5% uranium, 3.1% stable fissile products, 0.9% plutonium, 0.2% medium-term fissile products (Cs and Sr), 0.1% long-term fissile products (Tc and I-129 isotopes mainly), 0.1% other long-term fissile products, and 0.1% minority actinides.

After having been removed from the storage pool, spent fuel from the NNS will be stored in the new spent nuclear fuel storage. The spent nuclear fuel storage will be a new nuclear facility that will be built at the NNS site or at the site of the existing EDU1-4 or on other selected location.

The spent fuel will be stored there until a deep depository is available, the commissioning of which is prepared for year 2065 according to the current Strategy for dealing with radioactive waste and spent nuclear fuel (2002). This strategy does not exclude its using as a secondary raw material for further energy use either. The draft of update of government Strategy for handling radioactive waste and spent nuclear fuel (2014) is based on same assumptions.

The spent fuel storage will be a separate new nuclear facility, for which a separate EIA process as well as a separate licensing process according to the Atomic Act will be carried out. Therefore, the spent fuel storage neither is, nor can be, the subject of document assessment. The need of a new storage does not arise immediately with the NNS commissioning. This need will arise only after the operation of 10 years at the earliest, unless otherwise specified by legal regulations effective at that time. It is therefore expected at the preparation of the new NNS that the best storing technology available at the time will be used for the spent fuel storage. Storing the spent fuel in casks during the transport and storing the technology currently. This technology is used in spent fuel storages (spent nuclear fuel storage, interim spent nuclear fuel storage) at EDU1-4 site.

Radioactive Waste Handling

Owing to the planned increase of waste production as a consequence of putting nuclear power plant Dukovany units operated already out of operation after 2045, it is to be expected that the present capacity of radioactive waste repository Dukovany will not be sufficient throughout the operation of new nuclear sources (three new units in total at the territory of the Czech Republic are foreseen by 2045) and that it will be necessary to extend the storage capacities for the radioactive waste around 2050. It should be emphasised again that balances of radioactive waste production have been established conservatively and that at maintaining the reduced level of radioactive waste for storing from operated nuclear power plants achieved in recent years and the production from the NNS at the level of 50 m^3/1000 MW_e/year at the maximum power alternative, the capacity of radioactive waste repository Dukovany should be sufficient for the entire radioactive waste from the operation and putting EDU1-4 an ETE1-2 out of operation as well as for the radioactive waste from the operation of NNS and another NNS source (e.g at the Temelín site). However, it will not be sufficient for storing the radioactive waste from putting 3 NNS units out of operation.

Lacking capacities for storing the radioactive waste from the NNS will have to be ensured after considering and evaluating several variants, for example:

- extending the radioactive waste repository Dukovany,
- building the repository at another site or
- storing in the complex of the deep repository.

Balances of radioactive waste and spent nuclear fuel production from the new nuclear source at the Dukovany site are listed in the documentation, Chapter B.III.4. Other emissions and residues.

Ensuring the radiation protection and radiation situation monitoring

It will be required in relation to the NNS that an efficient system of radiation protection is ensured not only on nuclear source premises but also in its surroundings. Besides the fundamental principles, criteria, and requirements for radiation protection referred to above, it is required that the NNS project meets following according to SONS decree

No. 422/2016 Coll., on radiation protection and IAEA GSR standards Part 3 (2014) and SSR 2/1 rev.1 (2016) for the nuclear facility project:

- Identifying potential sources of irradiation in the NNS at all operational states (powered operation, outage, refuelling, radioactive waste handling) and emergencies and anticipated exposures and radiation risks associated with them.
- Permanent control of fuel cladding tightness and limiting the activity of primary coolant and formation of corrosion and activation products in the coolant of the primary circuit should be ensured by means of material design, purification plants design and chemical regime. Using construction materials with the minimum probability of their activation by irradiation or contamination by radioactive substances at the production of structures, systems, and components.
- Applying design and organisational measures to prevent release or dissipation of radioactive substances and contamination on the power plant premises.
- Applying efficient technical solutions minimising the activity of discharges and their composition from the viewpoint of impacts on the environment and public irradiation in designs of purification stations of liquid and gaseous waste.
- Proposing such layout of equipment that the access of staff to places with an increased radiation risk and places with potential contamination of persons was controlled and the exposure or contamination of staff was excluded or reduced efficiently.
- Dividing spaces of the power plant to zones according to the radiation risk in accordance with specifying requirements of the national legislation.
- Applying measures to exclude unauthorised and uncontrolled movement of persons and material through individual zones.
- Applying design measures for screening and air-conditioning systems so that doses of the staff were minimised at the normal operation and cleaning of the equipment as well as at abnormal occurrences.
- Proposing design of equipment maintenance, handling fuel, radioactive substances, and waste so that doses of the staff were minimised.
- Ensuring that the radiation exposure of staff was minimised in spaces with frequent maintenance or manual handling.
- Ensuring sufficient means for the decontamination of persons and equipment.

Relation to External Electric Power Systems

The NNS will be connected to the transmission system through transformer station Slavětice. Electric power of the NNS will be transmitted via the 400 kV overhead line to the Slavětice Transformer Station. The standby power supply of the NNS internal consumption will also be secured by two 110 kV underground lines from the Slavětice Transformer Station. Crossing of overhead 110 kV lines with other lines will be minimized in this way. It is a standard design with sufficient reliability and repairability both for the power outlet and the stand-by power supply. Generally, the connection of the NNS with transformer station Slavětice will be established in this way using technical solution resistant against failures from common cause, i.e. diversion technical solution.

Personnel provisions:

Approximately 800 persons (one unit) or 1,200 persons (two units) are assumed for operation and maintenance of the new nuclear power source (NNS) under routine operation.

Data concerning closure and decommissioning.

The concept of termination or decommissioning shall be dealt with and made more accurate in the course of the entire process of preparation, execution, commissioning, and operation of the NNS, i.e. in documentations to be submitted for the issuance of respective licences.

The “Conception Draft of Safe Operation Terminating” will be included in the documentation submitted to SONS pursuant to the Atomic Act as a part of documentation for the permitted activity, i.e. placing of the nuclear equipment. In the following stages of the project preparation, the “Conception of Safe Termination of Operating the Permitted Equipment Including the Method of Handling with the Produced Radioactive Waste” will be elaborated as a part of the documentation for the permitted activity, i.e. construction of the nuclear equipment, (building permit), as well as the subsequent “Plan of De-commissioning” and “Estimate Costs for De-commissioning” verified by the Radioactive Waste Repository Authority as a part of the documentation for the permitted activity, i.e. operation of the nuclear equipment.

Specific Data of Other Facilities at the Site

This chapter of documentation describes specific data and requirements related to the other nuclear facilities at the Dukovany site.

Summary of Other Nuclear Facilities at the Site

The following nuclear facilities are situated at the Dukovany site:

- Dukovany Nuclear Power Plant (EDU1-4) - operating organisation ČEZ, a. s.,
- two spent nuclear fuel storages (operating organisation ČEZ, a. s.),
- radioactive waste repository - operating organisation Radioactive Waste Repository Authority (RWRA).

The location of these nuclear facilities is shown in following figure:

EDU 1-4	EDU1-4
MSVP	Interim spent nuclear fuel storage
SVP	Spent nuclear fuel storage
ÚRAO	Radioactive waste disposal

No other nuclear facilities (with the exception of the new nuclear power source being the project subject) are under preparation at the site.

For more detailed information on mentioned nuclear facilities, see the following text.

Schedule of Operation and Decommissioning of Nuclear Facilities at the Site

The schedule of construction, operation and decommissioning of individual nuclear facilities at the site is drawn up specifying the time flow of the new nuclear power source (NNS) concurrent impacts together with other facilities at the site. The schedule includes the following existing and prepared nuclear facilities:

- new nuclear source (NNS) with differentiation of the first unit and the second unit,
- existing nuclear power plant (EDU1-4),
- Interim spent nuclear fuel storage (ISNFS),
- spent nuclear fuel storage (SNFS),
- radioactive waste repository (RWR).

Time of operation concurrence of the NNS first unit (i.e. NNS5) with the EDU1-4 operation is conservatively assumed for max. 10 years[5]. The second unit of NNS (i.e. NNS6) will be put into full operation after termination of the EDU1-4 operation. It means that concurrence of operation of two NNS units with the operation of the EDU1-4 will not occur.

From the viewpoint of impact of the concurrence of the construction and operation of the NNS and the operation and decommissioning of the EDU1-4, following states were conservatively (envelope based) included in the assessment:

2025 - 2035: EDU1-4 in operation (up to 2 000 MW_e), construction of NNS Unit 1, construction of NNS Unit 2,

2035 - 2045: *lower power alternative of NNS (units up to 1200 MW_e power):* operation EDU1-4 (up to 2000 MW_e), operation NNS Unit 1 (up to 1200 MW_e), construction NNS Unit 2

higher power alternative of NNS (units up to 1750 MW_e): operation EDU2-4 (do 1500 MW_e), operation NNS Unit 1 (up to 1750 MW_e), decommissioning EDU1

2045 - 2105: *lower power alternative of NNS (units up to 1200 MW_e power):* operation two NNS units (up to 2400 MW_e), decommissioning EDU1-4

higher power alternative of NNS (unit up to 1750 MW_e power): operation one NNS unit (up to 1750 MW_e), decommissioning EDU1-4

[5] The actual EDU1-4 operation time cannot be deduced on the basis of this value. It is a conservative estimation for safe assessment of concurrent impacts on the environment.

It follows from the above that the envelope power of the concurrent units operation of maximum ten years corresponds to the operation of three EDU2-4 units (up to 1500 MW_e) and one NNS unit of higher power alternative (up to 1750 MW_e), i.e. a total of 3250 MW_e. This also covers the possibility of concurrent operation of four EDU1-4 units (up to 2000 MW_e) and one NNS unit of lower power alternative (below 1200 MW_e), i.e. a total of 3200 MW_e.

3250 MW_e power is laid down as a site limit from viewpoint of safe securing of cooling water supply and power transmission off site. The acceptability of this power and of its environmental effects for the period of 10 years of concurrent operation is evaluated from the viewpoint of impact on the environment and human health, similarly as the acceptability of long-term effects associated with power of up to 2400 MW_e of the NNS itself together with the contributing effect of decommissioning EDU1-4 and other nuclear facilities at the site.

The overlap of construction of NNS Unit 1 and Unit 2 (with the lapse of time of 1 year between starting constructions) is considered conservatively for purposes of evaluating environmental effects of construction in the assessment.

Opinion of the expert report author:

No essential comments of the team of expert report authors in relation to the mentioned chapter.

It is to be noted formally that the documentation states in the clause Nuclear fuel and handling with spent nuclear fuel that the “Update of the state strategy for handling radioactive waste and spent nuclear fuel (2014) is based on the same assumptions”.

The Strategy for dealing with radioactive waste and spent nuclear fuel was approved on November 29th, 2017 by a Resolution of the Government of the Czech Republic No. 852/2017.

No comments of author of expert report to the description of the project capacity and extent, with a notice that not all described in this Chapter is the subject of the concerned assessed project (NNS Dukovany). It concerns follow-up or relevant activities in some cases that will have to be assessed by a separate proceedings of assessment of impacts on environment and public health according to the legislation valid at that time in good time before implementation - it concerns e.g. relevant radioactive waste repository, interim spent nuclear fuel storage, permanent repository of spent fuel and radioactive waste, power outlet etc.

It is correct on the other hand that the documentation author stated this context.

The statement in the documentation - “No other nuclear facilities (with the exception of the new nuclear power source being the project subject) are under preparation in the site” is somewhat is misleading in this context. In fact, such facilities have not been prepared currently as yet, the implementation of interim spent fuel storage as well as of another radioactive waste repository possibly cannot be excluded in the future – such projects would have to be subject to separate proceedings of assessment of impacts on environment, too.

B.I.7. Estimated Project Commencement and Completion Dates

The documentation specifies the following construction milestones:

Estimated construction commencement date: 2025

Estimated commissioning date: 1st NNS unit: 2035

2nd NNS unit: after operation termination of EDU1-4

Estimated termination date: after 60 years from commissioning

Opinion of the expert report author:

No comments of the team of expert report authors.

B.I.8. List of Self-Administration Territorial Units Involved

Regions: Vysočina, South Moravia

Communities: in the territory of which the project is physically located:

Dukovany, Slavětice, Rouchovany,

other communities that could be affected by the announced emergency planning zone and communities using potable water from sources supplied by the Jihlava River that is the receiving stream of waste water from the NNS:

Lhánice, Mohelno, Kladeruby nad Oslavou, Kramolín, Dalešice, Hrotovice, Litovany, Přešovice, Horní Kounice, Rešice, Horní Dubňany, Biskoupky, Ivančice, Moravské Bránice

Opinion of the expert report author:

No comments of the team of expert report authors.

B.I.9. List of follow-up Decisions according to § 9a par. 3 and of administrative authorities that will issue these Decisions

The list of the most important follow-up Decisions is given in the documentation.

Opinion of the expert report author:

No comments to the considered chapter. The subsequent decision is not related to the Act on environmental impact assessment directly because it is related to respective branch acts so that their list cannot impact the environmental impact assessment in the scope of the assessed project in any way, for example meaning that a constituent part of the project must be a series of subsequent decisions.

B.II. Data of Inputs

B.II.1 Land

The documentation states that the agricultural land resources as well as land plots intended to fulfil function functions will be annexed due to the project execution.

The permanent annexation will consist in the annexation for placing power plant units in the area A (approximately 88 ha), annexation for overhead parts of electrical connection in the area C (approximately 1 ha) and annexation for the above ground parts of water system connection in the area D (approximately 12 ha) according to the documentation. Permanent annexation is not required for the area B (construction site installations). Agricultural land resources (ARL - approximately 97 ha) are dominant in the area of permanent annexation, while the land intended to fulfil forest function (LIFFF - approximately 2 ha) as well as other areas (approximately 2 ha) represent minor share.

It ensues from the documentation furthermore that the temporary annexation for the construction period consist in the annexation for construction site installations in the area A (approximately 18 ha), the annexation for construction site installations in the area B (approximately 109 ha) and the construction and handling zones in areas C and D (approximately 31 ha), whereas it is anticipated conservatively that the construction period will be always longer than one year.

Opinion of the expert report author:

No comments of the team of expert report authors from the viewpoint of demands on areas. Land plots are not defined where the construction will be executed in protective zones of forest – this situations will be specified more precisely within the consent to issue the decision on construction placing or using the area within 50 m from the forest boundary. Claims to areas in categories ALR as well as LIFFF could have been stated according to individual concerned plots. Essential pieces of information about area demands are evident from the documentation and, since the withdrawing from ALR or LIFFF will be governed by respective branch acts, no substantial comments are raised by the team of the expert report authors concerning the given chapter.

B.II.2 Water

The documentation states following expected water demands:

Raw water take-off: up to 73 000 000 m^3/year

The declared value represents maximum yearly raw water intake for two NNS units, each of up to 1200 MW_e power. The average (for thickening in the cooling circuit of 2.5) yearly raw water intake for two NNS units each of up to 1200 MW_e power will be up to 68 000 000 m^3/year. These figures correspond to the climatic scenario of +2 °C. Jihlava River will be the source of raw water. Raw water will mostly (98%) be used for refilling external cooling circuits of the power plant, the rest (up to 2%) for production of demineralised water, service purposes, fire-fighting, and other purposes.

The existing intake of water from Jihlava River for EDU1-4 is limited by the value of 63 000 000 m^3/year (the real intake values are up to 55 000 000 m^3/year), the total intake for the period of synchronous operation of NNS (one unit of up to 1200 MW_e power) and EDU1-4 or for the synchronous operation of NNS (one unit of up to 1750 MW_e power) and EDU2-4 will thus not exceed the value of 99 500 000 m^3/year.

Potable water intake: up to 140 000 m^3/year

The documentation states that the expected volume consists of the potable water intake for two NNS units, the intake for one unit will be up to 70 000 m^3/year (however, the real contracted quantity will be higher). The connection to the public water main will be the source of potable water. Potable water will be used for drinking and hygienic purposes, partly also for service purposes.

The existing permissible potable water take-off for EDU1-4 is 350 000 m^3/year (however, up to approx. 80 000 m^3/year of this amount is used), therefore total potable water take-off during the period of concurrence of NNS (one unit) and EDU 1-4 will not exceed approx. 150 000 m^3/year (contracted quantities will be higher, however).

Water supply systems

The water supply systems include a potable water system, fire-fighting water system, and raw water system.

The potable water system will provide water supply for sanitary facilities, i.e., for personal consumption of employees, including water supply for hygienic purposes and catering establishment. Potable water will also serve as service water, for example for cleaning works. Potable water supply will be performed independent of the existing branch for EDU1-4 by means of a new branch from the Slavětice - Moravský Krumlov water main.

The fire-fighting water system of the new nuclear power source (NNS) premises will be independent of the EDU1-4 existing system however it will be designed similarly. The cooling water system of each NNS unit or another source of large water volume (e.g. potable water reservoir) will be a source of fire fighting water. Water volume accumulated in this system (cooling tower basin, inlet, cooling water pumping station wells, warmed and cooled water mains) will provide sufficient water reserve for fire fighting. The system of supplying the NNS with fire fighting water will consist of a new pumping station (either free-standing or connected constructionally with the pump station of cooling water) equipped with refilling and a fire fighting pumps. Refilling pumps will maintain the pressure under normal operation, fire fighting pumps will increase the pressure and flow rate, if necessary in case of fire and fire extinguishing intervention. The outdoor fire network in NSS premises itself will be circuit connected to a greater extent, partly branched, equipped with outdoor hydrants. Internal object fire water distributions will be connected using connections from this network

The raw water supply system will serve to refill the losses in external cooling circuits of the power plant and for the demineralised water production of above all. Refilling the cooling water system and systems of essential service water and non-essential service water, that is to say covering losses caused by blow-downs and vaporization from these systems, constitute the dominant component of consumption (approx. 98%). The raw water supply system shall consist of the pumping station, delivery pipe mains, the water storage reservoir, and gravity pipe mains that shall be common for both NNS units. Jihlava River respectively Dalešice - Mohelno Waterworks will be the source of raw water (the intake will be carried out from Mohelno Water Reservoir), as it is for the existing EDU1-4. It is anticipated that raw water for construction purposes will be ensured from the existing public water main or from the Mohelno water reservoir possibly using the existing system of raw water supply for EDU1-4.

A new pump station of raw water including take-off object for supplying water to the NNS is envisaged that will be located on the right bank of Mohelno Water Reservoir

reservoir close to the existing pump station for EDU1-4. Raw water will be transported from this new pump station to the new storage water reservoir in new discharge pipe mains placed in a new corridor with a shortened route. The new water reservoir will be placed next to the existing water reservoir. New gravity mains will be executed for NNS needs from this new water storage reservoir in concurrence with existing gravity mains. The capacity of the system will cover all NNS needs. The total length of the new route makes approx. 2.6 km. Placing new discharge mains in concurrence with existing discharge mains in the extended corridor of existing discharge mains or the rehabilitation of the existing pump station for EDU1-4 are considered as alternative solutions. Raw water will be led in gravity flow from the new water storage reservoir to the NNS in new gravitation mains. If the rehabilitated pump station is used in the time of concurrent EDU1-4 and NNS operations, the existing water storage reservoir and the new water reservoir will be interconnected. The technology of the existing water reservoir will be rehabilitated partially.

Available cooling water supplies for the removal of residual heat from NNS reactors will be guaranteed for the time sufficient to provide for an alternative water supply under conditions of a full isolation of the NNS from the surrounding environment. The available cooling water supply will be available in safety systems tanks directly. Further water volume will be available in tanks and distribution pipelines of the raw water supply system, in the pools under cooling towers, eventually in other systems based on the design solution. Mohelno Water Reservoir directly or impounding reservoir at Skryjský Stream will be alternative sources of refilling cooling water, from where water can be transported to the NNS with help of stationary or mobile means (fire-fighting tanks, fire-fighting hoses, and mobile fire-fighting pumps). An interconnection to Slavětice - Moravský Krumlov water main used for supplying potable water will be another alternative sources of cooling water. The demand of water supplemented for cooling is dropping exponentially after the reactor shut-down.

Opinion of the expert report author:

The team of expert report authors states that the notifier has been asked to provide a detailed explanatory background documents concerning supplying nuclear facilities at the site Dukovany with service water that are substantiated in ***Annex No. 2.2.*** *of submitted expert report.*

B.II.3 Other natural resources (for example raw material resources)

The documentation states that no significant demands for inputs of other natural resources will be caused. The existing operated deposits will be used as sources of building raw materials in the construction, no demands to open new deposits intended solely for NNS will arise. The consumption of materials in course of construction for two NSS units will range in these levels: cement 300 000 tons, lime 3400 tons, sand 34 000 tons, gravel sand 1 180 000 tons, gravel and grids 154 000 tons, bricks 60 000 tons, gas-silicates 32 000 tons, precast concrete products 140 000 tons, building steel structures 40 000 tons, reinforcing steel 110 000 tons, pre-stressing steel 3000 tons, pavings 20 000 tons, reinforced blocks 15 000 tons, timber and lumber 3000 tons, plastic concrete 1000 tons. These values for one NNS unit will amount to approximately one half. There are no significant additional demands for operational, building or structural materials during the period of termination. The decommissioning will not cause demands for other natural resources.

Opinion of the expert report author:

It can be anticipated in the opinion of the team of expert report authors that demands for building raw materials will be significant, namely in relation to transporting raw materials on public roads above all. As commented in further parts of expert report, adequate recommendations have been formulated in the binding statement to these issues.

B.II.4 Energy resources

The documentation states following requirements:

Nuclear fuel: up to 46 t TK/year (except first charge)
The given value represents the nuclear fuel consumption of two NNS units, each of up to 1200 MW_e power, the nuclear fuel consumption of one NNS unit of up to 1750 MW_e power will be up to 32 t TK/year.

Electric energy: up to 170 MW_e
The specified value constitutes power input for the own consumption of two NNS units.

Operation substances: up to 3000 t/year
Chemicals are understood to be chemicals for the treatment of process water, lubricants, driving fuels, fuels, and technical gases. The need of chemicals will be at the level of tens (hundreds exceptionally) tons/year at most. The consumption of other oil substances consist in turbine oil, transformer oil, engine oil, oil, light fuel oil, and other oils and lubricants. The quantities will be at the level of tens of tons/year of respective substances. Technical gases needed for the NNS operation include hydrogen, carbon dioxide mainly and other technical gases (nitrogen, oxygen, acetylene, argon, and others).

Opinion of the expert report author:

No comments of the team of expert report authors.

B.II.5 Biodiversity

The documentation states that no demands on inputs of biodiversity will be caused. Impacts on biodiversity are assessed in Chapter D.I.7. Impacts on biodiversity, or in its sub-chapter D.I.7.5. Impacts on ecosystems No demands on inputs of biodiversity will be caused in the period of construction or decommissioning.

Opinion of the expert report author:

A more precise opinion is that elements and enclaves representing structural landscape elements with higher biologic diversity in the territory occur in areas A to D locally, too. No comments of the team of expert report authors in relation to the specified Chapter otherwise because the current outline of documentation requires the description of biologic diversity also in descriptive part of documentation – this description is specified under point C.II.7 in case of the evaluated documentation. The requirement to include demands on biodiversity into part B.I. Inputs resulted from the recent amendment of Act No. 100/2001 Coll. only

B.II.6 Demands on transport and other infrastructure

The documentation states in relation to the road transport that transport journeys of approx. 2400 vehicles a day, out of that approx. 260 transport journeys of heavy duty lorries are anticipated at the operation stage, if 2 NNS units are implemented. The documentation indicates that the transport will be carried out on road no. II/152 passing along the site, passenger traffic directions will be divided in the ratio of approx. 55% westwards (Slavětice) and 45% eastwards (Dukovany), directions of heavy duty vehicles traffic then in the ration of 65% and 35%. The target intensity of the existing transport at the EDU site is approx. 1 250 vehicles/day (of which 135 heavy duty vehicles). Traffic demands of EDU1-4 being shut down will be reduced at the time of 2 NNS units operation. The total traffic demands will be thus up to approx. 4 400 transport journeys of vehicles/day (out of that approx. 400 transport journeys of heavy

lorries). These traffic demands will not be exceeded even for the period of NNS operation (one unit) and EDU1-4 operation concurrence.

When constructing one unit, the total intensity of target construction traffic will be approximately 2600 travel journeys daily (out of that, approximately 500 travel journeys of heavy lorries) in the construction period. It will be possible to arrive at the building site using several alternative accesses, both the north access from the II/152 road and the south or east road from the III/15249 road.

The documentation states in relation to railway transport that it will be of little significance and that the level of the target railway transport intensity will amount to train units daily in the operation stage.

Target intensity of railway transport during the period of construction can be expected at the level of train units per day.

The possible connection to the railway network will be implemented by extending the existing siding that serves the existing power plant and is connected to the railway network in the Rakšice station.

The documentation states further that the transport of oversized or heavy components during the period of construction will be insignificant from the standpoint of intensity (units of pieces during the period of construction). However, this transportation will be significant with regard to space and weight demands and might require local measures, local modifications of the existing transport infrastructure or temporary limitations.

Opinion of the expert report author:

No comments of the team of expert report authors. Respective recommendations in relation to the estimated number of transport journeys on public roads are commented in another part of the submitted expert report.

B.III. Data of Outputs

B.III.1 Pollution of air, water, soil, and soil environment

The documentation states in relation to the said Chapter that they will be insignificant in terms of emissions into atmosphere because standby technological facilities (dieselgenerator stations, boiler plant), which will not be in continuous operation, will be the only sources of pollutants from operation of technological facilities. Emissions of pollutants (solid pollutants dominantly, SO_2, NO_x and CO) will be produced during the operation of back-up boiler plant and during regular tests of technological facilities, the time of which will be in the order of approx. tens of hours per year; they are listed in Table B.30 of the assessed documentation.

The automotive traffic will be another source of emissions that is categorised as a mobile source under the Clean Air Act. The transport is a source of emissions of pollutants both from the combustion of fuels and emissions from brakes and tyres abrasion or from re-suspension of dust particles on the surface of the carriage way. The amount pollutants emissions depend on the transport intensity in the respective period and on the development emission factors of motor vehicles mainly. For the evaluation of impacts, emission factors were established based on the expected development of vehicle fleet structure in future years, while the trend of rising number registered passenger and freight vehicles fulfilling emission standards EURO 4 – 6 was taken into consideration. The documentation states that the growth of pollutants emissions due to the transport intensity increase will be of little significance compared with the condition without the NNS execution and that a lower production of unit emissions than at present of most harmful pollutants is anticipated in connection with the drop of emission factors of motor vehicles in the period of the NNS operation.

An auxiliary boiler plant with heat output up to 20 MW_t will be also in operation in the period of NNS construction. According to the documentation, the mass flow of relevant harmful pollutants from this source will range at half level of the mass flow specified for the back-up boiler plant in table B.30 of the documentation. Other source of emissions in the period of NNS preparation and construction will be motor vehicle traffic caused by transport demands of construction staff and the transport of materials and raw materials for the construction. The growth of pollutant emissions due to the traffic intensity increase will be of little significance compared with the condition without the NNS execution and a lower production of unit emissions of NO_x, benzene, and CO than at present is anticipated in the period of NNS construction in relation to the decrease of emission factors of motor vehicles.

The documentation refers quite logically to Chapter B.III.2. in relation to water pollution pursuant to the current wording of Annex No. 4 of the Act. Waste water because it is beyond reason to comment the mentioned aspect identically in 2 places.

The documentation states in relation to soil and soil environment pollution that no other direct inputs are anticipated.

Opinion of the expert report author:

Without substantial comments of the team of expert report authors concerning the documentation conclusions for the construction and operation stage. It can be stated only that since transport intensities on addressed road sections as well as selected emission factors in tabular formats are specified in the dispersion study in Annex 5.3., emission balances for addressed road sections and for areal to transport related sources could have been mentioned for comparison. However, it is possible to agree

with the statement that when existing and target conditions are compared they do not differ essentially because of the development emission factors. Limiting emissions in the construction stage as well as well as minimizing risks in relation to pollution water and lands will be solved in detail by measures in the scope of elaborated principles of construction organisation. Adequate recommendations are formulated in the binding statement in this sense.

B.III.2 Waste Water

The documentation states that following volumes of arising waste water may be expected in relation to the reviewed project:

Process (technological) waste water.

It is expected in the volume up to 32 000 000 m^3/year.

The given value represents the nuclear fuel consumption of two NNS units, each of up to 1200 MW_e power, the nuclear fuel consumption of one NNS unit of up to 1200 MW_e power will be up to 16 000 000 m^3/year. Average annual amount of industrial (technological) waste water (for thickening of 2.5 in cooling circuit) for two NNS units, each of 1200 MW_e power will be up to 28 000 000 m^3/year. These data correspond to the climatic scenario of +2 °C. The recipient of technological waste water will be Jihlava River. The blowdown from the cooling water system or the blowdown from the service water system above all, further waste water from the water treatment and check tanks will make up the technological waste water. From the qualitative point of view, the composition of technological waste water will correspond to the composition of the technological waste water from the existing EDU1-4 approximately and will depend on the amount of pollution extracted together with raw water and thickening of pollution due to evaporation above all. The introduction of pollution to waste water due to the NNS operation (water treatment, modification of chemical regimes, etc.) will be minimal.

The existing discharging of industrial waste water from EDU1-4 is limited for technological, sewage, and rain water as a sum by value of 28 000 000 m^3/year (real discharging ranges in values up to 22 000 000 m^3/year). Total discharging of industrial waste water during the concurrence of the NNS operation (one unit up to MW_e) power and EDU1-4 or for the concurrence of the NNS (one unit up to 1750 MW_e) power and EDU2-4 will not exceed thus the value 44 000 000 m^3/year.

Waste water related to carried out construction activities (concrete production, rinsing, washing, and tests of technologies and the like) will arise at the unit construction. The expected amount of these waters will be in order of several thousand m^3/year at the most. Waste waters from the construction will be carried to waste water collection tanks. If their quality as well as quantity comply with the legislation in force, they will be discharged to the existing retention tank on Skryjský Stream and subsequently to Jihlava River, otherwise they will be eliminated in a different manner (e.g. transported for disposal). Discharge of technological waste water will be gradually decreased during the period of termination.

Sewage waste water

It is expected in the volume up to 75 000 m^3/year.

The given value represents the quantity of sewage waste water for two NNS units, the quantity for one unit will be up to 53 000 m^3/year pursuant to the documentation. The

Jihlava River will be the treated sewage waste water recipient. From the qualitative point of view, composition of sewage waste water will approximately correspond to composition of sewage waste water from the existing EDU1-4.

The existing discharge of sewage waste water from EDU1-4 does not exceed 120 000 m^3/year (this quantity includes also the part rain water carried through the waste water treatment plant), therefore, the total discharge of sewage waste water during the period of concurrence of the NNS (one unit) operation and the EDU 1-4 operation will not exceed the value of 173 000 m^3/year.

Quantity of sewage water in the course of construction will be of the order of several hundreds of thousands of m^3/year, the recipient of treated sewage water from construction will be Jihlava River (by means of Skryjský Stream). Discharge of sewage waste water will be gradually decreased during the period of termination.

Rain water

It is expected in the volume up to 184 000 m^3/year.

The given value represents rain water drainage from the premises of two NNS units in accordance, the quantity for one unit will be approx. one half. The recipient of rain water from NNS premises will be Jihlava River (by means of Skryjský Stream), a smaller amount (up to about 15% of discharge) will be carried to Olešná catch basin (by means of Lipňanský Stream). Flows of rain water to be drained will be limited by setting tanks and retention tanks or dry polders. From the qualitative point of view, there will be no change in the quality of rain water.

The existing draining of rain water from the EDU1-4 premises is up to 200 000 m^3/year, therefore, the total draining of rain water from the NNS (one unit) premises and the EDU 1-4 premises will not exceed the value of 292 000 m^3/year, from the NNNS (two units) premises and the EDU 1-4 premises will not exceed the value of 384 000 m^3/year.

The quantity and the recipient of rain water from the NNS premises in the course of construction will correspond to a phase of operation (network of sewers for the rain-water drainage will be built up at the beginning of construction). The discharge from construction site installations is up to 184 000 m^3/year (area A) or 239 000 m^3/year (area B). Recipients are the Jihlava River (by means of Skryjský Stream) or the Olešná Creek possibly (by means of Lipňanský and Heřmanický Steams), flows of rain water to be drained will be limited by setting tanks and retention tanks or dry polders. The quantity of rain water being drained will decrease during the period of termination depending on the progress of releasing the territory.

System of waste, ground, and rain water management

Industrial (technological) waste water

A brand new system of collection, treatment, and drainage of industrial waste waters will be executed for needs of the NNS that will be independent of the existing system of sewage waters drainage from EDU1-4. Similar types of industrial waste waters will arise at the NNS operation like from the operation of existing EDU1-4. The largest share in discharged waste water will be blowdowns from external cooling circuits. Aggressive waste waters from the operation will be discharged after previous neutralisation only. Equally, oily waste waters will be pre-treated before possible discharge in systems designated for this (unoilers and the like). Part of industrial waste

waters will make up active waste waters from check and collecting tanks that will pass the radiation control before they are discharged.

All industrial waste waters including active and treated sewage water will go through the waste water sump (placed in NSS premises) and further to the final receiving stream, Jihlava River (Mohelno water reservoir). Small-scale hydraulic power plants for utilisation of waste water energy may be mounted on the pipe mains.

Sewage waste water

The collection and treatment of sewage waste water z NNS will be entirely independent of the existing system for EDU1-4. The sewage network will be divided to sewerage draining sewage water from the radiation controlled area and from outside the radiation controlled area. Both sewerages will flow to the new waste water treatment plant (WWTP) that will be also divided to separate units from viewpoint of the construction and technology for treating waste water from the radiation controlled area and from outside the radiation controlled area. Treated sewage waters will comply with legislation requirements and will be brought to waste water sump. The WWTP capacity will be designed for the NNS operation with a sufficient margin for an outage when the usual number of staff is increased by the personnel of external contractors.

A new WWTP will be used for needs of construction, pre-treated sewage waters will be brought to the retention reservoir on Skryjský Stream and carried by its flow to the final receiving stream Mohelno water reservoir on Jihlava River.

Rain and ground Water

The system of collection, drainage, and possible treatment of rain and groundwater from the NNS will be entirely independent of the system of existing EDU1-4. The retention reservoir on Skryjský Stream that will be used also for NNS needs will be an exemption.

Rain water from a greater part of the NNS premises (main construction site) and the western part of the construction site installations will be directed northward to the existing storage reservoir on the Skryjský Stream (and further through the existing Skryjský Stream). Considering the gradient of territory, rain waters will be drained to other basins as well from the southern part of the main construction site (i.e. around the cooling tower area) and the western and the southern part of the construction site installations southward to the Lipňanský Stream, and from the south-eastern part of the construction site installations to the Heřmanický Stream to the Olešná catchment area. Retaining and directing the surface outflow from the NNS areas will be provided by adequately designed sewage system. Retaining settling (safety) tanks catching undissolved substances and other pollutants will be constructed as measures for assuring the rain and ground water quality prior to their discharge into the recipient so that their releasing into the environment is prevented. The eventually required retention will be ensured by retention reservoir or reservoirs or by establishing dry polders or by use of existing water management equipment. Local separators of oil substances will be installed at places with potential risk of polluting water by oil (parking sites, lay-by and filling areas, etc.), If groundwater draining (e.g. for the purpose of intentional decrease of groundwater level in vicinity of building objects by reason of their protection), this water will fall into the storm sewage system after the quality check and together with it lead to the final recipient.

Protection against the contamination of water from the NNS operation will be especially assured by tightness (impenetrability) of bottom parts building of and building objects. A plan of measures for the case of an accident ("emergency plan") will be elaborated for the operation; the involved objects and equipment will be visually inspected and their tightness checks will be conducted during the operation. If deficiencies are detected, the appropriate repair will be carried out. The monitoring of groundwater level will be extended and operated for NNS in connection with the existing monitoring for EDU1-4 that will also serve the purpose of early identification of eventual contamination and performing corrective actions.

Reducing radioactive substances in effluents from the NNS into water courses

The values of maximum expected tritium effluents into water courses will have to be reduced by design measures especially in case of extremely low flow rates in Jihlava River that is the recipient of the discharged waste water.

This need results from the low flow rate in Jihlava River that might not be able to assure sufficient thinning and from the fact that tritium atoms have almost identical chemical properties like the atoms of common hydrogen H-1 (protium) that is the natural basic part of each molecule. That is why tritium cannot be removed from waste water efficiently and effectively, contrary to absolute majority of other radionuclides.

The design measures for reducing tritium effluents will be based on physical principles of limiting the origination of tritium, limiting its concentration in the coolant of primary circuit (the biggest source of tritium in liquid effluent), on standard methods of treating the liquid radioactive waste and on measures in the manner of tritium discharging.

The pre-treated waste water of the primary circuit will be the biggest source of tritium in liquid effluents from NNS and to considerably lower extent also the pre-treated waste water from the spent nuclear fuel storage pool and further auxiliary systems containing the primary circuit coolant (waste water originates due to water exchange in the primary circuit and in the spent nuclear fuel storage pool, when part original coolant is replaced with de mineralized water and part of the original medium is led away through drainage systems, organized and non-organized releases etc. into storage tanks for pre-treatment).

Opinion of the expert report author:

Without substantial comments of the team of expert report authors concerning the specified balances of waste water origination. The impacts related to the mentioned production of waste water are commented with regard to both quality and quantity in further part of the submitted expert report.

B.III.3 Waste

The documentation shows that the production of municipal and other waste in the volume of approx. 2000 t/year and a production of hazardous waste in the volume of approx. 240 t/year at the operation of 2 NNS units is assumed.

At present, approx. 2 200 tons of waste per year are produced at the EDU site (of which approx. 180 tons of hazardous waste). Therefore, the total production of non-active waste during concurrence of the NNS (one unit) operation and the EDU1-4 operation will be up to approx. 3,200 t/year of communal and other waste and 300 t/year of hazardous waste.

The quantity of waste produced in the course of construction (of two units) will be up to 300 000 tons per construction period (of which approx. 2 000 tons of hazardous waste), the quantity for one unit will be approx. one half. Waste will mostly have the nature of building waste and communal waste.

Conventional Waste Handling

The operated Dukovany Nuclear Power Plant (EDU1-4) does not have its own facility for utilisation or disposal of waste. Waste is handed over to authorised persons who ensure recycling or disposal of waste under contract. The waste management of the NNS will be designed analogically (including analogical composition and comparable amount of the waste) and will be based on collecting, concentrating and continuous classification of the waste and its subsequent handing over to authorised persons (legal or physical persons authorized for entrepreneurial activities with waste).

Opinion of the expert report author:

Without substantial comments of the team of expert report authors concerning the waste in construction and operation stages. An informative summary of originating waste could be included in the mentioned chapter thanks to the fact that the structure of waste originated within NNS will be analogical to the existing production. The waste management will be governed by the valid legislation concerning waste management, regardless to the process of the environmental impact assessment.

B.III.4 Other emissions and residues

Noise

The documentation specifies decisive stationary sources of noise: cooling towers, transformers, reactor building, turbine hall and other operational objects. The documentation states that the specified values represent total envelope (maximum) of acoustic output values of decisive groups of noise sources of the NNS (two units of total net power output up to 2400 MW_e). The operation of these sources is continuous, i.e. the same for daytime as well as night time.

The transportation within the premises will be another noise source during the NNS operation. The personal transport will be natural distributed according to the existing or future parking sites The bus traffic will use the existing areas of mass transport stations and stops of public transport. The freight traffic entering the NSS premises will use the service roads of the premises.

The traffic on public roads will be another noise source. The documentation referrers to outputs of the acoustic study that is included in Annex 5.2. of the evaluated documentation.

The period of the NNS preparation and construction will be the significant period with regard to the acoustic effect of emissions. The operation of construction machinery on the construction site area sis anticipated in these phases mainly. The most significant impact can be expected in course of earthworks or excavation works, when considerable employment of machinery can be expected in the order of tenths of machines running at the same time (dosers, excavators, loaders, compacting machines, etc.).

Vibrations

The documentation states that the project will not be a source of significant vibrations

propagating to the environs. In particular, the turbine hall (the turbine) is a vibration source, however, the transmission of vibrations from the turbine to the turbine stool subbase is minimised by a suitable mounting and is limited thus to the nearest vicinity. Effects of vehicle movements driving on the public roads can be additional potential sources of vibrations. However, these are usual transport sources that are suppressed in the subbase already in the immediate vicinity of roads.

From the standpoint of vibrations in the course of the NNS preparation and construction, only usual construction machines and transport means are under consideration, impacts of which will be limited to their near vicinity.

Ionising radiation

The documentation states following balances:

Radioactive effluents into atmosphere:

The documentation states following balances from the viewpoint of radioactive effluents into atmosphere:

- noble gases (without Ar-41): up to 7,7E+14 Bq/year
- tritium: up to 1.1E+14 Bq/year
- C-14: up to 1.4E+12 Bq/year
- iodine: up to 3.8E+10 Bq/year
- aerosols: up to 2.1E+10 Bq/year
- Ar-41: up to 2.6E+12 Bq/year

The specified values represent envelope (maximum) annual activity of effluents into the atmosphere from NNS (two units of total net power output up to 2400 MW_e) for the individual groups of radionuclides during operational states, with conservatively anticipated transfer of whole liquid effluents into the atmosphere.

If the transfer of liquid effluents into the atmosphere does not occur the values of gaseous effluents will be as follows:

- noble gases: up to 5.2E+14 Bq/year
- tritium: up to 1,3E+13 Bq/year
- C-14: up to 1,3E+12 Bq/year
- iodine: up to 7.5E+09 Bq/year
- aerosols: up to 3.6E+09 Bq/year
- Ar-41: up to 2.6E+12 Bq/year

The values are based on data provided by suppliers of reference projects. It is possible to expect based on operational experience with reactors of PWR type realistically that actual effluents will be significantly lower than the values anticipated by the design.

Liquid radioactive effluents:

The documentation states following balances:

- tritium: up to 9.2E+13 Bq/year
- corrosion, activation, and fission products up to 4.9E+10 Bq/year
- C-14: up to 9.5E+10 Bq/year

According to the documentation, the specified values represent the envelope (maximum) of annual activity of liquid effluents from the NNS (two units of total net power output up to 2400 MW_e) during operational states for the individual groups of radionuclides, not considering the possible controlled transfer of part of tritium and C-14 effluents into the atmosphere (on of the possible technical solution of reducing liquid effluents of H-3). The discharged activities for one NNS unit will be lower. The values

are based on data provided by suppliers of reference projects. Based on operational experience with reactors of PWR type (see the envelope values of effluents from EDU1-4 into water courses specified hereinafter), it is possible to expect realistically that actual effluents will be significantly lower than the values anticipated by the design.

Complete radioisotope composition of collective envelopes of liquid effluents (from NNS and from operated EDU1-4) is specified in Chapter D.I.3.3. Impacts of ionising radiation.

Ionising radiation field:

The assessed documentation evaluates the electromagnetic (gamma) radiation or the neutron flow directly from the technological equipment (without the contribution of effluents) as insignificant.

It cannot be excluded according to the documentation that radiation sources (sealed sources) without a significant impact on the environs, which are part of defectoscopic apparatuses (e.g. for weld checking) will be used in the course of construction. There will be no additional sources of ionising radiation in the period of termination or decommissioning.

Radioactive waste

The documentation anticipates the volume of produced radioactive waste to amount up to 120 m^3/year.

According to the documentation, the specified value represents the envelope value of RW amount after the treatment (intended for depositing) for two NNS units, each of power up to 1200 MW_e, and corresponds to approximately 600 casks (barrels of 200 l volume) a year. The RW production will be up to 87.5 m^3 year for one unit of power output up to 1750 MW_e, which corresponds to approximately 438 casks a year. The value is based on unit generation of 50 m^3/1000 MW_e net power per year.

Spent nuclear fuel

The documentation assumes the quantity of produced spent nuclear fuel in the amount up to 46 t TK/year.

The quantity of produced spent nuclear fuel corresponds to the quantity of fresh fuel in a charge. The specified value represents the annual production of the spent nuclear fuel for two units of the NNS, each of power output up to 1200 MW_e. The production for one NNS unit with power up to 1750 MW_e will be up to 32 t TK/year.

Non-ionising Radiation

The documentation states that the project will not be a significant source of non-ionising radiation. Electric and magnetic fields in the environs of individual facilities (electric lines, transformers, generators, and others) will meet requirements of the Government Decree No. 2911/2015 Coll., on health protection against non-ionising radiation. The limit of the modified intensity of electric field E_{mod} = 0.2 V/m, valid for physical person in community environment, will be observed wherever in publicly accessible outdoor area.

Opinion of the expert report author:

Noise

Without substantial comments of the team of expert report authors concerning the data on noise sources from the construction as well as operation stages. Substantiation of

the corresponding conditions for the draft statement is apparent from further part of the submitted expert report, both for the construction stage, and for the operation stage. The matters of the low frequency component of noise are also commented in further part of the submitted expert report.

Vibrations

Without comments from of the team of expert report authors concerning the specified information on vibrations.

Ionising radiation

No comments of the team of expert report authors in relation to the information provided on ionising radiation. The values of effluents into the atmosphere and liquid effluents represent maxima for the selected envelope method of evaluation.

The matters of effluents of ionizing radiation from NNS are commented by the team of authors in further part of the expert report.

Radioactive waste

No comments of the team of expert report authors in relation to the specified capacities of produced radioactive waste.

The following recommendation of the team of the documentation authors included in Chapter D.IV.2.2. is not reflected by the team of the expert report authors in the binding statement draft, because it is already included in the submitted project:

- *The principles of minimizing the radioactive waste production will be applied in the technical and technological solution of the NNS.*

Spent nuclear fuel

No comments of the team of expert report authors in relation to the specified capacities of produced spent radioactive fuel.

Non-ionising radiation

No comments of the team of expert report authors.

B.III.5 Additional data

The documentation in the mentioned Chapter balances total volumes of masses that would be handled with within the construction:

- top soil removal: up to 450 000 m^3
- subsoil removal: up to 220 000 m^3
- excavation: up to 2 700 000 m^3
- embankment: up to 2 700 000 m^3

The project is balanced as regards the earthworks within the actual areas.

Opinion of the expert report author:

Without substantial comments of the team of expert report authors concerning the specified volumes of materials that would be handled with during the construction. The recommendations concerning limitation of emissions in the construction stage are commented in further part of the submitted expert report.

C. Data on the State of Environment in the affected Territory

C.I List of the most significant environmental characteristics of the territory involved

The listing of basic environmental characteristics of the areas for placing and construction of the project and the territory involved is described in the documentation in Table C.1. with reference to the following Chapter C.II.

Opinion of the expert report author:

Without comments of the expert report elaborating team; the mentioned environmental characteristics specified in Table C.1. are expanded furthermore in Chapter C.II.

C.II Characteristics of the current environment or landscape condition in the territory involved and description of its components or characteristics that might be affected by the project

C.II.1 Population and public health

In this Chapter, the documentation deals in relation to assessed project with the location of build-up areas of communities with regard to the distance of nearest residential community build-up area of the territory involved from the border of existing premises of EDU1-4 and from the area for the NNS placing and construction.

Demographic data are specified furthermore, namely in form of the number of inhabitants of the territory involved, population density, population structure, economic activity of the population, structure of business subjects. The movement of population in connection with places of employment and tourism is mentioned, too.

The following is substantiated in the documentation with regard to the health condition of the population: the summary investigation carried out, methodical data, investigation focus, monitored areas and characteristics and results of investigating the health condition.

The evaluated indicators, mortality, incidence of malignant tumours and signs of reproduction process disorder are mentioned with regard to health characteristics.

The documentation concludes in relation to mortality that no evidence was found of adverse impact of EDU1-4 of the mortality men or women, neither in indicators of total mortality, nor in indicators of mortality in productive age.

The documentation states in relation to malignant tumours that their occurrence was not even in the monitored territory; differences occurred between areas as well as between periods in individual areas. It is understandable as a consequence of randomness usual by limited count of assessed cases on the one hand, and as an evidence of different intensities of significant cancerous factors in life conditions on the other hand.

The occurrence analysis of selected infantile tumours of lymphatic system, in case of which the eventual impact of ionizing radiation would be most probable, may be considered as significant evidence of zero impact of EDU1-4 on the incidence of malignant tumours according to the documentation. The results substantiate that the incidence of these tumours is of the same order in the monitored territory as the

nationwide incidence and that no differences exists between the exposed and control areas.

The documentation concludes concerning the reproduction process disorder that the incidences of spontaneous abortions as well as of children with low birth weight are roughly at the level of nationwide incidences or somewhat lower in the monitored areas.

The psychological state of the population in relation to the operation safety of nuclear power plants is characterized further.

The documentation concludes with regard to the public opinion that majority of population of the Czech Republic supports further development of nuclear power supply. On the whole, the future construction of the new nuclear source enjoys prevailing support of the general public. The operated power plant EDU1-4 is regarded by the general public overall positively. The future replacement of the operated power plant EDU1-4, prepared sufficiently in advance, is preferred as the best solution. The issue of spent nuclear fuel is perceived as questionable aspect of the nuclear energy above all.

Opinion of the expert report author:

Without comments of the expert report elaborating team with regard to the description of population and public health. It is evident from the published background documents that an impact of the existing nuclear sources on the health of inhabitants of the nearest evaluated communities has not proven.

C.II.2 Air and climate

The documentation describes basic climatic characteristics in this Chapter, as well as immission background of the area of interest with regard to 5 year arithmetic averages of monitored harmful pollutants as published by the Czech Hydrometeorologic Institute (CHMI).

Opinion of the expert report author:

Without comments of the expert report elaborating team with regard to the description of this component of the environment. It may be noted that data for the period 2013 to 2017 are already available in the time of submitting this expert report and the currently presented values do not differ significantly from the data specified in the documentation.

C.II.3 Noise and other physical and biological characteristics

Noise

The documentation states that the project is situated in an area adjacent to the existing Dukovany Nuclear Power Plant (EDU1-4). No protected (in terms of noise) areas and constructions are situated in this area. The nearest protected areas are situated at the adjacent boundary of build-up area of the nearby communities and are defined in Figure C.13 of the documentation. The existing (background) values of the equivalent level of acoustic pressure from stationary sources in reference points are specified in Table C.26 of the documentation, whereas it ensues from the calculation results that the power plant impact has no significant acoustic effects in the nearest or most involved protected outdoor space of constructions and fulfils the hygienic limit ($L_{Aeq,T}$ =

50/40 dB day/night) reliably, even taking into account the concurrent effect of the switching station Slavětice.

Reference points situated near most involved objects along the selected sections of potential significantly involved roads were chosen for the description of noise situation caused by thoroughfare of motor vehicle traffic in individual communities. Defining these sections was based on data of traffic intensities related to the NNS. Involved sections are shown collectively at Figure C 14 of the documentation.

The existing (background) values of the equivalent level of acoustic pressure from traffic on public roads in the nearest communities are summarized in Table C 27 of the documentation.

It ensues from the documentation, however, that a limit exceeding effect is evident in residential build-up areas of most involved objects in some communities even taking into account the institute of old noise loads, namely in more distant communities with considerable traffic intensity existing in close proximity of protected objects.

Vibrations

No sources of significant vibrations are situated in the territory involved according to the documentation. Measuring of vibrations, both from the operation of power plant Dukovany, and from the traffic, was carried out in the territory involved in order to evaluate the situation. The measuring was performed at seven points in total.

The documentation from the measuring results substantiates that the situation in the territory involved is reliably in accordance with all applicable regulations or standards.

Ionising radiation

The documentation substantiates in relation to ionizing radiation that the natural irradiation is absolutely dominant (marked by shades of blue), followed by the irradiation from artificial sources (brown shades) where the medical irradiation dominates. Other contributions to population exposure to radiation (including effluents from the nuclear power plants) are minor.

The documentation states that from all the nuclear facilities in the EDU site, only the operated units of EDU1-4 release a limited quantity of radioactive substances to the ambient. The other nuclear facilities (ISNFS, SNFS, RWRA) do not release radioactive substances to the environment. Radioactive substances are hermetically sealed in these facilities and the dose rate is monitored in the intermediate vicinity of these facilities.

Results of assessment of EDU radiation effects on the environs and population are summarised in following chapters of documentation. The documentation shows that the State Office for Nuclear Safety has prescribed an authorised limit of 40 μSv/year for effluents into the atmosphere and 6 μSv/year for liquid effluents for EDU1-4 (all the units summarily). The EDU1-4 operating organisation evaluates observance of the limit every year and presents it in annual reports to the competent supervising authorities, which subsequently publish the results in their annual reports. All the effluents of radioactive substances from EDU1-4 from its commissioning up to now were deeply below prescribed limits.

Gaseous effluents are monitored by reason of checking the observance of stipulated limits and signalling escapes of radioactive substances into the environment.

The surveillance is executed by monitoring, measuring, evaluation and recording values and parameters characterizing effluents of radionuclides into the vicinity of EDU1-4. It includes continuous balance measuring of all radionuclides that might relevantly contribute to the irradiation of population, as well as uninterrupted measuring of representative radionuclides capable of signalling deviations from usual operation quickly.

Liquid effluents are monitored for the purpose of checking the observance of stipulated limits and signalling escapes of radioactive substances. If the permissible activity of liquid effluents from selected check tanks is exceeded, the system ensures interrupting their discharge.

The effluents activities of radioactive substances from EDU1-4 into water courses are monitored in the origination place of the discharged waste water i.e. in check tanks in both buildings of active auxiliary operations, as well as in both operational buildings and then in the place of the water discharging into the water course, i.e. in the waste channel.

Liquid effluents are monitored for the purpose of checking the observance of stipulated limits and signalling escapes of radioactive substances. If the permissible activity of liquid effluents from selected check tanks is exceeded, the system ensures interrupting their discharge.

The effluents activities of radioactive substances from EDU1-4 into water courses are monitored in the origination place of the discharged waste water i.e. in check tanks in both buildings of active auxiliary operations, as well as in both operational buildings and then in the place of the water discharging into the water course, i.e. in the waste channel.

The results of monitoring the radiation situation in the ambient of EDU1-4 are described further. Monitoring the ambient of EDU1-4 is ensured based on the monitoring program of the EDU1-4 surrounding. The monitoring program is a document approved by SONS. The monitoring of surrounding is carried out by the operator of EDU1-4, i.e. by the company ČEZ, a. s., through the Laboratory of Ambient Radiation Inspection (LARI).

The documentation also describes monitoring provided at the level of the state through the nationwide Radiation Monitoring Network (RMN). The State Office for Nuclear Safety (SONS) is authorized to control the RMS activities.

Non-ionising radiation

The matters of non-ionizing radiation concern the vicinity of electrical devices that produce electromagnetic field by their operation (lines electric power lines, switching stations, transformers and the like). These devices are standardly designed so that they comply with legal requirements for this type equipment, including requirements for values of electromagnetic field in their vicinity.

The zone affected by impacts of electromagnetic field is generally situated in the area between the power plant Dukovany and transformer station Slavětice.

The documentation concludes that the highest admissible value of modified intensity of electric field pursuant to Government Decree No. 291/2015 Coll., on protection of health against non-ionizing radiation, is fulfilled with margin anywhere in publicly accessible spaces of the territory involved.

Disturbing factors

Premises of the existing power plant EDU1-4 are provided with lighting. Aircraft warning lights of red colour, placed on vertical objects (cooling towers, ventilation stacks, but also tower observatory of CHMI beyond the premises EDU1-4) on the one hand, and lighting of roads and operational areas in the premises of EDU1-4 on the other hand, make part of the lighting.

The documentation concludes that light pollution manifests especially in foggy weather times when the light disperses in atmosphere and forms the typical gleam around the power plant. This phenomenon is present within the territory in the long term, for several decades, and might have annoying nature (if at all), but not endangering nature for the inhabitants of nearby communities. The impacts of this phenomenon on biota can be evaluated in the same way.

Opinion of the expert report author:

It can be stated by the team of expert report authors in relation to the descriptive Chapter "Noise and Further Physical and Biologic Characteristics" that no comments are raised with regard to description of vibrations, non-ionizing radiation, and disturbing factors.

It can be stated in relation to mentioned information concerning the description of acoustic situation in the area of interest that the requirement concerning existence of the tone component, as ensued from requirements within the impact assessment process, is incorporated into conditions of the binding statement draft and is commented in further part of the presented expert report.

The fact concerns the data of ionizing radiation monitoring at the nationwide level (to which SONS draws attention) that a system is described that does not comply with new legislation at all and that old terminology is used. However, this is not essential for the evaluation of NNS impacts on the environment.

C.II.4 Water

The documentation specifies the location of the area of interest from the regionally-hydrological point of view. The documentation states furthermore that the dominant part of the main construction site area (area A) will be drained through the Skryjský stream to the Jihlava River like the existing EDU1-4 premises. The exception is the south edge of the land plot for placing the NNS (area A) and the area for placing the construction site installations (area B), from which water is drained to local watercourses as a result of natural fall of terrain, i.e., the Lipňanský stream and Heřmanický stream, a recipient of which is the small Olešná River.

Water bodies of surface water are documented in Figure C.35. The documentation states further that the protected area is not part of natural water accumulation (CHOPAV). No protection zones of water sources intended for potable water supply of population are located in the territory involved. The areas for project placing and construction do not reach into inundated areas of the specified water courses.

Quantitative data, i.e. flow rates, for the monitoring point Jihlava - Dalešice downstream (that is decisive for the assessment water supply securing for the power plant) are based on the ascertained flow rate series for the period 1932 - 2015 (total 84 years = 1008 months). These flow rates correspond to the climatic scenario +0 °C (i.e. without

the climatic change). These flow rates are also corrected for the climatic scenario +2 °C for evaluation purposes so that the prospective period, decisive for the assessment of NNS impact, is covered, too.

In this way, a conservative background document is acquired for the evaluation of supply water securing and for assessment of impacts on quantitative as well as qualitative characteristics that is based on values realistically ascertained and corrected for the climatic change.

The documentation demonstrates that the impact of EDU1-4 operation on the water quality for large majority of assessed indicators is caused by pumping raw water from Mohelno Reservoir for cooling EDU1-4, by the evaporation of part of water in cooling towers of EDU1-4, and by the discharge of concentrated waste water back to Mohelno Reservoir. Resulting concentrations of indicators in waste water are substantially affected by concentrations of substances in raw water that are substantially influenced by pollution in the river basin upstream Dalešice Reservoir and their possible changes and transformations in Dalešice or Mohelno Reservoirs. In addition to this impact that is decisive for most indicators, the concentrations of some indicators in waste waters from EDU1-4 are also affected by using specific substances in EDU1-4 operation. These are namely the sulphuric acid, sodium hydroxide, iron(III) sulphate, ammonium hydroxide, hydrazine, calcium hydroxide and sodium sulphite. These substances increase slightly only the total content of dissolved salts (DIS), concentration of sulphates, water reaction (pH), and concentration of nitrogen above all.

The documentation states in relation to groundwater that the territory of the NNS site belongs to the hydro-geological region 6550 Crystallinicum in Jihlava River Basin according to the division to hydro-geological regions and the site reaches into the territories of hydrogeological regions 6560 Crystallinicum in Svratka River Basin - central, 6540 Crystallinicum in Dyje River Basin - west part, 6570 Crystallinicum of Brno Unit and eastwards then into the hydrological regions 5222 Boskovice Furrow and 2241 Dyje-Svratka Valley of very small area only.

There are no significant reserves of groundwater in the NNS site, since the involved hydrogeological regions are in territory with relatively small water content.

The documentation states that the groundwater properties are regularly monitored in vicinity of the land plot for the NNS location. The documentation states that the groundwater properties are regularly monitored in vicinity of the land plot for the NNS placing. These samples are analysed and their chemical and biologic properties are evaluated subsequently.

The documentation states with regard to the evaluation of impacts on groundwater bodies that the share of EDU1-4 is insignificant to negligible according to analyses of the Water Management Research Institute and arises only as consequence of the pollutants thickening (due to the evaporation of part of the abstracted raw water) and due to the fact that waste water thickened in this way infilters groundwater sources along Jihlava River together with water of Jihlava River subsequently.

Opinion of the expert report author:

No substantial comments of the team of expert report authors with regard to description of this component of the environment. Within the expert report elaborating in relation to the received opinions, the team of expert report authors requested certain explanatory background documents concerning the matters of supplying nuclear

facilities in Dukovany site with technological water that are attached in ***Annex No.2.2.*** *of the presented expert report.*

It ensues from these background documents that the evaluation of the condition/potential of water bodies was carried in accordance valid methodologies. These methodologies were elaborated based on data from reference and other sites after 2010 that already included the currently ongoing climatic changes in the assessed territory. These methodologies were not used for prospective variants with the scenario of climate change +2 °C due to that fact that if further changes of water temperatures and outflow rates occur, it would also affect the reference sites by the change of initial conditions for the status evaluation condition and for setting the limit values for individual indicators and components of the status of water bodies. Thus, the initial methodical data are not available for evaluation of the future condition. Therefore, it is expected that, if such change is ascertained the methodical procedures would be modified for the planning needs pursuant to the Water Framework Directive (2000/60/ES) and the evaluation of the NNS project impact would be carried out newly according to the new methodologies and with respect to the changed target values of components of the condition/potential of water bodies and of individual evaluated indicators.

The performed water management balance calculations of achieving sufficiently secure take-off for the NNS or for partial concurrence of some units of the existing power plant and the NNS are based on basic assumption that the system of water reservoirs Dalešice-Mohelno, i.e. the system, from which water is abstracted also for the existing Dukovany power plant remains functional.

It is an absolutely standard water management practice to model future condition based on long-term observation of actual courses of flow rates, since only this makes possible to take into account long-term variability and dynamics of flow rate series of respective water course, the Jihlava River in our case. Therefore, the procedure selected in the EIA documentation or presented in annex No. 4 is absolutely correct from this perspective.

The binding statement draft contains adequate recommendations that are formulated in relation to minimizing the risks of affecting the surface and groundwater quality as well as the outflow situations at the site.

C.II.5 Land

The documentation shows that a soil cover of the territory involved mostly consists of brown earth on loess or loamy sedimentary deposits. These are good-quality, fertile soils with a good moisture regime.

The agricultural land quality is variable in the territory involved as regards the presence of individual protection classes; lands with protection classes I, II, and V are present more or less uniformly, lands with protection classes III and IV are present in minority. Approx. 19 various land ecological units of various qualities were found in the territory, main land units consist of approx. 12 land types. The actual area for the project location consists mostly of land with protection classes III, II and in a minority also I, i.e. lands categorised as land mostly with average to above-average production capability in the given region.

Opinion of the expert report author:

No comments of the team of expert report authors In relation to ALR. The documentation of EIA process level provides basic information on the character of the Estimated Pedology-Ecological Unit (EPEU) with regard to demands on lands in ALR category. Detailed annexation paper will be included in the documentation for building permit and its elaborating must be carried out in accordance with respective branch acts, even regardless the process of assessing the impacts on the environment.

It can be stated in relation to LIFFF that the annexation of approximately 2 ha of LIFFF category land plots for the location of raw water pumping station is mentioned in Chapters B.II.1. and D.I.5.1., however, the character of the annexed forest land plots is not specified in the description part of the documentation.

The annexation of LIFFF will be also governed by the respective branch act regardless the EIA process.

C.II.6 Natural sources

The documentation states that no protected deposit area is situated on the land plot for the NNS placing and in its vicinity. It ensues from surveys of the NNS land plot and its vicinity that no mining equipment, remains after terminated mining of raw materials or under-mined areas are situated there. Extraction of gas, oil, water or leachable minerals neither takes place nor took place on the land plot for the NNS placing or in its vicinity.

Opinion of the expert report author:

Without comments of the expert report elaborating team with regard to the description of this component of the environment.

C.II.7 Biodiversity

Protected areas

No large-area nor small-area specially protected areas according to the Act No. 114/1992 Coll., on Nature and Landscape Protection, as amended, i.e., national parks (NP), protected landscape areas (PLA), National Nature Preserves (NNP), Nature Preserves (NP), national natural monuments (NNM), and natural monuments (NM), are situated on nor interfere with areas for the project location and construction and the area of the existing power plant.

There are currently 48 small Special Protected Areas (SPA) declared in the whole area of interest (20 km range), which are specified in Table C.59 of the documentation.

NATURA 2000, natural parks

The documentation states then that the following sites are the nearest to the project:

- Site of Community Importance (SCI) Jihlava valley (CZ0614134) - at a distance approx. 1.2 km north-east of the project location area (however in the immediate contact with the area for the project water system connection),
- SCI Rokytná River (CZ0623819) - at a distance of approx. 4.5 km south of the project location area.

No natural parks are situated on nor interfere with areas for the project location and construction and the area of the existing power plant. Neither the areas for the project location and construction nor the existing power plant area interfere with any registered significant landscape elements (SLE).

Memorial Trees

A memorial tree Lípa (Linden) of Lipňany is situated in contact with the area D (the area for water system connection). Nor areas for the project location and construction nor the existing power plant area interfere with any memorial trees.

TSES

Actual areas for project placing and construction are in direct contact with 9 elements of Territorial System of Ecological Stability (TSES) that are specified more closely in Table C.63 of the documentation.

Flora

The documentation states that detailed surveys vegetation took place in the areas intended for the project placing and construction especially from June 2013 to July 2014; they were supplemented by survey on the more precisely specified areas of the electric power outlet and of the water management performed from May to July 2015 and in 2016. These surveys recorded the species composition of vegetation in close detail, that is why it is possible to rule out with high reliability that significant plant associations or their fragments eventually populations of specially protected or endangered plant species were overlooked in the area. The results of surveys of 2010, executed within elaboration of the feasibility study, and results of mapping the biotopes for Agency of Nature and Landscape Conservation of the Czech Republic were also used apart from these surveys carried out for the project purposefully.

The north part of the investigated area is situated in the vicinity of Mohelno Water Reservoir and consists mainly of large forest complexes on the slopes above the water reservoir. Natural habitats are abundantly present reaching high quality here and there. Forest ecosystems on the slopes above the Mohelno Water Reservoir are part of the SCI CZ0614134 - Jihlava Valley where extremely valuable phytocenoses are found and also specially protected areas linked to the serpentine geological substrate with the appearance of species and habitats unique in the Czech Republic. These parts are the most valuable in the entire area.

The most valuable habitat in the area are serpentine pine forests (L8.3), Subpannonian steppe grasses (T3.3) and rocky vegetation with blue fescue *(Festuca pallens)* (T3.1) according to the documentation. Thermophilic oakwoods (L6.5), in places acidophilic oakwoods (L7.1) and oak-hornbeam forests (L3.1) are also representative. There are no biotopes tied on serpentines, steppic grasslands or rock vegetation in areas intended for the project placing and construction.

In total, 616 species of higher vascular plants were registered in the entire investigated territory (they are listed in annex of the biological evaluation). These were essentially meadow, steppe and forest species, as well as species of field, wetland, and aquatic. These species are typical of mesophyticum and thermophyticum. Of this number, 23 species are specially protected, 97 species are included in the Red Data list of the Czech Republic and 3 species are also protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Fauna:

Malacology

The occurrence of 49 species molluscs was ascertained by the survey (45 species of gastropods, 4 species of bivalves; they are listed in the annex of the biological evaluation). Concerning water molluscs, the finding of Austrian bythinellla *Bythinella austriaca*, classified in the Red Data as a vulnerable species (VU), is the most important one. It was ascertained in Skryjský Stream between its outflow from the piped section and its issue to the reservoir downstream the WWTP.

Astacology

The surveys carried out in 2009-2010 in Skryjský Stream, Luha Stream, Lipňanský Stream, Heřmanický Stream and Olešná Stream did not prove occurrence of crawfish according to the documentation, that is why the targeted astacological surveys was not executed in further years (2013, 2014 and 2016) and the crawfish presence in the specified water courses was monitored within malacozoological, ichtyological and hydrobiological surveys.

Entomology

The entire investigated territory shows high biotope diversity according to the documentation, therefore, hundreds of insect species were found in it within entomology surveys, thereof 16 are included among specially protected species of the Czech Republic and 54 in the Red Data list of invertebrate animals of the Czech Republic. However, 11 specially protected species and 17 species of Red Data list were only registered at sites directly affected by the project placing or construction, namely on the area intended for the construction site installations, in the raw water feeder and in the spring area of Lipňanský Stream.

Hydrobiology

Within the hydrobiological survey in the NNS area of interest, biological components were monitored, which are commonly used for the monitoring of the ecological status of surface water, and appeared to be the most suitable for the given type of water. Macrozoobenthos and phytobenthos were monitored in small watercourses, phytoplankton in stagnant waters and macrophytes in the flow of the Jihlava River downstream of the Mohelno WR.

The results of hydrobiology survey proved significant impact of discharged warmed-up waste water on Skryjský Stream. During usual operation of EDU1-4 undisturbed by outages in years 2013 and 2014, its temperature did not drop under 17 °C even in the winter period and a temperature difference of 15,54 °C was detected compared to the reference site on Luha Stream during half year monitoring. Moreover, its hydrological regime is considerably unstable, determined by discharging water from the retention tank. These factors cause minimum occurrence of water invertebrates in the stream, both with regard to abundance, and with regard to species diversity, and on the contrary, the occurrence of two introduced thermophilic species of phytobentos, diaton Pleurosira laevis and red algae Compsopogon aeruginosum.

These factors cause minimum occurrence of water invertebrates in the stream, both with regard to abundance, and with regard to species diversity, and on the contrary, the occurrence of two introduced thermophilic species of phytobentos, diaton Pleurosira laevis and red algae Compsopogon aeruginosum. A thermophilic non-native diatom species *Pleurosira laevis* is an exception.

The survey of macrophyte in the water course of Jihlava River confirmed natural dynamics of the association in the monitored years, with gradual increase of the biomass of filamentous algae and decreasing occurrence of bryophytes.

Ichtyology

Survey of fish and cyclostomes was carried out in selected water courses that would be directly affected by the NNS construction and operation. It concerns Lipňanský Stream (recipient of rain water during the NNS construction and operation), Heřmanický Stream (recipient of rain water during the NNS construction only) and Olešná Stream downstream the confluence with Lipňanský Stream. The survey was supplemented in Skryjský stream in the summer of 2016.

Data of fish stock in Mohelno Water Reservoir and Jihlava River downstream the water reservoir down to the confluence with Rokytná were acquired from local fishing unions. However, their species composition is absolutely unnatural due to the management of the Dalešice-Mohelno water system, which changes water temperature conditions, and due to the fishing exploitation. The fish species ascertained in the monitored water courses occur commonly in the Czech Republic, with the exception of the carp koi found in the retention tank on Skryjský Stream, and with regard to nature conservation are practically insignificant. The composition of fish associations is affected by drying of water courses due to the activities of Eurasian beaver (its constructions impede the fish to pass upstream), but also by fish escape from water reservoirs into water courses or by purposeful stocking.

Herpetology

The survey ascertained 6 species of reptiles and 5 species of amphibians in the areas intended for project placing and construction – specified in Table C.66 of the documentation. All ascertained species are protected by law and included in the Red Data List of the Czech Republic. Neither the actual construction site, the construction site installations nor the area for power outlet represent a significant site with regard to occurrence of amphibians, since there are no places suitable for their reproduction here. The area intended for water management infrastructure is the most valuable site both for the amphibians, and the reptiles, especially the pools in the vicinity of Lipňanský Stream and the ruderalised meadow stands near the Mohelno Water Reservoir and in the valley Skryjský stream.

Ornithology

As many as 29 species of birds included in the Red Data list of the Czech Republic were observed in the areas intended for project placing and construction, thereof 13 species are specially protected according to the Czech legislation and 7 species are specified in Annex I of the Council Directive No. 79/409/EHS on the conservation of wild birds (they are listed in Table C. 67 of the documentation together with data, whether the species nest at the finding place (proven nesting) or whether it is a site suitable for its nesting (nesting probably or possibly) or absolutely unsuitable. Majority of the species was registered in the area intended for the water management infrastructure. The common kingfisher on Olešná Water Reservoir, Mohelno Water Reservoir and WWTP of EDU1-4 and the European honey buzzard in the forest at the south-west bank of the Mohelno Water Reservoir may be considered as the most significant observed species.

Mammalogy

In total 22 species of mammals were registered in vicinity of the Dukovany NPP in the course of mammaliology survey of the monitored area, thereof 7 species are included among endangered species according to the Red Data List and 6 species are specially protected species pursuant to Decree No. 395/1992 Coll. as amended (they are listed in table C.68 and the places of field observation are shown at Figure C.59.) The Eurasian beaver and the typical nest of the hazel dormouse were observed in the area for placing the water management infrastructure (area D), however, the occurrence of the red squirrel may be expected here, too. With regard to the finding of the bicolored shrew in proximity of the area for placing the construction site installations, it is very probable it also appears here already. The system of pools in the floodplain of Lipňanský Stream is the most abundant part of the investigated territory regarding the species occurrence. Biotopes in the vicinity of Dukovany NPP are not suitable for wintering of bats. It is possible to expect summer occurrence (flights, reproduction) of tree species in adjacent forests with regard to the presence of summer colonies in the existing buildings of EDU1-4.

Ecosystems

There are the following ecosystems in the territory involved: agricultural ecosystems, forest ecosystems, ecosystems of flowing water, ecosystems of standing water, ecosystems of marshland and ecosystems or areas strongly changed by man including ruderals.

Opinion of the expert report author:

The documentation is provided with relatively voluminous Annex No. 3.1 “New Nuclear Source at the Dukovany Site Biological Surveys and Evaluations” by very numerous team of experts on individual groups of organism, eventually on ecosystems or biological monitoring under the leadership of person authorized for biological evaluation. It ensues from the annex extent that the resulting document describing the status of biota and ecosystems, including biodiversity, is based on multi-years monitoring and field surveys of many years both in close proximity of the planned NNS and existing premises, and in relation to possible impacts, especially climatic or impacts by shielding of sites by buildings or by steam flume also in wider area. The detailed monitoring of approximately 40 km of Jihlava River represents also the background document among others for the nature assessment being prepared in parallel. The acquired results of survey and monitoring are documented by series of summarizing map background documents and by extensive photo documentation, from which it is possible to have real apprehension of the status of biota and ecosystems in the wider area.
Chapter 5.1 Floristics, Annex 3.1 of the documentation informs on the biodiversity status in areas A to D with specified biotope characteristics above all. The characteristics of wood species stands within forests as well as beyond forests are specified, including structure elements in areas A and B in this part.

The outputs of surveys of species significant with regard to nature conservation (specially protected species and species of red lists) are collectively summarized both for plants, and for investigated animal groups in all chapters of floristic as well as zoological (hydrobiological) survey. Table 53 contains summary of specially protected species of plants, in case of which the authors recommend exceptions from the protection conditions, Table 54 contains specially protected species with the same conditions, Tables 55 to 57 use the same principle for specially protected species of

reptiles and amphibians, for specially protected species birds and for specially protected species of mammals. The team of expert report authors rises no comments regarding the selected procedure, except only concerning the lesser butterfly-orchid, that is specified in the category of heavily endangered specially protected species in Table 53, although it is belongs to endangered species “only”, which is included in other parts of the text.

The describing part of the annex concerning the biota and the ecosystems is presented clearly considering the data amount and the extraction of crucial data to the respective chapter documentation of the documentation is correct.

C.II.8 Landscape

The landscape zone affected by the project is situated in the territory of 4 bio-geographical regions defining 4 landscape character areas (LCA).

- LCA 1.23 Jevišovice bio-geographical region
- LCA 1.24 Brno bio-geographical region
- LCA 1.50 Velké Meziříčí bio-geographical region
- LCA 4.1 Lechovice bio-geographical region

The landscape zone affected by the project is divided into eight places of landscape character (PLC):

- PLC-1 Surroundings of Třebíč – Velké Meziříčí
- PLC-2 Surroundings of Moravské Budějovice
- PLC-3 Surroundings of Želetava
- PLC-4 Surroundings of Křižanov – Velká Bíteš
- PLC-5 Surroundings of Moravský Krumlov - Ivančice
- PLC-6 Surroundings of Jevišovice
- PLC-7 Surroundings of Znojmo
- PLC-8 Surroundings of Čejkovice

Both the areas of landscape character and the involved landscape zones are described in the documentation.

Opinion of the expert report author:

The documentation is provided with an extensive study NNS - Summary Evaluation of Impacts on Landscape Character and Impacts of Shielding of the NNS Vicinity that makes Annex No. 3.3 of the reviewed documentation and gives comprehensive summary of the landscape condition of the wider territory dealt with.

Without comments of the expert report elaborating team with regard to the description of this component of the environment.

C.II.9 Tangible assets and cultural monuments

Tangible assets

The documentation states that there are no tangible assets (houses or other objects) of the third parties that would be in spatial conflict with the project in areas for the project location and construction. Certain transport and infrastructure networks in ownership or under administration of various legal entities are located here.

The meteorological station of CHMI, in operation since 1982, is situated on the area for electric power outlet from the NNS (area C).

Architectural and historical monuments

There are no national cultural monuments, objects of the world cultural heritage, archaeological monument reservations or other monument reservations in the area intended for the project placing and construction of the new nuclear source at the Dukovany site or in its nearest vicinity. No urban monument reservations, rural monument reservations, landscape monument zones, urban monument zones or rural monument zones are situated here. A cast iron cross with a sandstone foundation originally belonging to the former community Skryje is located next to the road II/152 crossroad and the tertiary road towards Rouchovany in area A (area for the nuclear units location, the main construction site). A chapel of the former community Lipňany is situated in area B (area for construction site installations) and also in its intersection with area D (area for water system connection) next to the tertiary road towards Rouchovany. A chapel in the former community Heřmanice is situated in a terrain depression southwards at the road III/15249 (outside the area B already but in its close vicinity). A cast-iron cross, with a stone foundation, originally belonging to the former community Skryje, is located on the way to the meteorological station in the area C (area for electric connection). A Monument to World War I victims from the community Skryje is situated on the way from road II/152 to the retention tank in area D (area for the water system connection). A chapel of the former community Skryje is situated approximately in the same area (already outside area D but in its close proximity).

Archaeological sites

No archaeological site is situated in premises of the existing power plant EDU1-4 and in the project location areas, according to the national archaeological database (ISAD, Information System of the National Heritage Institute).

Opinion of the expert report author:

Without comments of the expert report elaborating team with regard to the description of this component of the environment.

C.II.10 Transport and other infrastructure

The documentation states that all the roads at which the car transport related to the NNS operation or construction will take place have a sufficient capacity and are properly equipped for the anticipated traffic load. The surface quality of these roads is various, however, satisfactory in general. Traffic troubles are not frequent and consist in impaired throughput of certain crossings and in impaired technical condition of some bridge objects.

EDU1-4 have their own siding available, connected with Rakšice railway station. Here the trans-regional railway line No. 244 Střelice - Hrušovany nad Jevišovkou takes up

that ensures connection with the follow-up railway network. The total construction length of siding rails is approx. 25.6 km. Railway transport of the siding is irregular and very sparse.

The information on air and other (water and non-motorised) transport is also provided.

Opinion of the expert report author:

No comments of the team of expert report authors. Adequate recommendations for the binding statement are formulated in further part of the expert report concerning the motor vehicle traffic and the possibility to use railway transport.

C.II.11 Other characteristics of environment

In the mentioned chapter, the documentation describes geomorphological conditions, geological conditions, geological engineering conditions, seismicity, tectonics and geodynamic phenomena, old environmental loads and geological and palaeontological monuments in the area of interest.

Opinion of the expert report author:

No comments of the team of expert report authors.

C.III Total evaluation of environment status in the territory involved with regard to its bearable load and assumption of its probable development in case of non-execution of the project, provided it is possible to assess it based on the available information on environment and scientific pieces of knowledge

The documentation states that neither environment nor public health is impaired in the territory due to the operation of the existing power plant (EDU1-4) and further nuclear or nuclear facilities. All outputs are checked and fluctuate within required limits, stipulated by competent authorities, in the long term. Authorised limits of effective radiation doses in the radiation zone are reliably observed. The monitoring results document favourable condition of components of the environment. Therefore, the power plant and other equipment do not affect the environment quality of territory significantly, with the exception of the incontestable impact on the aesthetic quality of the territory, i.e. the impacts on the landscape and the landscape character, that are dominated by the power plant and its auxiliary objects in closer views due to their size. That is why the environmental state of the territory involved is not determined significantly by the operation and presence of EDU1-4 and other nuclear or non-nuclear facilities in the territory. Therefore, the expected development of the environmental state of the territory involved will be independent on the operation or terminated operation of EDU1-4 and further equipment to considerable extent.

It may be thus presumed based on available information about the environment condition and its development trends that the favourable environment condition would persist in the territory involved. This condition is sustainable in the long term. It may be thus presumed based on available information about the environment condition and its development trends that the favourable environment condition would persist in the territory involved.

Opinion of the expert report author:

No comments arise of the team of expert report authors concerning the point of the documentation dealing with requirements stipulated by law pursuant to Annex No. 4 of the Act No.100/2001 Coll. as amended. However, as the team of expert report authors stated already in Chapter II.1., the articulation of chapters in part C.I and C.II does not comply at all with the valid articulation pursuant to Annex No. 4 of the Act No.100/2001 Coll. as amended.

D. Complex Characteristics and Assessment of project Impacts on Public Health and the Environment

D.I. Characteristics and evaluation of the intensity and significance of expected direct, indirect, secondary, cumulative, cross-border, short-term, medium-term, long-term, permanent as well as temporary, positive as well as negative project impacts.

D.I.1 Impacts on population and public health

Radiation effects

It ensues from the results specified in the documentation that the values of dose optimisation limits stipulated atomic act will not be reached due to the NNS impact (in whatever power alternative) in concurrent effect with further nuclear facilities at the site. The documentation states further that the overall quality of the environment in the territory involved, related to its condition and development up to now (i.e. without the existence of the project), is favourable in all respects, an unacceptable load of the territory does not occur. If these limits are observed, the exposed population would be protected by socially acceptable manner.

The whole life risk of actual bodily harm from radioactive effluents from NNS and other nuclear facilities at the site is at the order level of 10^{-5} and lower within the critical group of inhabitants in case of all three assessed power alternatives even with a very conservatively envisaged scenario of life conditions of a representative person. This degree of risk is well acceptable from the standpoint of health. The most radiation loaded area is the NNS immediate environs and a bank strip of the Jihlava River from the Mohelno reservoir to the confluence of the Jihlava River with the Oslava River in Ivančice. It is possible to territory consider the risk to be acceptable in this territory in light of the extremely conservative calculation assumption (envisaging whole life consumption of potable water from a water source supplied exclusively from the Jihlava River).

Comparison with radiation background in the area in question showed that the NNS contribution to the lifetime risk of detriment is absolutely insignificant as compared with the other ionising radiation. These conclusions are substantiated also by the result of the elaborated evaluation of the health condition of inhabitants in the vicinity after 30 years of operation of EDU1-4 - Chapter C.II.1.3 of the documentation.

In spite of these conclusions, the optimization of radiation protection concerning effluents of radioactive substances from NNS will be carried out within future authorisation procedures that are required by Act No. 263/2016 Coll. by reason of reducing the risk of actual bodily harm.

The study of impacts on public health elaborated by a person authorized to evaluate impacts on public health summarizes the following conclusions concerning evaluation of radiation impacts:

- Even in case of the very conservative scenario of the representative person’s living conditions, the lifetime risk of detriment from effluents into the atmosphere for the representative person (earlier for the critical group of inhabitants) is in the order of 10^{-5} and lower for all three power alternatives of new sources under assessment. This degree of risk is well acceptable from the standpoint of health.

- The most radiation loaded area is the NNS immediate environs and a bank strip of the Jihlava River from the Mohelno reservoir to the confluence of the Jihlava River with the Oslava River in Ivančice; even there, it is still a lifetime risk in the order of units of cases in the population of 100 000 inhabitants, i.e. an acceptable risk
- The comparison with the radiation background in the area in question showed that the NNS contribution to the lifetime risk of detriment is absolutely insignificant as compared with the other ionising radiation.

Non-radiation effects

Air pollution

Solid substances of PM_{10} as well as $PM_{2.5}$ fractions, nitrogen dioxide, benzene, and benzo(and)pyrene are the decisive emitted harmful pollutants that may have potentially adverse impact on human health in connection with the project.

The project contribution to average annual concentrations of PM_{10} fluctuate including the background under the level of 60 % of the stipulated limit as show the results for solid substances. The specified level is above the basic target value of WHO slightly only. It is such nowadays already and persists without big changes during all evaluated time horizons and in all combinations. NNS has no significant effect on this level. The NNS contributions to average annual immission concentrations of $PM_{2,5}$ in the monitored residential territory represents up to 72 % of the limit cumulatively with the background. It is true, however, that this situation is present now already and it will continue to be present also in future under assessment and that the NNS does not effect it virtually.

The results for nitrogen dioxide make it obvious that the NNS contribution together with the existing background will not exceed the specified limit of 40 $\mu g/m^3$ in any of the reference points and any period. However, prospective concentrations together with background at the residential development are at the level of up to 30% of the prescribed limit. The evaluation of maximum hourly immission concentration is analogical; the contribution in conservative sum with the background will generate total immission concentration below 43% of the stipulated limit. We can state thus that the NNS contributions to the average annual concentrations as well as to the maximum hourly concentrations of nitrogen dioxide are insignificant in the exposed residential area from the standpoint of health at all the time horizons under assessment.

The sum of the benzene immission concentrations of local background and the contributions from the NNS will result in benzene load of local inhabitants at levels close to the 26% of the stipulated limit. So, they are well acceptable from the standpoint of health. NNS has no significant effect on this level.

Contributions of the project to average annual BaP immission concentrations together with the background are below the limit already at present (up to 72% of the prescribed limit), will continue being at this level also at all future time horizons under assessment and the project execution has no significant effect on this situation. The project is thus acceptable from the standpoint of health even in relation to BaP concentrations.

The insignificant change of immission situation results also from gradual modernization of the vehicle fleet park that would bring improved of emission characteristics of vehicles, and thus prospectively lower emissions of harmful pollutants from motor vehicles traffic. This favourable development emissions (and immissions

consequently) may be expected in the entire evaluated territory in spite of the gradual natural growth of the traffic intensity on public roads.

As far as the project effects on air pollution are concerned, it can be stated in general that concentrations of the pollutants under assessment together with the background continue being below the limit during the operation period; So, these loads are well acceptable from the standpoint of health. This applies also for updated traffic background documents based on the nationwide traffic count of 2016.

The study of impacts on public health summarizes following conclusions concerning the evaluation of the atmosphere pollution:

- Generally, it is possible to state with regard to the project impact on the atmosphere pollution that in case of majority of evaluated harmful pollutants, their concentration in atmosphere remains below the limit including the background in the time of construction as well as operation; the limit exceeding of the maximum short-time concentration of PM_{10} represents an exception in certain project construction phases; these loads can be accepted from the health viewpoint with regard to infrequency of their occurrence and expected effectiveness of proposed measures

Noise

The noise loads specified in Chapter D.I.3.1 of the documentation represent exposure input for evaluation of the noise health impacts and risks. Noise Impacts.

The noise from the operation of stationary sources is evaluated in the most involved protected outdoor spaces of the nearest residential build-up area constructions for various time periods. It concerns the existing condition (evaluating impacts of the noise sources from the premises of EDU1-4 including the switching station Slavětice and non-public roads within the premises), the prospective condition (operation of NNS including the extended switching station Slavětice and the vehicle traffic on non-public roads within the premises) and the temporary condition (concurrence of NNS + EDU1-4 with one new generation units with 2 cooling towers, including the extended switching station Slavětice). The noise contributions from the stationary sources are low in all the combinations under assessment and cannot influence the total level of local noise loads (by adding them to the background). They are therefore of no significance from the standpoint of health. The impact of the possible change of altitude placing of the towers or of the alternative arrangement of the cooling towers was also evaluated. It ensues from the calculations that these parameters are not significant and the differences in results are negligible.

The documentation assesses noise loads of exposed residential houses in the throughfare villages, in which an increase of traffic frequencies can be anticipated during the NNS construction period. The extent of the change caused by the project execution (the operation period after the completed NNS construction) is the subject of interest above all. It ensues from the calculations of noise levels during the NNS operation and without it that the participation of NNS would increase the local noise levels in the communities by several tenths of dB at maximum. Such low difference cannot be distinguished by senses, therefore the situation after the NNS commissioning would not differ significantly from the situation without the project execution with regard to health effect. Furthermore, it is the potentially worst anticipated situation when NNS traffic demands were assessed together with the ongoing EDU1-4 demands. They are going to decrease gradually in the following years, however, which will result in gradual elimination of the potential noise impacts.

The study of impacts on the public health summarizes the following conclusions with regard to evaluation of noise:

- the noise contributions from stationary sources are low in all evaluated combinations and cannot affect the total level of the local noise loads (by adding to the background); that is why they do not have health significance
- The noise from building activity producing contributions to local noise levels, is in the closest proximity of residential build-up area at the level of 50 dB or lower; if the local noise background is under the limit, which can be assumed, the specified contributions would be well acceptable with respect to health, all the more as the loads would be of temporary and short-time nature
- More serious situation can be identified in connection with traffic on public roads in exposed thoroughfare communities in the course of construction where relatively high noise load exists even without the NNS construction - this concerns mainly Ivančice with levels up to 73.2 dB, Moravské Bránice (up to 69,5 dB), Slavětice (up to 62.9 dB), Hrotovice (up to 67,8 dB) and Dolní Kounice (up to 67,3 dB); although the contributions of the NNS construction are relatively small in these communities, they shift the noise levels into the critical zone (risk of ischemic heart disease) - specially thorough protective measures (carriage way modification, increasing the driving fluency and reducing the driving speed etc.) should be implemented in these communities; the moderate contributions of the NNS construction will not change the occurrence of the given site in certain noise annoyance zone in other cases. Considering that temporary effects are concerned, this situation can be acceptable from the standpoint of health.

Vibrations

Vibration levels specified in Chapter D.I.3.2 of the documentation represent the exposure input for evaluating the health impacts and risks of vibrations. Vibration impacts.

It ensues from the specified data that vibration values both from the technology operation, and from the traffic, are under the existing condition deep below limits stipulated in health protection regulations. This condition will persist even after the NNS execution. That is why the vibration matters are not a limited factor with regard to health.

Electric and magnetic fields

The values specified in Chapter D.I.3.4 of the documentation represent exposure input for evaluation of the health impacts and risks of electric and magnetic field (i.e. non-ionizing radiation). Impacts of non-ionizing radiation.

The overhead and underground lines run through the open landscape, there are no residential buildings in their environs. The settlement Bažantnice (part of Slavětice) is the nearest residential area, in sufficient distance from overhead as well as underground line. Chronic impacts of electric or magnetic fields from the assessed lines are out of question here. Possible adverse effects, such as hissing sound of conductors, interference of radio and television signals or disturbance of peace of mind, will have no considerable effects either.

The study of impacts on public health with regard to evaluation of electric and magnetic field in the final evaluation states that the interests of public health will not be affected

with because of the great distance of residential houses from the assessed high voltage lines.

Psychological impacts

From the psychic point of view, the nuclear power plant proximity and accompanying potential risks of irradiation and possible accidents could create fear among the population in the immediate environs. However, according to the surveys performed it does not occur at all apparently or is of little significance at least. All statistically significant differences between the investigated sets of inhabitants (living both in territory involved, with the existence of nuclear power plant, and in similar check areas without existence of a nuclear power plant) are in favour of the set of inhabitants of the territory involved, i.e. the group of people living near to the power plant.

The conclusions of both studies confirm in unison that the existence of the nuclear power plant and its proximity do not disturb significant personality features nor psychological balance and peace of mind. Maintaining this favourable condition can be expected also in the period of NNS operation.

However, this relatively high level of psychic life of the population of the area involved however cannot be considered as given once and for all and constant. This undoubtedly depends on the trouble-free operation of power plants and safety of the nuclear power as a whole. If the EDU1-4 and the NNS operations are routine and stabilised without abnormal occurrences, the existence of EDU1-4 and the NNS will have no adverse effects on the psychological characteristics of the population in the area in question in future either.

Social and economic impacts

Impacts on the migration and demographic structure of population

Dramatic changes in number of inhabitants such as occurred in the area at the turn of 70th and 80th in connection with the construction of first four units of Dukovany NPP cannot be expected in connection with NNS project construction. Fluent follow up of development trends related to the existing EDU1-4 operation is probable in connection with the NNS construction and operation, since gradual transfer of the current employees to the new units is to be expected in case of the NNS construction as well as, of course, natural exchange of employees due to age. Total increase of the number of employees in the medium-term horizon will be rather inessential with regard to employment rate in the whole region of significant transport links to the power plant (the 14 communities in five kilometres surroundings of the power plant and the towns Třebíč, Moravský Krumlov, Moravské Budějovice, Jaroměřice nad Rokytnou, Náměšť nad Oslavou and Ivančice).

On the contrary, a serious setback of migration situation can be expected in case of terminated activity of EDU1-4 without follow up of the NNS construction and operation with regard to the periphery location of the territory. In communities that are currently able to acquire by migration the population of younger productive age, this trend would probably reverse gradually (as in other periphery areas, by analogy). It is possible to expect that especially part of current younger and more educated inhabitants, who would not find employment opportunities in the region would leave. The region will also cease to be attractive for incoming young people, especially those with university education. The de-population tendency would be accompanied by ageing of the local population.

Impacts on the social environment including employment rate

The existence of the operated EDU1-4 positively influences the work market and employment rate of the region positively. The importance of EDU1-4 was also enhanced thanks to the drop of work opportunities in local centres (e.g. in Třebíč) that was related to termination of activities of important employers during the transformation period. This strengthened the periphery nature of the territory on boundary of two regions (Vysočina Region and South Moravian Region) where the EDU1-4 is situated.

The nuclear power operation plant requires a high share of specialised activities, which is reflected by higher education level of the employees of the power plant and its sub-contractors. The existence of the power plant influences the economics of the region positively also thanks to relatively high buying power of the employees of the power plant and its sub-contractors. The balance of the number of employees is specified in the documentation.

Certain activation of the work market may be expected in future during the period of the NNS construction based on the data specified in the documentation. Approximately 1000 (in the period of construction commencement) up to approximately 5000 work places (in the fourth year of the NNS construction) will be generated in the territory temporarily then the number of employees would drop again to the level of approximately 1200 employees assuring the NNS operation, which corresponds to the existing manpower of the EDU1-4 operation, and of approximately 1000 employees of sub-contractors active at the NNS in outage periods mainly. This reality might result in temporary change of the employment structure with the tendency to enhance the secondary sector, especially the building industry. Although it cannot be expected that all this work places will be occupied by employees from the region, a positive impact on the regional employment (certain decrease of the regional unemployment rate) can be anticipated. The presence of employees, especially for the future NNS operation, would also generate other benefits for the territory, namely appearance of new educated and qualified employees in the region as well as maintaining the high buying power of inhabitants.

A stabilized regional work market can be expected roughly at the current level in the period of terminating the operation of existing units and starting the NNS activity with regards to the fact that part of the employees will ensure the termination of EDU1-4 operation and other employees will be gradually transferred to the NNS.

Terminating the operation of EDU1-4 without the NNS construction would mean gradual attenuation of the local work market according to the documentation. The impact of eventual termination of the EDU1-4 activity on the work market must be perceived in the context of social-economic development of the region that is affected by series of external factors. The work places would not be cut suddenly and some employees would evidently take jobs with other subjects. Certain number of work placed would be created in connection with the de-commissioning of the existing power plant and rehabilitation of the environment (approximately 800). It is possible to estimate based on analyses that roughly 800 work places would disappear gradually directly in the nuclear power plant and similar number at least at sub-contracting companies with seats near to the NPP Dukovany. The required social-professional structure of employees would certainly differ for this type of work from the structure of employees currently engaged in the activity of EDU1-4. In addition to this, creating new jobs for highly specialized employees would be very difficult in this periphery region.

Transport services

No important transport infrastructure constructions are currently linked with EDU1-4 operation and with the NNS construction and subsequent operation according to the documentation. The public road transport infrastructure of the territory is used. The railway siding of the power plant is the only purpose-built transport construction. The impact of NNS construction and operation on the development of the transport infrastructure would consist mainly in the form of repairs and modifications prior to the construction and after the construction.

The expected changes of traffic intensity on the road network due to the NNS operation or construction are little significant in total according to the documentation and the total absolute traffic load of roads is also not significant (more closely the documentation, Chapter D.I.10 Impacts on Transport and Other Infrastructure). The total traffic intensity would gradually drop in case of the zero status (without the NNS execution), however, with small total significance even in this case. This would result in lower traffic impacts (noise loads and the like), partly also in lower wear of carriage ways, the transport infrastructure of the territory involved might get to the periphery of interest on the other hand and the maintenance/repairs might proceed more slowly.

The existing power plant and its closest vicinity is serviced by several bus lines to Třebíč, to Dačice (or to Brno in opposite direction) and to Znojmo as public transport concerns. Lines of contractual bus transport for employees of EDU1-4 and for inhabitants of nearby communities service similar routes like the public transport buses, but they provide substantially more connections.

Public utilities and availability of services

The importance of the operated power plant EDU1-4 for providing the communities in the region with public transport and other services is limited and especially apparent in communities in the closest vicinity of the power plant according to the documentation. Future development of the availability of public services depends mainly on the population development of the region according to the investigation carried out. If the number of people immigrating into nearby communities grows in case of decision to construct the NNS, the demand for providing the communities with utilities like posts and medical facilities would remain at the current level or even further increase.

Maintaining the transport servicing and availability services in similar extent can be also expected , construction is in case of executing the NNS construction; increased number of connections and some services is probable with regard to higher number of people at the construction site. A reduction of accommodation services can be expected within the territory in case of non-execution of the NNS and de-commissioning of EDU1-4 in spite of ambiguity of the data concerning the number of active economic subjects operating in the vicinity of EDU1-4. On the contrary, the number of lodged people would apparently increase in near surroundings in course of the NNS construction; this would be of short time nature, however, mainly during the period of the NNS construction. It is probable that the termination of the EDU1-4 activity without prior NNS construction NNS would result in reduction of the public service utilities of the territory mainly in the area of public transport and health care.

Public administration

The documentation states that the existence of EDU1-4 has positive impact on the development and administration of the surrounding territory. ČEZ company, a. s., endeavours to support actively the development of regions, in which it operates. It

concerns granting contributions for the development of communities or promotional sponsoring especially.

Impacts on the prices of real estates and the housing development

The documentation states that growing trend of interest in building land plots and real estates in the power plant vicinity can be expected due to NNS preparation, construction and operation, especially of new long-term employees. Several prepared development areas intended for construction of family houses are situated in the nearest communities, same as areas for public utilities that might be used for development of utilities of the communities in case of demands of new inhabitants.

Impacts on recreation potential of the territory

The documentation states that the NNS project corresponds by its placing and nature to the existing EDU1-4 that is long-term part of the territory. The NNS will be placed in area adjacent directly to EDU1-4, i.e. in the area that is not interesting for recreation purposes and is not in used in this way significantly (with the exception of industrial tourism or tourism to memorials of disappeared communities). There are no significant tourist attractions or significant tourist infrastructure in the area of the NNS location (again with the exception of the information centre of EDU1-4). The areas for the NNS placing and construction touch the existing cycle tracks and hiking trails (cycle track No. 5175 and hiking trail connecting Rouchovany with Jihlava Valley that lead around the premises of EDU1-4 from west side), however, they will be moved without further consequences so that passability of the territory is not limited. The actual EDU1-4 is according to documentation currently relatively significant tourist attraction, both thanks to the operation of the information centre, and thanks to other organized events and excursions (e.g. visits of the power plant premises). The same applies to the Information Centre of Dalešice Waterworks.

Impacts during construction or decommissioning – radiation impacts

No radioactive substances will be discharged to the environment in the course of the NNS construction. The existing nuclear facilities only will be in operation at the site in this period. The construction of the new nuclear source will have no impact on its effluents, its (insignificant) impacts on the population of the territory involved and on the public health will not be changed as well. A further decrease in radioactive effluents to the environment, i.e., without a significant effect on population, will occur during termination of the project operation as compared with the period of operation.

Opinion of the expert report author:

No comments arise of the team of expert report authors with regard to the impacts on public health and with regard to radiation risks. It is apparent that principle prerequisite is in relation to the evaluated radiation impacts that it will have to be proved for particular selected unit in further phases of the permitting process that the source term for the respective type of radiation abnormal occurrence will be lower, or the same at maximum, as envisaged in the EIA documentation. Based on recommendations for fulfilling radiation objective for the new nuclear sources that ensues from Western European Nuclear Regulators' Association (WENRA), the following condition is formulated in the binding statement draft:

- ***It should be proved in further phases of the permitting process that:***
  - ***no radiologic impacts or only small ones will be required for design basis accidents and in the same way also for design extension conditions without fuel melting, i.e. implementation of no urgent protective measures for the population in NNS vicinity will be needed and no or only small***

(time and area limited) need will exist of implementing restrictions in the sphere of food and agricultural products

- ***for severe accidents (design extension conditions with core melting), space- and time-limited radiological impacts will be required according to the WENRA recommendations, which will ensure compliance with the following requirements:***
  - ***the need of evacuation will be ruled at a distance of more than approximately 3 km***
  - ***the need of sheltering and iodine prophylaxis will be ruled out in distance greater than approximately 5 km***
  - ***agricultural production at a distance of more than approximately 5 km will be suitable for consumption one year after the radiation accident***
  - ***no permanent relocation anywhere outside the premises of the power plant (for practical application, it is interpreted as no permanent relocation at a distance over 800 m from the reactor)***

In addition to that, the following recommendations concerning the technical solution (eventually modified by the team of the expert report authors) are formulated in the binding statement in accordance with the documentation draft that are generally significant for the total evaluation impacts on the public health of all evaluated aspects according to the opinion of the team of expert report authors:

- ***Within further project preparation, continuous more precise specification of the requirements for nuclear safety assurance of the new nuclear source in the tender documentation in accordance with the valid nuclear legislation***
- ***It should be ensured that the envelope environmental parameters, specified in the documentation of the project impacts on the environment will not be exceeded within the technical and technological solution of the NNS (Chapter B.II. Data on inputs and B.III. Data on Outputs) will not be exceeded within the technical and technological solution of the NNS.***
- ***the NNS design solution must ensure protection of the NNS against consequences of a radiation abnormal occurrence at any other nuclear facilities situated at the site***

The following recommendations of the team of the documentation authors specified in Chapter D. IV.2.2. are not reflected by the team of the expert report authors in the binding statement draft, because they ensue from the valid legislative regulation, or because they concern general procedure in case of the requirement for taking ALARA principles into account, or because the future NNS de-commissioning will be subject of separate assessment of impacts on the environment according to the legislative regulation valid in that time, or because the specified recommendations are already part of the project:

- *The technical and technological solution of the NNS will ensure that the dose optimization limit of representative person will not be exceeded that is related to irradiation from effluents from all operated units located at one site; the same applies to the authorized limit of radioactive effluents to the atmosphere and the authorized limit of liquid radioactive effluents that will be stipulated in further stages of the permitting process.*
- *The technical and technological solution of the NNS will take into account requirements of the ALARA principle for protection of inhabitants and employees.*
- *The technical and technological solution of the NNS will take into account the need of its future decommissioning with regard to the ALARA principle and minimization of impacts on the environment.*
- *The project solution of the NNS will ensure protection of the NNS against consequences of possible external events of natural origin and consequences of possible events caused by human activity in the NNS vicinity.*
- *The NNS project will be resistant to crash of big airliner, whereas this event will be assessed as design extension conditions and dealt with using approach taking primarily into account the WENRA recommendations for new reactors.*
- *The design of NNS will comply with standards and principles of electromagnetic compatibility (EMC conception). Apart from the ability to preserve their own functionality in*

the given environment, the NNS systems and equipment will meet the limits of the level of interference emitted to the electromagnetic environment.

The sphere of monitoring the radiation situation is one of principles of safe utilization of nuclear energy and one of general requirements for nuclear facilities project and for design engineering of nuclear facilities according to the Atomic Act. Using TDS II and ATDS systems and establishing a system similar like TDS I at boundaries of the guarded area of NNS, eventually extension of the existing TDS I of EDU1-4 by a part covering the NNS area, is presumed for the NNS. The following recommendation is formulated in the binding statement draft:

- ***The design of radiation situation monitoring should be elaborated within further preparation of the NNS project.***

State Office for Nuclear Safety states in its opinion that the notifier did not specify any information on intended civil engineering solution for shelters, emergency control centre, technical support centre, external emergency support centre, back-up emergency control centre and back-up technical support centre in the description of conceptual solution of the building part of the power plant, i.e. information on the intention how to meet the requirements on coping with radiation abnormal occurrence stipulated in the part of the sevenths Decree No. 329/2017 Coll.

It can be stated of team of expert report authors that omitting this matters in the documentation ensues also from the evaluation approach in the documentation – “envelope method”. In spite of that, the team of expert report authors recommends the following condition into the binding statement:

- ***More detailed documenting of the civil engineering solution for shelters, emergency control centre, technical support centre, external emergency support centre, back-up emergency control centre and back-up technical support centre, including the time schedule of their execution, within the documentation for building permit of the NNS***

Without comments concerning the evaluation of the atmosphere and noise health risks, whereas adequate recommendations for the binding statement are commented in the respective Chapters of the expert report.

Without comments mostly with regard to social and economic impacts. Concerning the transport services, certain risks cannot be ruled out related to increased traffic loads especially in the construction stage according to the opinion of the team of expert report authors.

The following recommendation could be formulated in the binding statement according to the opinion of the team of expert report authors:

- ***The method/principle of eventual compensation for using the respective traffic network should be discussed with the owners of involved roads within further phase of the project preparation taking into account the nature of the traffic invoked by the project, the condition of the road network, the service obligations of the transport infrastructure owners and the tax obligations of the commodity forwarders, (after more precise determination of final transportation routes from the source of main commodities to the NNS construction site and resulting transport intensity in the construction stage); the agreed compensation method/principle should be executed without delay.***

The documentation requires in the draft of conditions of the binding statement that the possibility to use railway for transportation of selected building materials is taken into account. The team of expert report authors proposes this condition to the binding statement in the following form:

- ***to prefer the possibility to use railway for the transportation of selected commodities (especially building commodities), taking into account the railway infrastructure condition, loading possibilities and railway access to the commodity sources.***

The following recommendations are also formulated in accordance with the EIA documentation in the binding statement draft:

- ***to include measures in the NNS design solution that would reduce individual effective doses of a representative person caused especially due to the discharge of liquid effluents (waste water) containing radioactive substances from NNS***
- ***to ensure contact with nearby communities and general public in the road area during the whole period of the NNS preparation, construction and operation and inform them on the progress of the project preparation and execution and on its potential impacts on the ambient, including flexible reaction to arising suggestions and queries***
- ***to execute evaluation of health condition of the inhabitants in the more distant exposure area E2 (districts Třebíč, Znojmo and Brno-venkov) inn the time 1 year at minimum prior to putting the 1st unit into trial operation and subsequently in intervals of 10 years and to make the results accessible for the general public***
- ***to inform the general public regularly on the impact of the NNS operation on the environment by collective annual reports published on the web sites of the operator.***

To state concerning the transport solution according to opinion of the team of expert report authors that the traffic load specified in the documentation must be determined more precisely based on development in time of the traffic loads on the potentially used road system.

The assessment of technical condition of the roads is not subject of the assessment of impacts on the environment, because the road owners or administrators deal with it. In spite of that the following conditions are stipulated in the documentation of environmental impacts that deal with the matters of technical condition of roads taking into account legislation requirements:

- ***The description and diagnostics of the condition of the involved road network should be ensured prior to the NNS construction. If necessary, to ensure modifications of roads and road network objects are executed so that do not degrade significantly due to the construction taking into account the service and maintenance activities and obligations of the road owners.***
- ***The roads affected by the construction should be put to the condition after the completion of the project construction that will ensue from discussing with the owner of the roads; the exact extent of necessary repairs will be based on the diagnostics and survey, executed prior to the NNS construction and after the construction taking into account intensity of the construction related traffic generated by the project compared to other traffic and taking into account maintenance obligations of the road owner and operator.***

Without comments of the team of expert report authors concerning the impacts related to radiation effects in the course of the construction and de-commissioning.

Finally, the attention might be drawn to certain formal comments concerning the evaluated Chapters:

- *Non-radiation impacts - Atmosphere pollution - there is a reference to the basic target value of WHO for PM_{10} that is not specified, however. WHO recommends for average annual concentration of PM_{10} the target value of 20 $\mu g/m^3$ and for average annual concentration of $PM_{2.5}$ the target value of 10 $\mu g/m^3$ in the updated amendment from 2005*

- *It is stated in same section – “Contributions of the NNS to the average annual immission concentrations of $PM_{2.5}$ inclusive the background reach up to 72% of the limit in the monitored residential area”. It refers to the immission limit valid today – however, the limit of 20 µg/m^3 will be valid after 2020, it should be rather referred to this limit – rather to 90% of the limit.*
- *The immission background in wider site of interest is envisaged at the level of five year averages 2011-2015. The five years averages 2012 - 2016 and 2013-2017 are available on the CHMI portal currently – they do not indicate significant changes of the atmosphere quality.*

D.I.2 Impacts on atmosphere and climate

Impacts on atmosphere

The stage of the operation

The documentation states that the project is not a combustion source, therefore it will not be a significant source of emissions into atmosphere.

A calculation of immission load resulting from the project (stationary and traffic sources) is elaborated for evaluation of the project impacts on the atmosphere quality. The calculation is carried out according to SYMOS methodologies and evaluates immission loads of harmful pollutants PM_{10} and $PM_{2.5}$, NO_2, benzene and benzo(and)pyrene in the territory involved. The results are summarized in the following text, more detailed data and graphical display of the results are included in the dispersion study – an annex of the documentation.

Standby technological facilities (diesel-generator stations, boiler plant) will be sources of pollutants from operation of technological facilities of the NNS according to the Chapter B.III.1 of the documentation, they will not be in continuous operation, however. Emissions of pollutants (solid pollutants, SO_2, NO_x and CO prevailingly) will be produced during regular checks of dieselgenerator stations, time of which will be on the order of approx. tens of hours per year (it is the time needed for testing the equipment functionality, maintenance, etc.).

The automotive traffic will be another source of emissions that is categorised as a mobile source under the Clean Air Act. The transport is a source of emissions of pollutants both from the combustion of fuels and emissions from brakes and tyres abrasion or from re-suspension of dust particles on the surface of the carriage way. The amount pollutants emissions depend on the transport intensity in the respective period and on the development emission factors of motor vehicles mainly.

The documentation sets out the following conclusions with reference to the dispersion study:

Solid pollutants: The highest calculated contribution to the average annual PM_{10} immission concentration due to the NNS operation reaches the level up to approx. 0.35 $\mu g.m^{-3}$, i.e. approx. 0.9% of the immission limit (40 $\mu g.m^{-3}$). Despite the increase of traffic intensities, a slight drop can be expected due to the decrease of the impact of secondary dustiness from the carriage way in some sections.

An increase of immission concentrations by approximately up to approx. 0.3 $\mu g.m^{-3}$, i.e., 0.75 % of the immission limit (40 $\mu g.m^{-3}$) can be expected due to concurrent impact of immission background change during the period of the NNS operation However, these maximum values are only delimited to the NNS site itself. A decrease in the immission concentration at the nearest residential development is expected due to a decreased impact of transport on the public roads.

In case of NPS operation, the highest calculated contributions to the maximum daily PM_{10} concentration can be expected at the level of approx. 5 $\mu g.m^{-3}$, i.e. approx. 10% of the immission limit value (50 $\mu g.m^{-3}$). The maximum values are near to the new stationary NNS sources as well as at higher altitudes above sea level north of NNS. These highest possible daily concentration values can again occur on condition that a combination of the most unfavourable meteorological conditions lasts continuously all the day. According to the wind rose data, these unfavourable conditions can be expected in only 2% of the year. Therefore, there is a small degree of probability of a

real occurrence of concentrations modelled in this way. In fact, the values substantially lower will be reached. The highest calculated contribution to the average annual immission concentration of $PM_{2.5}$ due to the NNS operation reaches the level of approx. 0.1 $\mu g.m^{-3}$, i.e. the value of approximately 0.4% of the immission limit (25 $\mu g.m^{-3}$) (or 0.5% of the immission limit 20 $\mu g.m^{-3}$ valid after 2020). An increase of immission concentrations by approximately 0.08 $\mu g.m^{-3}$, i.e. values of approximately 0.3% of the immission limit (25 $\mu g.m^{-3}$), (or 0.4% of the immission limit 20 $\mu g.m^{-3}$ valid after 2020) can be expected due to the concurrent impact of background concentration change in the period of the NNS operation. These maximum values are only delimited to the NNPS site itself. A decrease in the immission concentration at the nearest residential development is expected due to a decreased impact of transport on the public roads.

Nitrogen dioxide (NO_2): The highest calculated contribution to the average annual NO_2 immission concentration over the period of the NNS operation reaches the level up to approx. 0.4 $\mu g.m^{-3}$, thus approx. 1% of the immission limit (40 $\mu g.m^{-3}$). The highest calculated contribution to the maximum hourly NO_2 immission concentration over the period of the NNS operation reaches the level up to approx. 6 $\mu g.m^{-3}$, i.e. approx. 3 % of the immission limit (200 $\mu g.m^{-3}$). We expect reduction of immission loads of NO_2 in the period of the NNS operation taking into account the development of immission background. The dominant impact of this drop is caused by a decrease in primary emissions from fuel combustion due to renewal of the fleet (improvement of vehicle emission standards). We can anticipate that average as well as maximum annual concentrations remain below the limit reliably in the area.

Benzene: The highest calculated contribution to the average annual immission concentration of benzene due to the NNS operation reaches the level up to approx. 0.002 $\mu g.m^{-3}$, i.e. up to 0.04% of the immission limit (5 $\mu g.m^{-3}$). We do not anticipate a total increase in immission concentrations due to the NNS operation at a concurrent impact of a change in the background concentration. The dominant impact of this drop is caused by a decrease in primary emissions from fuel combustion due to renewal of the fleet (improvement of vehicle emission standards). Reliable observance of the legislation immission limit is expected for average annual concentration of benzene due to the impact of the evaluated project.

Benzo(a)pyrene: The highest calculated contribution to the average annual benzo(a)pyrene immission concentration due to NNS operation reaches the level up to approx. 0.007 $ng.m^{-3}$, i.e. up to 0.7% of the immission limit (1 $ng.m^{-3}$). Despite the increase of traffic intensities, a slight drop can be expected due to the decrease of the impact of secondary dustiness from the carriage way in some sections. An increase in the immission concentrations up to approx. 0.006 $ng.m^{-3}$, i.e. up to 0.6% of the immission limit (1 $ng.m^{-3}$) at a concurrent impact of a change in the background concentration can be anticipated during the NNS operation period. The maximum values are reached in the NNS site area. Reliable observance of the legislation immission limit is expected for average annual concentration of benzo(a)pyrene due to the impact of the evaluated project.

Construction stage

The rough ground shaping in the locality will be essential for solid pollutants, when the dominant impact of secondary emissions of dust particles from activities being performed and from vehicles moving on unpaved surfaces can be anticipated. Concerning average annual concentrations, the concentration increase up to the value of the immission limit can be expected for solid substances of the PM_{10} fraction on

boundaries of the construction site. In case of maximum daily concentrations, the contributions of the performed activities reach values high above the immission limit even in considerable distances from residential build-up area where essential increase of the count of cases of maximum daily concentration exceeding can be expected, up to approximately 16 times a year. The permissible number of overruns is specified by law to 35 overruns per year, however, this limit will not be exceeded at the nearest residential development probably. Average annual $PM_{2,5}$ fraction concentrations can be expected to be below the limit already on the site boundaries. With regard to such significant impacts on the solid matter immission load, preventive measures for the elimination of dustiness during the project construction under assessment are proposed. A suitable combination of measures, which make it possible to significantly decrease dustiness during construction execution, can achieve a significant decrease in the impact on immission load in the area involved and elimination of possible situations above the limit. A more significant impact of nitrogen dioxide, benzene and benzo(a)pyrene has been calculated for the concurrence period of construction of both units, which is caused by a considerable intensity of induced traffic as a result of transport of passengers and materials that is moreover anticipated to be constant throughout concurrence of construction of both units. Deterioration of the immission situation can be expected mostly at the construction site area where changes in average annual concentrations will reach the level of units of percent of immission limits. In case of short-term nitrogen dioxide concentrations, the maximum values can be expected over the rough grading period when the maximum number of vehicles ensuring transport of excavated soil to the dumping ground area is used. This situation will be limited in time and can only occur under the worst dispersion conditions. With regard to the considerable immission margin, we might consider the immission situation in the course of the construction to be under the limit for these harmful pollutants, both in the nearest residential build-up areas of nearby communities, and even in close vicinity of the construction site.

Impacts on climate

Impacts on local climate

Impact on change of temperature and humidity: The documentation states that the area corresponding to the given value of the characteristics enlarges and higher values of temperature and air humidity occur in comparison with impact of the cooling tower system of the existing power plant EDU1-4, especially if the system is extended by new cooling towers of the NNS in case of operation concurrence of NNS and EDU1-4. The values of maximum average rise of the air temperature are very low, the value differences between both cooling tower systems are in the order of hundredths of °C; the differences of maximum values of the daily air temperature rise are at the level of tenths of °C. Maximum value differences of average increase of the air humidity reach the order of 10^{-3} g/kg (order of 0.01% to 0.1% of usual values of the specific humidity) and the value differences of daily maximum values of the rise reach the order of 10^{-2} g/kg (order of 0.1% to 1% of usual values of the specific humidity). The negligible difference in the increase of these climatic characteristics ensues from generally small impact of steam flumes from the cooling towers on ground values.

The documentation summarizes that greatest changes of ground temperature and ground humidity can be expected at configurations with the lowest altitudes of the steam flumes. However, even at such configurations, the impact of steam flumes on

the values of both characteristics is negligible and unmeasurable using operational methods.

Impact on precipitation conditions in the vicinity and formation of ground fog or ice coating: The documentation states that the air stream from the new cooling towers will carry small water droplets to the ambient atmosphere that may fall on the earth surface together with droplets originated from condensation of water steam in the flume (if any) and may thus increase the amount of atmosphere precipitation theoretically. It can be expected that great majority of droplets will evaporate even before they fall on earth due to their size. Therefore, these impacts can occur practically only in cold weather and at high air humidity. Maximum precipitation usually occurs in the distance up to double or quadruple of the height of cooling tower, whereas the annual aggregate of precipitation originated in this way exceeds 20 mm nowhere in the vicinity of the tower. Emission of water steam from cooling tower might lead not only to forming visible flume, but also to occurrence of ground fog, both by aerodynamic pulling the flume down to the surface, and by direct transfer of water steam from the cooling tower to the ground layer of atmosphere with subsequent condensation, that can be considered as insignificant based on previous conclusions, however.

Calculations carried out for the estimate of the precipitation falling out did not prove any significant NNS impact. The reason is that the liquid water depositing from the flume will evaporate in the unsaturated environment below the flume. Very low changes of temperature and humidity at high flumes are the basic reason why increased frequency of conditions favourable for fog occurrence was not proven.

The outlet of liquid water from cooling towers might affect the origination of icing in the cold period from October to March. The maximum deposition of liquid water will be reached at the concurrence of NNS and EDU1-4. Highest values are to be found in the area very close to cooling towers and they decrease with the distance rapidly. The calculated values of duration of the conditions for originating icing on carriage way reach at maximum 71 hours for the winter season (i.e. 6,2% of the cold period), whereas highest values occur at configurations that include the outlet from the NNS and EDU1-4. The duration of conditions for origination of icing, up to 23 hours, will be shorter for all configurations of the separate NNS than the duration of these adverse conditions in the existing situation, which amounts to 45 hours during the winter season.

Impact on the change of the shielding by visible flume: The documentation states that the visible flume might cause shielding of earth surface similar like natural cloudiness in daily hours with Sun above the horizon. Thus, it can contribute to the frequency of shielding in cases, when the earth surface is not shielded by natural cloudiness. That is why the flume shielding was monitored at situations with Sun above the horizon and with the observed coverage by cloudiness lower than 7/8. Apart from calculations for the whole year, the shielding was separately monitored in the vegetation period (warm half of the year, April to September). The calculations confirmed that the flume from the new configuration of the cooling towers will be bigger and will reach higher altitudes. The area shielded by the flume will enlarge as a consequence of this. Maximum frequencies of shielding fluctuate in the prospective condition of operating just the NNS at similar level as for the existing operation; the 10% increase of shielding frequency is limited only to the close vicinity of the tower system. The highest values of maximum frequencies belong to configurations in the transient concurrence operation of the NNS with EDU1-4 that include new cooling towers of the NNS in

combination with cooling towers of the existing power plant. Local increase of the maximum frequency in comparison with the existing system fluctuates around 5%. On the contrary, areas with decreased shielding frequency compared to EDU1-4 originate at configurations after terminating the operation of the existing power plant. However, they are compensated by increased frequency of larger horizontal shielding extent. Similar conclusions might be deduced for the limited vegetation period. The drop of extent of the area with low shielding time in comparison with results for the whole year is the most distinct feature of outputs for the vegetation period. Maximum frequency values are higher at the same time than maximum values for the whole year with the same or even lower average values. The explanation consists in different Sun heights above the horizon in the warm and cold halves of the year. Namely, the area of shielding is situated more closely to the cooling tower system in the summer half of the year when Sun reaches the highest height above the horizon.

Impacts on extreme meteorological conditions of the site: The documentation states that the NNS will have no impact on any extreme meteorological conditions of the site that will be measurable and detectable by operational methods. Using lower cooling towers might result in slightly stronger impact on the ground temperature and humidity compared to the impact of EDU1-4, however, the differences are negligible. The concurrent operation of NNS with EDU1-4 is envisaged conservatively for 10 years; the temperature load of the atmosphere from the NNS operation will be comparable with the load from EDU1-4 operation after the closure of EDU1-4 operation.

Impacts on Global Climate

Production of greenhouse gases

The documentation states that the nuclear energy belongs to almost zero producers of greenhouse gases with regard to the power plant operation. They are directly emitted in small amount only at periodical tests of auxiliary equipment (for example back-up diesel-generators) or at outages of the NNS units (auxiliary boiler plant). The indirect emissions are therefore significant only, whereas the nuclear fuel extraction and processing have the highest share in emissions of greenhouse gases of the whole life cycle of nuclear power plant. Comparing greenhouse gas emissions from individual energy sources, it is evident that nuclear energy belongs next to renewable energy sources (water power plants 0.35 to 60 $t_{CO2\text{-}e}$/GWh, wind power plants 7.9 up to 30 $t_{CO2\text{-}e}$/GWh, and solar power plants 14 to 200 $t_{CO2\text{-}e}$/GWh) and emits several times less emissions than fossil energy sources (brown coal power plant up to 1700 $t_{CO2\text{-}e}$/GWh, black-coal 879 to 985 $t_{CO2\text{-}e}$/GWh, and gas power plants 290 to 930 $t_{CO2\text{-}e}$/GWh). It is evident, therefore, that the NNS has high potential of decreasing the emission of greenhouse gases and thus the contribution to climatic changes. The higher share of low carbon energy sources (including NNS) in the energy mix leads to further reduction of indirect emissions of greenhouse gases (favourable synergy effect) at the same time, which contributes to this, too.

Vulnerability of the project towards the climate change

As ensues from the documentation, the NNS project is prepared for long period of operation. Terminating the NNS operation can be expected around the year 2100, as ensues from the time schedule, included in Chapter B.I.6.4.2. of the documentation Time Schedule of Operation and De-commissioning of nuclear facilities at the Site; terminating the operation of the NNS may be expected around 2100. The effects of the climatic change cannot be ruled out during this period. The analyses

carried out within the documentation elaborating, therefore refer to the ±0 °C climatic scenario (that represents the current climate condition) as well as the +2 °C climatic scenario (representing the conservative temperature change in 2100). It concerns the demands of the NNS for water take-off above all (documentation Chapter B.II.2 Water), development hydrological characteristics of involved water courses including evaluation of securing water for supply NNS (documentation Chapter C.II.4. Surface and Groundwater) and evaluation of NNS impacts to water environment (documentation Chapter D.I.4. Impacts on Surface and Ground Waters). All natural impacts of the NNS site on the NNS project are taken into account at the same time, including the potential climatic change (documentation Chapter B.I.6.3.1.6. Suitability of site for the NNS location). The documentation concludes that the NNS project represents a robust solution that is reliably resistant against the potential climate change at the NNS site. This is secured in two levels according to the documentation:

- the initial project solution will be already resistant against potential climatic change at the NNS site,
- the regularly updated safety evaluation of the NNS will take into account continuous impact of the climatic change at the NNS site based on actual development of the climatic indicators.

The requirement of the above mentioned Instructions for Incorporation of Climatic Changes into Considerations of Principles of So-called Adaptive Control, i.e. the preparedness for continuous taking the newly acquired pieces of knowledge into account is fulfilled by this according to the documentation at the same time.

Opinion of the expert report author:

Impacts on atmosphere – operation stage

Without substantial comments of the team of expert report authors concerning the impacts on the atmosphere in the operation stage with reference to the results of the dispersion study in annex 5.3. of the documentation.

Concerning formal aspects, the attention might be drawn to the fact that the following is stated at the beginning of the chapter describing the impacts on the atmosphere: The project is not a combustion source, therefore it will not be a significant source of emissions into atmosphere. It can be stated that this wording is somewhat misleading – it would be more poignant to state that it would not be a significant source of emissions of atmosphere pollutants.

Impacts on the atmosphere – construction stage

The possibility of affecting immission loads cannot be ruled out for the construction stage, especially in the closest vicinity of the NNS construction. At the same time, attention might be drawn to the fact that the expected high immission concentrations of PM_{10} and $PM_{2.5}$ result from the conservative inputs to the dispersion study. That is why it is necessary to execute all measures within the construction in order to limit the emission from the building activity. The following modified recommendation is formulated for the binding statement in accordance with the EIA documentation:

- ***Minimization of impacts on the atmosphere quality should be assured in the period of the NNS construction, namely by application of preventive measures to eliminate dustiness in accordance with the program atmosphere quality improvement of the zone South-East (code BD3 “Limiting Dustiness from Building Activity”). The selection of adequate combination of measures will be will be emphasized with regard to dominant impact construction site traffic that minimize impact of emissions from vehicles driving on the construction site roads (e.g.***

optimization of the length of transportation routes at the construction site, using compacted construction site roads, cleaning the vehicles, roads and handling areas, limited speed of transportation mechanisms and the like), eventually measures that minimize dust emissions from other activities (e.g. minimizing or ruling out free depositions of fine grained materials, maintaining open surfaces sufficiently wet and the like).

The following recommendation of the team of documentation authors included in Chapter D.IV.2.2. is not reflected by the team of the expert report authors in the binding statement draft, since the proposed recommendation is part of the project already:

- *The function of the NNS ventilation systems will be designed so that radioactive substances would be removed from gaseous radioactive effluents prior to entering the ventilation stack effectively and with high efficiency.*

Impacts on climate

The team of expert report authors agrees with the evaluation performed in the documentation concerning impacts on the climate. The following recommendation is formulated for the binding statement draft concerning potential climate changes:

- ***monitor continuously the development of climatic conditions within further phases of the project preparation and in case of provable changes, react to them in the project preparation especially with regard to assuring NNS demands for water***

D.I.3 Impacts on noise situation and possible further physical and biological characteristics

Noise impacts

Noise from stationary sources

The impact NNS operation is evaluated in acoustic study. All the calculations for the prospective situation are considered for the maximum operating power, i.e. also for maximum concurrence of technological equipment at the NNS site. The operation of the switching station Slavětice after its planned extension and the traffic on non-public roads in NSS premises (including roads in the premises of EDU1-4) that meet the definition of stationary source are taken into account in the calculation is at the same time.

Values of equivalent level acoustic pressure are specified for the prospective condition in noise-wise least favourable case of two unit arrangement of the NNS in the most affected protected outdoor areas or in outdoor area of buildings in table D.6 of the documentation. The EDU1-4 operation noise is not considered in this basic calculation, all the technological equipment emitting significant noise to the surroundings will no longer be in operation.

It is apparent from the results in the documentation that the hygienic noise limits will not be exceeded in the two unit NNS operation even cumulatively with the operation of the extended switching station Slavětice in the most affected protected outdoor area and in the protected outdoor area of buildings of the nearest residential build-up area during day as well as during night periods.

It ensues from Table D. 7 of the documentation furthermore that the operation of two NNS units is less favourable from the acoustic viewpoint with regard to the nearest or most affected protected outdoor area (Slavětice) than the operation of one NNS unit and EDU1-4. Therefore, the operation of two NNS units (without operation of EDU1-4) is decisive for the assessment.

The NPS operation also includes (like the existing EDU1-4 by analogy) exceptional operating activities, among which belong tests or functional integration of relief valves, steam generators, steam dump stations to atmosphere, relief valves of pressure reducing stations and diesel-generator stations. Activities of these pieces of equipment do not take place under normal operation, only during periodical tests and absolutely exceptionally during abnormal operation. Based on the measurements performed during tests of the EDU1-4 equipment, no significant disturbing effects or hazards to health of the nearest villages' inhabitants are assumed with respect to a distance of the development and a very short time interval of tests. Similar situation can be expected at the tests of the NNS equipment.

Traffic noise

Noise from transport on public roads will be related to the contribution of the project transport operation to background intensities of road traffic on transport routes that constitute main access routes to the Dukovany site (out of them on road II/152 in particular).

The noise situation during the operation period was assessed for the prospective situation without the NNS execution (i.e. only a natural increase of the public road network traffic was taken into account) as well as for the prospective situation with the

NNS (i.e. taking account of traffic induced after the NNS execution). In the prospective scenario, the ongoing traffic demands of the EDU1-4 power plant are also considered that will continue being significant even after terminating its operation.

With regard to the natural increase of traffic and also newly induced traffic demands after the NNS execution, it can be assumed that noise level will increase adequately as compared with the current situation. More detailed data are specified in the acoustic study.

The data in the documentation imply that the highest increases due to the NNS operation can be expected on the main approach route from Třebíč in the village Slavětice (increase by approx. 0.8 dB during daytime and approx. 1.2 dB during night time), furthermore in villages Dalešice and Valeč. From the opposite direction, the highest increase is anticipated in the community Jamolice (increase by approx. +0.6 dB during daytime and approx. +0.9 dB during night time) and in the community Polánka similarly. Dispersion of induced demands into the larger traffic network has already occurred in the other sections, an increase of noise values by approx. 0.4 dB can be expected, which can be considered a non-appreciable change[6]. Furthermore, it is the potentially the worst expected situation, when NNS traffic demands were assessed together with ongoing EDU1-4 demands that are going to decrease gradually in the following years, however.

The calculation model used the emission characteristic of cars as well as trucks according to the methodology issued in 2011, which could not take into account the new valid noise emission limits and the procedure for approving motor vehicle types, which are going to be introduced to the market after 2020. Considering the fact that these new limit values will already be valid over many years at the time of the NNS operation commencement, it is possible to legitimately consider the further gradual decreasing of acoustic properties of motor vehicles. As a consequence of this natural modernisation of the fleet in the coming years, we can expect that the hygienic limits for traffic noise will be fulfilled in a great number of localities. The residential built-up area of the town Ivančice, furthermore some objects in Náměšť nad Oslavou or the critically located object at Slavětice land-registry No. 50, can also be included among the protected objects, at which noise shall likely have an impact above the limit. The limit exceeding situation existed at these objects already prior to the determining date in 2000 and therefore it is not caused by direct impact of the assessed project execution, with exception of the object in community Slavětice where the NNS execution contributes significantly to the limit exceeding condition (it applies to the situation in community Slavětice that the community bypass was not taken into consideration by the noise analyses conservatively, although it is envisaged in the zoning plan of the community).

On the basis of these facts, the documentation recommends to monitor noise in the most affected areas during the NNS operation and to take measures leading to a decrease of the noise load in the area monitored on the basis of their assessment.

Considering that no measures in the noise propagation path (noise barriers) are possible in an urban area of individual villages, it is recommended to take so-called technical and organisational measures. These can include replacement of road

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[6] The difference within the interval from 0.1 to 0.9 dB cannot be regarded as assessable change according to Section 20 Paragraph (5) of the Government Decree No. 272/2011 Coll., on protection of health against adverse effects of noise and vibrations, as amended.

surfaces, preferring a so-called silent road surface, when a noise decrease by approx. 2-3 dB during the surface lifetime can be expected or to take measures on protected objects directly (a very effective and quick solution is replacing windows for noise educing windows, at which the protected building's external cladding sound insulation is increased). These measures are primarily within the competence of noise source owner (i.e. of road owner or administrator).

Noise in the construction stage

The documentation states that the project construction will be connected with intensive activities at the construction site (the main construction site, the construction site installations, the corridors of infrastructure networks), as well as with the construction related transport on public roads (the transport of building and constructional materials and also the transport of staff). The noise impact of these activities is evaluated in the acoustic in Annex 5.2 of the documentation.

The noise situation at the construction site is evaluated for two acoustically most significant stages of works execution:

- the period of rough grading, connected with extraction and transfer of topsoil and subsoil and
- the period of building activities at the NNS construction connected with intensive concrete and steel structure works.

The most demanding stage during grading in terms of mechanisation application is the soil excavation period and soil transport to respective areas of the construction site installations or of the main construction site. These activities will be carried out in day time only (6:00 a.m. to 10:00 p.m.). The resulting values of the equivalent level of acoustic pressure in the nearest or potentially most affected protected areas of buildings are specified for the stage of rough grading in Table D. 9 of the documentation.

The results imply that hygienic limits for construction noise in the most affected protected external area of the nearest residential development objects during the rough grading period will not be exceeded in any daytime between 6:00 a.m. to 10:00 p.m. Although no grading and follow-up transport of soil are assumed in the area C (area for electrical connections) and the area D (area for water connections) in concurrence with activities in the areas A and B, a contribution of these activities in case of a theoretical concurrence with the most demanding RG (rough grading) stages was assessed by calculation as well. The limit values of the noise from building activity at the level of 65 dB will be observed in case of works on the area C concurrent with activities on areas A and B, that is in case of limiting activity periods on the area C to 7:00 a.m.- 9:00 p.m. Concerning the area D, the expected contribution of activities to total values of acoustic pressure is little significant due to the considerable distance from protected areas and that is why it is not a limiting factor for eventual employing machinery on the area D in concurrence with activities on areas A and B, in whatever day time (6:00a.m. - 10:00 p.m.).

Building works will start after the rough grading carried out. Calculation is carried out for the phase of parallel construction of both production units and cooling towers, including related truck drives at the construction site that ensure both the transport of concrete from the local concreting plant (on the area B), and the supply of materials needed for the construction. Resulting values of equivalent level of acoustic pressure

in nearest or potentially most affected protected areas of buildings are specified in table D.10 of the documentation for the most critical stage of the construction.

It ensues from the results that the period of actual building activity is more favourable with regard to noise impacts compared to the rough grading period and the hygienic limits for noise from construction will not be exceeded in the nearest or most affected protected outdoor area of buildings in nearby communities in whatever day time between 6:00a.m. and 10:00 p.m.

Construction activities, which will have to be performed continuously for reasons of observing technological procedures and construction conditions, such as concreting itself and internal on-site transport, are only envisaged during night time in this stage. Considering the noise levels reached at the nearest protected objects during full use of mechanisation (max. 47,2 dB); it can be reliably assumed, however, that the hygienic limit for noise from the construction will be observed also during night time (10:00 p.m. - 6:00 a.m.); its value is determined as $L_{Aeq,T}$ = 55 dB.

The work staff as well as the materials will be transported in the day time only in the course of the construction, with the exception of specific time-wise limited or acoustically insignificant activities (e.g. transport of over-size or heavy components, works conducted exceptionally that must be carried out without an interruption from technological reasons and the like). These activities will not result in worse noise load during night time thanks to their short-time nature. That is why the acoustic situation is evaluated for the day period (6:00 a.m.- 10:00 p.m.) only. Noise from traffic on public roads in the course of the construction is summarized in Table D.11 of the documentation.

It ensues from the presented results that the highest increases of traffic noise can be expected on the approach route through Rouchovany, Rešice and Tulešice (mostly transport of gravel sand and gravel) with the highest value up to approximately 6 dB and up to approximately 4 dB from Ivančice through the community Jamolice. These growths can be expected only for the limited time of concurrence of the transport of the construction of 2 units in parallel, the intensities will be half only or lower in other phases (i.e. the specified growth will be lower by approximately 3 dB at minimum).

The documentation states further that it is conservatively envisaged for purposes of the documentation elaborating that all (100%) raw materials and materials needed for the construction will be transported on the road network, however, transport of some raw materials and other materials using railway cannot be ruled out with regard to existence of the siding. That is why the noise impacts are also analysed for the noise from railway transport. The transport of cement and lime using the Uacs wagons (of 52 t capacity) is envisaged, potentially also the transport of gravel and sand using goods wagons of the same capacity. The maximum daily batch of materials represents in this case 17 wagons daily or (in case of gravel and sand transport) up to 87 wagons daily. It is evident from the calculations that the hygienic noise limits are not exceeded in the most affected protected outdoor area of buildings in vicinity of the siding. This is the consequence of more than sufficient distance of the siding from the protected area. In case that a larger amount of raw materials than the average daily demand would be transported, a sufficient reserve still exists with regard to observing hygienic limits.

Vibration impacts

Impacts of vibrations will not be significant and will not differ significantly from the existing reliably satisfying condition according to the documentation.

Values of vibration acceleration up to approximately 53 dB are ascertained in subbase directly adjacent to the existing EDU1-4 (whereas basic limit according to Government Decree No. 272/2011 Coll., on the protection of health against adverse effects of noise and vibrations, as amended, is 75 dB) and vibration velocities up to approximately 0.04 mm/s (whereas the limit according to ČSN 73 0040, Load of Building Objects by Technical Seismicity and Their Response, is 1.0 mm/s for usual brick constructions). It is evident that all applicable limits are observed under the existing condition and with considerable margin (of more than one order). This situation will remain preserved in case of the NNS execution. The technical solution of the turbine and turbine table ensures effective isolation of vibrations from the ambient and the new source will be placed in more than sufficient distance from the protected (residential) build-up area, whereas reliable observance of limits can be expected even in its close vicinity.

Likewise, the impacts of transport sources (road railway) will not differ significantly from the existing condition, when all applicable limits are reliably observed with a margin of more than one order (ascertained values vibration accelerations up to approximately 67 dB in case of railway and up to approximately 51 dB inn case of road (the limit is 75 dB) and vibration velocities up to approximately 0.071 mm/s in case of railway and up to approximately 0.038 mm/s in case of road (the limit is 1.0 mm/s).

Ionising radiation effects

The radiation impacts of operational conditions are evaluated in this Chapter of the documentation. More detailed data are specified in Annex 5.1 of the documentation, the summary of procedures and results only is included in text hereafter.

In the normal and abnormal operation of a nuclear power plant, the impacts of ionising radiation may occur through a small, controlled and checked amount of radioactive substances, released into the environment in the form of effluents into the atmosphere (from ventilation stack and cooling towers), and into water courses (from check tanks).

It is assessed within the evaluation of impacts of ionizing radiation, whether the stipulated limits or generally binding limit values are fulfilled. The Atomic Act and the implementing Decree on Radiation Protection stipulates the general irradiation limit for inhabitants and the dose constraints for nuclear facilities operators.

The general irradiation limit for individual inhabitant amounts to 1 mSv/year from all artificial sources (with exception of medical applications).

The operator of the nuclear equipment is obliged to assure that the optimization limit for the representative person of the population, 0.25 mSv a year, is not exceeded due to discharging radioactive substances to the environment. However, the total individual effective dose, which includes the sum of the effective doses from external exposure and the committed effective doses from internal exposure, shall not exceed 0.2 mSv/year and 0.05 mSv/year for effluents into the air and effluents into surface water, respectively. If several pieces of nuclear facilities are situated at the site (as in case of Dukovany NPP site), the collective impacts of the ionizing radiation are evaluated in relation to the representative person as well as other inhabitants.

Representative person is a person representing the model group of physical persons that are the persons most irradiated from the assessed source (the power plant in the given case) and through the given paths. It is an individual typically living in a community in the environs of the power plant, whose living habits (consumption of water, local food, staying outdoor) will be determined so as to maximize the dose received.

Input data for evaluation of the impacts of ionizing radiation

Conservative determination of the so-called source term, i.e. maximum size of effluents from the NNS as well as the EDU1-4, is the basic input for the assessment of the effects of ionising radiation.

The maximum envelope values of effluents of individual radionuclides specified by suppliers of reference units are used as inputs in case of the source term of the NNS. For practical reasons (taking account of power concurrency), the envelope discharges from the NNS are determined separately for power alternative up to 2x1200 MW_e and up to 1x1750 MW_e. The source term of EDU1-4 is determined as the maximum of effluents of individual radionuclides from EDU1-4 during the last 11 years of operation.

The source term for operational conditions of NNS and EDU1-4 is specified in the form of summarizing into individual groups of radionuclides in Chapter B.III.4. of the documentation. Other emissions and residues, specifically their parts concerning the ionizing radiation. The source term is presented divided into individual radionuclides in the following tables.

The real composition of radionuclides within the individual groups may differ depending on the technique used for the determination of radionuclide composition as well as considering time-related changes during transformation of individual radionuclides. According to the principle of the applied envelope approach, the total effluents should not be higher than specified in Chapter B.III.4. of the documentation and the maximum individual annual dose for individuals from the population should not be higher than the dose optimization limit stipulated pursuant the Atomic Act. It means that the source term summarizing into groups as specified in Chapter B.III.4. of the documentation must be regarded as the evaluating envelope.

Expected annual radionuclide effluents from the NNS operation (power alternative 2x1200 MW_e) into the atmosphere are specified in Table D.12. of the documentation.

Expected annual radionuclide effluents from the NNS operation (power alternative 1x1750 MW_e) into the atmosphere are specified in Table D.13. of the documentation.

Annual effluents radionuclides from the EDU1-4 operation into the atmosphere are specified in Table D.14. of the documentation.

Anticipated annual radionuclide effluents from the decommissioning of EDU1-4 into the atmosphere are specified in table D.15. of the documentation.

Anticipated annual liquid effluents of radionuclides from the NNS operation (power alternative 2x1200 MW_e) into the atmosphere are specified in Table D.16.

Anticipated annual liquid effluents of radionuclides from the NNS operation (power alternative 1x1750 MW_e) are specified in Table D.17.

Annual effluents radionuclides from the EDU1-4 operation are specified in Table D.18. of the documentation.

Anticipated annual radionuclide effluents from the decommissioning of EDU1-4 are specified in table D.19.

The calculation program ESTE Annual Impacts in the ESTE EDU Annual Impacts version 5.00 (hereinafter ESTE AI only) was used to determine the radiation impacts of the NNS operation. The calculation code ESTE AI is a program for evaluating the radiologic impacts of operational conditions of nuclear facilities on the ambient.

Used assumptions

In calculating the annual individual effective doses per representative person and other persons living in individual calculation sectors, the below mentioned assumptions are applied, which are based on the requirements of SONS decrees, IAEA documents, ICRP documents and US NRC RG Guide 109. Calculations were carried out for all age groups of inhabitants (infants, children, adolescents, adults) taking into account differences in conversion factors, breathing rate and differences in consumption of individual food components. Results of evaluating the impacts of ionizing radiation on the inhabitants can be summarized in the following table:

calculated case			Annual individual effective doses including committed effective dose
			Watercourses + air
1a	Operation of NNS 2x1200 MW_e and decommissioning of EDU1-4 (average flow rate in the Jihlava River)	The general limit (1.0E-03 Sv/year) as well as the dose optimisation limit (2.5E-04 Sv/year or 2.0E-04 Sv/year for exposure from effluents into the air and 5.0E-05 Sv/year for exposure from effluents into watercourses) are met for the representative person.	2,34E-05 Sv
1b	Operation of NNS 1x1750 MW_e, operation of EDU2-4 and decommissioning of EDU1 (average flow rate in the Jihlava River)		2.05E-05 Sv
1c	Operation of NNS 1x1750 MW_e and decommissioning of EDU1-4 (average flow rate in the Jihlava River)		1.57E-05 Sv
2a	Operation of NNS 2x1200 MW_e and decommissioning of EDU1-4 (minimum flow rate in the Jihlava River)		3.73E-05 Sv
2b	Operation of NNS 1x1750 MW_e, operation of EDU2-4 and decommissioning of EDU1 (minimum flow rate in the Jihlava River)		3.25E-05 Sv

Lifetime doses

Envelope effluents and long-term average flow rates in Jihlava River with the assumption of +2 °C climatic change are considered for determination of the whole life doses. It is assumed that the individual being assessed will be born in the year of putting the NNS into operation in any of the most loaded sectors along the Jihlava River between the Mohelno reservoir and Ivančice (sectors 54, 55, 56), living all his/her life there and having characteristics (behaviour) of a representative person for individual considered scenarios for the concurrency of operation of the NNS and operation or decommissioning of the EDU1-4. The lifetime dose consists of the sum of annual effective doses and committed effective doses for 70 years of life.

The following two scenarios of the NNS operation and concurrency with EDU1-4 are considered:

- Operation of the NNS 2x1200$_e$ + EDU1-4 (4 Units) in the decommissioning process (70-year period of operation of the NNS 2x1200$_e$ after 2035, consisting of 60 years of the NNS operation expected by the design and 10 years of extended operation of the NNS.
- Operation of the NNS 1x1750 MW$_e$ + operation of the EDU2-4 (3 Units) + EDU1 (1 Unit) in the decommissioning process between 2035 and 2045 (10 years) and subsequently operation of the NNS 1x1750 MW$_e$ + EDU1-4 (4 Units) in decommissioning process (60-year period of operation of the NNS after 2045, consisting of 50 years of the NNS operation expected by the design and 10 years of extended operation of the NNS).

For these scenarios, the lifetime doses for representative person are summarised in the following table. It ensues from the results that the whole life (70 years) individual dose (1.6 mSv) for the representative person caused by the NNS operation taking into account the concurrent effect of EDU1-4 equals approximately half of the level of annual individual dose from the natural background.

	Atmosphere	Watercourses	Sum
	[Sv]		
Scenario 1	1.01E-04	1.53E-03	1.63E-03
Scenario 2	5.80E-05	1.09E-03	1.15E-03

Transboundary effects

The cross-border effects were evaluated for the same calculation cases (power alternatives) as for the Czech Republic in the documentation.

Annual individual effective doses were evaluated in all calculation sectors up to a distance of 100 km from the NNS (i.e. on the territory of Austria and Slovakia), the sectors under the most load and the corresponding annual individual effective doses including committed dose were determined. Furthermore, the collective doses outside the 100 km zone are determined, namely on the territory of all neighbouring states (Austria, Slovakia, Poland and Germany).

As in the immediate vicinity of the NNS, liquid effluents have the most significant effect in the evaluation of cross-border effects, which is visible in the sectors along the Dyje and Morava rivers on the territory of Austria and Slovakia. In view of the significantly higher flows in such rivers (as compared to the Jihlava River downstream of the Mohelno reservoir), the received annual individual effective doses including committed effective dose are, however, more than one order lower than for the representative person on the territory of the Czech Republic and range at the level s of approx. 1 µSv/year (1E06 Sv/year), i.e. negligible doses (according to the National Radiation Protection Institute, the average annual individual dose caused by natural background on the territory of the Czech Republic is approximately 3200 to 3500 µSv/year). In other sectors, the doses from the operation of the NNS are at level of 0.01 to 0.1 µSv/year (1E08 to 1E07 Sv/year). The contribution to the annual exposure for representative inhabitants of neighbouring states as a result of operation and effluents from the NNS does not represent any load or risk to such inhabitants. It can be stated based on the evaluation carried out and the results acquired that practically no radiation impacts occur for inhabitants of neighbouring states in operational conditions of the NNS (taking into account the concurrent effect of EDU1-4).

Results of evaluating the impacts ionizing radiation on biota

The radiation effects on the biota were evaluated on the basis of the concept of reference animal or reference plant (Reference animal and plant, RAP) and on the basis of the procedures according to the IAEA documents (IAEA Safety Standards DS427 Prospective Radiological Environmental Impact Assessment for Facilities and

Activities, Derived Consideration Reference Levels (2014)) and the ICRP documents (ICRP 114, ICRP 108). For reference animals or reference plants, as appropriate, living in all immediate sectors of the Dukovany locality, the daily dose rate caused by liquid and gaseous effluents discharged from the NNS was calculated. The daily dose rate determined by calculation for the individual biological species to be assessed is compared with the reference values according to the above mentioned IAEA Guide DS427. According to that Guide, where the dose rate is below the lower limit for reference values, the radiation effect of effluents on the relevant plants and animals to be assessed may be regarded as negligible and the level of environmental protection against adverse radiation effects may be regarded as sufficient.

The assumption of the minimum flow rate of 1.2 m^3/s n Jihlava River has been applied to determine the radiation impact on the biotic component.. It means that the calculation cases 2a (NNS operation 2x1200 MW_e and decommissioning of EDU1-4) and 2b (NNS operation 1x1750 MW_e, concurrent operation of EDU2-4 and decommissioning of EDU1) are evaluated, which lead to the highest radiation doses for individuals from the population, as indicated in the proceeding parts.

On the basis of the assessment, it can be concluded that the radiation effects on biotic environmental compartment are insignificant in all power alternatives.

Other effects of ionizing radiation.

The following impacts are also considered and evaluated in the documentation:

- impacts on surface water due to discharging waste water from the NNS to the Mohelno Water Reservoir and evaluation evaluating the activity concentration or concentration of monitored radionuclides in Jihlava River downstream the Mohelno Water Reservoir pursuant to Government Decree No. 401/2015 Coll.
- impacts on the surface water bodies due to discharging waste water from the NNS to the Mohelno Water Reservoir and evaluation of activity concentration or concentration of monitored radionuclides according to the standards of environmental quality as per the Government Decree No. 401/2015 Coll.,
- impacts on sources of potable water due to infiltration of water from Jihlava River to the sources of potable water in proximity of Jihlava River and maximum expected affectation of sources of potable water by liquid effluents from the NNS,
- impacts on groundwater in proximity of NNS at incidental escape of fluids containing radioactive substances from the NNS and possible infiltration into sources of potable water.

The impacts are evaluated for these power alternatives:

- EDU1-4 (4x500 MWe): this power alternative characterises the existing condition and the continuation of EDU1-4 operation,
- NNS (2x1200 MWe) + decommissioning EDU1-4: this is the alternative of operating two NNS units, each of 1200 MWe power output, with decommissioning of EDU1-4; this power alternative envelope covers also the alternative of operating one NNS unit of 1750 MWe power output with decommissioning of EDU1-4,
- NNS (1x1200 MW_e) + EDU1-4 (4x500 MW_e): it is the alternative of concurrent operation of one NNS unit of 1200 MW_e power with four units of EDU1-4, each of 500 MW_e power,
- NNS (1x1750 MW_e) + EDU2-4 (3x500 MW_e): it is the alternative of concurrent operation of one NNS unit of 1200 MW_e power with three units of EDU2-4, each 500 MW_e power.

The predicted activity concentration of all monitored radionuclides (H-3, Cs-137, Sr-90, Ra-226) fulfils the standards of environmental quality pursuant to the Government Decree No. 401/2015 Coll., according to which the impact of the NNS on the surface water quality is evaluated. The annual average values of admissible pollution are fulfilled also for indicators of total alpha activity concentration and total beta activity

concentration corrected for potassium 40 in all years of the 84 years simulated series, the same also applies for most of the years in case of the indicator of total beta activity concentration.

It can be stated regarding radioactive substances that the ecology condition/potential of involved surface water bodies is evaluated as good in all years of the 84 years of the flow rate series in case of all power alternatives of the NNS operation (including the concurrence with EDU1-4). The standardized values of environmental quality pursuant to the Government Decree No. 401/2015 Coll. are not exceeded in any case in the evaluated period.

Non-ionising radiation effects

The impacts of non-ionizing radiation (i.e. magnetic or electric field in proximity of electrical devices) will not be significant and will meet the required limit. It is given by the Government Decree No. 291/2015 Coll., on protection of health against non-ionizing radiation, that stipulates for other persons (i.e. general public wherever in a freely accessible area) and for 50 Hz frequency (the frequency of electric systems in the Czech Republic) the highest admissible value of $_{mod}$ (t) = 0.2 V/m for the intensity of electric field induced into tissue. This value must not be exceeded in any time moment.

Disturbing effects

The premises of NNS will be provided with lighting. Aircraft warning lights of red colour, placed on vertical objects (cooling towers, ventilation stacks) as well as the lighting of roads and operational areas in the premises of the NNS will make part of the lighting analogically like in case of EDU1-4.

The aircraft warning lights will comply with respective regulations and that is why no space for minimizing their impact on the light pollution of the territory exists concerning their placing, orientation and luminous intensity. It is unavoidable equipment for safety protection.

The lighting of NSS premises will be designed using modern available means so that the light pollution of the night sky and landscape is limited. Lamps will be used for the lighting that limit emissions to directions that are not necessary (i.e. towards the sky). However, it may be expected that the NSS premises will be clearly visible even with execution of these measures in the night period, especially in foggy weather. However, this impact will be minimized by the optimized design of the lighting of NSS premises. The specified impacts will have combined effect at the concurrence of the NSS placing and operation with EDU1-4 (operation, decommissioning), but significant problems cannot be expected even in this case.

Effects of other physical or biological factors

Potential effects of other physical or biological factors are ruled out.

Impacts during construction or termination

Potential effects of other physical or biological factors during construction or termination are ruled out.

Opinion of the expert report author:

Noise from stationary sources

The team of the expert report authors regards as reasonable to remind in relation to the noise load from stationary sources that certain comments were raised within the opinion of the hygienic station of Vysočina region (see Chapter V. of the submitted expert report that concern the low frequency components of the noise. In connection with this, it can be referred to the requested supplementary background document specified in ***Annex 2.1.*** *of the submitted expert report, based on which the opinion of the protection body of public health was updated through the Ministry of Health with regard to impacts on the public health.*

It ensues from the explanatory background documents of this annex that the low frequency sound with frequency components has very low attenuation and is very little influenced by inhibitions at propagation through air due to its physical properties. It spreads to great distances in this way. Problems with low frequency noise are often detected inside rooms and not in outdoor area. This is connected with the material composition and thickness of partition structures, with the room dimensions and with the sound wave length.

Special attention must be therefore paid to the tone components of the noise in these low frequencies, especially because that low frequency noise penetrates through building structures only with very low attenuation and is subjectively perceived markedly more negatively in comparison with medium and high frequencies that the building outer walls filter substantially better.

Pursuant to Section 2 of the Decree of Government No. 272/2011 Coll., the noise is regarded to be a noise with tone components, in the frequency spectre of which the acoustic pressure level of a third octave zone, eventually of two imminently adjacent third octave zones, is higher by more than 5 dB than the acoustic pressure level of both adjacent third octave zones and the equivalent acoustic pressure level of the frequency zone 10 Hz to 160 Hz is higher than the hearing threshold level in this third octave zone that is stipulated for this frequency zone in Annex No. 1 to this Decree.

The following condition is formulated by the team of the expert report authors for the binding statement draft based on the above mentioned facts, whereas the notifier understands the fact that the protection body of public health would not award any time limited permit for the noise from the new source in terms of the Section 31 of the Act No. 258/2000 Coll., as amended:

- ***the noise from the operation should be measured at the time of starting the trial operation and subsequently also at the time of starting the usual NNS operation; the measuring should also include the evaluation of the occurrence of the tone component of the noise; if a conflict with hygienic noise limit is detected additional noise protection measures must be adopted in order to meet the limits***

Traffic noise

The team of the expert report authors formulated following condition for the binding statement draft based on all facts specified in Chapter V. of the expert report and in requested supplementary background documents specified in ***Annex 2.1.*** *of the expert report, while the notifier understands the fact that the protection body of public health would not award any time limited permit for the noise from the new source in terms of the Section 31 of the Act No. 258/2000 Coll., as amended:*

- ***a detailed acoustic study should be elaborated after the civil contractor is selected that would evaluate the noise impact of the selected solution on the nearest or potentially most involved protected outdoor area or protected outdoor area of buildings of nearby communities***
- ***prior to the construction start, noise should be measured in areas potentially most affected by the construction related traffic based on the actual situation in time of the construction commencement; an acoustic study evaluating the impact of construction related traffic on the acoustic situation will be also elaborated; based on these data, eventual measures should be adopted leading to decrease of noise load (e.g. traffic organization measures, reducing the speed of vehicles, replacement of windows at the involved objects and the like)***

Noise in the construction stage

It can be stated that the impacts on the noise situation during the construction stage are very hard to estimate in the current phase of the project preparation when neither the civil nor the procedure of the civil engineering works are known. However, it is essential that the risks of disorder of the comfort factors of the resident population are significantly eliminated. Respecting the following measures during the construction stage can be required according to the team of the expert report authors:

- ***set up as one of benchmark the specification of guarantees for minimization of negative environmental impacts of construction and for the total duration of construction in the selection process for the construction contractor*** ; ***take into account requirements for application of modern and progressive construction practices (using less noisy and more environmental friendly technologies) in the selection process.***

The evaluation of the magnitude and significance of the noise impact in the construction stage will be part of further project preparation, because it is necessary to deal with these matters seriously only after the principles of construction organization (PCO) are elaborated. The following recommendations are formulated for further project preparation in this connection:

- ***Principles of construction organization should be elaborated that will contain the following requirements with regard to minimizing the impacts on the noise load in construction stage and the impacts on the surface and groundwater:***
  - ***the inhabitants of the nearest houses will be in advance informed about the prepared construction and the length and nature of the individual construction stages***
  - ***All civil works connected with delivery of building and technological materials will be conducted in proximity of residential build-up areas in day time only, with the exception of acoustically insignificant activities, for example such as the transportation of oversize and heavy components, when the night time is more favourable for such transportation thanks to lower traffic intensity, and with exception of material deliveries assuring works that must be carried out without interruptions from technological reasons – these works will be defined within construction organization principles in advance***
  - ***all noisy civil works will be carried out in proximity of protected objects in day time only, namely from 06.00 a.m. to 10.00 p.m.***
  - ***The civil works in proximity of the community Slavětice (vicinity of the switching station) will be limited to the day time excluding the early morning and late evening hours (between 07:00 a.m. and 9:00 p.m.)***
  - ***a check measuring of the noise will be carried out at the nearest residential build-up area at the beginning of the civil works and sound protection measures will be put in concrete terms***
  - ***machines with lower guaranteed noisiness will be used within the construction; noise exigent works will be combined with works of low noisiness, operation of substantial noise sources will be shortened in one day – the works will be divided into several days with shorter time segments – with the exception of ensuring works that must be conducted without interruptions from technological reasons – these works will be defined in advance within the construction organization principles***
  - ***an emergency plan will be elaborated for the construction in terms of the Act No. 254/2001 Coll., on Water and Amendments to Some Acts (Water Act), as amended, with the content of which the whole working staff of the construction will be acquainted***
- ***to ensure contact with nearby communities and general public in the road area during the whole period of the NNS preparation, construction and operation and inform them on the***

progress of the project preparation and execution and on its potential impacts on the ambient, including flexible reaction to arising suggestions and queries

Vibration impacts

Without comments of the team of expert report authors concerning the evaluation of vibrations.

Ionising radiation effects

No substantial comments of the team of expert report authors elaborating team.

Information about the NNS radiation impacts on Austria in the distance of 380 km from the NNS was supplemented as a requested supplementary background document pursuant to Section 9 of Act. No.100/2001 Coll., as amended, based on requirements from the Austrian side within the consultations carried out, namely for the source term "DEC, severe accident, ground escape"; it is included in ***Annex No. 2.2.*** *of the submitted expert report.*

The documentation proposes the following recommendation to the binding statement draft:

- *It will be evaluated based on monitoring reports concerning EDU1-4 and NNS in the documentation for individual phases of the NNS permitting process pursuant to the Atomic Act, whether significant change in effluents of radioactive substances occurred and whether the collective effluents from the NNS and EDU1-4 exceed the envelope used in the documentation of the project impacts on the environment. A causal analysis will be carried out and a revised evaluation of the health impacts will be elaborated in case of exceeding.*
- *At the end of the trial operation, the validity will be verified and confirmed of non-exceeding the assumptions and results of the documentation of the project impacts on the environment in relation to the expected impacts of ionizing radiation from NNS in concurrent effect with EDU1-4 or further nuclear facilities at the site.*
- *It will be evaluated in the documentation for individual phases of the NNS permitting process pursuant to Atomic Act based on from the reports of the EDU1-4 and the NNS monitoring, whether significant adverse trends of radioactive substances concentration in the environment occur. If this trend is detected, a causal analysis will be carried out and the need of corrective actions will be evaluated.*
- *Measuring will commence at sources of effluents from NNS (ventilation stack, check tank and waste water tank) and in modernized/extended parts of the monitoring system in the vicinity prior to the start of putting the NNS into operation. Furthermore, the functionality will be evaluated of the measuring near the sources and of the ambient monitoring system at putting the NNS into operation and at the NNS operation.*

The team of the expert report authors does not accept the first two recommendations for the binding statement draft, because they are ensured in the binding statement draft by the recommendation that the technical and technological solution of the NNS will ensure that the envelope of environmental parameters will not be exceeded, which is specified in the documentation of the project impacts on the environment (Chapter B.II.). Data on inputs and B.III. Data on outputs). Further two recommendations are not accepted, because performing the effluents monitoring of nuclear facilities is part of the valid legislation, including the evaluations.

It must be stated furthermore that the team of the expert report authors came to the conclusion after studying the evaluated documentation that the requirements ensuing from the opinion of the "Ministry of Power Supply, Section of Nuclear Power Supply" of

the Polish Republic dated 8. 3. 2018 in relation to cross-border impacts, which concern effective doses and committed effective doses in the territory of the Polish Republic, are not included in the evaluated EIA documentation. That is why the notifier was asked to provide supplementary background document that is included in ***Annex No. 2.3.*** *of the submitted expert report. It ensues from the specified supplementary opinions that they do not influence the final conclusions of the assessed documentation in any way.*

Non-ionising radiation effects

No comments of the team of expert report authors.

Disturbing effects

No comments of the team of expert report authors. The following recommendation is formulated for the binding statement draft in accordance with documentation:

- ***The lighting of the NSS should be resolved within the documentation for building permit in such a way that significant light pollution of the ambient does not occur e.g. by installing directional light sources***

Effects of other physical or biological factors

No comments of the team of expert report authors.

Impacts during construction or termination

No comments of the team of expert report authors.

D.I.4. Impacts on Surface and Ground Waters

Impacts on Surface Water

The impacts are evaluated for following power alternatives in the documentation:

- EDU1-4 (4x500 MW_e): this power output alternative characterizes the existing condition and the continuation of EDU1-4 operation,
- NNS (2x1200 MW_e) + decommissioning EDU1-4: this is the alternative of operating two NNS units, each of 1200 MW_e power output with decommissioning EDU1-4; this power alternative envelope covers also the alternative of operating one NNS unit of 1750 MW_e power output with decommissioning EDU1-4,

NNS (1x1200 MW_e) + EDU1-4 (4x500 MW_e): it is the alternative of concurrent operation of one NNS unit of 1200 MW_e power with the operation of four units of EDU1-4, each of 500 MW_e; power; this power alternative covers as an envelope also the alternative of concurrent operation of one NNS unit of 1750 MW_e power with the operation of three EDU2-4 units, each of 500 MW_e power and with the decommissioning EDU1.

These alternatives are assessed for the climatic scenario +0 °C (i.e. without climatic change) and for the climatic scenario +2 °C. The climatic scenario +0 °C is decisive for the assessment of short-term impacts (EDU1-4 or concurrence NNS with EDU1-4), the climatic scenario +2 °C is then decisive for long-term impacts (NNS or NNS with decommissioning EDU1-4).

Impact on the character of the territory draining

According to the documentation, the project execution will result in stabilization of areas actually agriculturally cultivated or of grassed areas, on which significant water infiltration takes place under existing conditions. An increase in hard surfaces will result in an increase of rain water outflow into the recipient, namely in the maximum amount of 184 000 m^3/year. It is a relatively very small amount that will not influence significantly the existing character of the territory draining or the hydrological characteristics of the recipient, even in relation to the water loss in the recipient due to evaporation in cooling towers (that amounts to approx. 50 000 000 m^3/year). Rain water will be retained in a retention tank prior to discharging into the recipient. The documentation states that the project practically maintains the division of the rain water amount drained to the individual catchment basins.

Impact on quantitative characteristics of water courses

Water for NNS will be abstracted also from Jihlava River (reservoir of the Mohelno Waterworks), into which waste water will be discharged. The water supply of EDU1-4 is provided in identical way. The water consumption (i.e. difference between the amount of water extracted and water discharged) is specified for individual power alternatives of NNS and EDU1-4, including their concurrence or taking into account the decommissioning, in Table D.46 of the documentation. Outages are not included in these values, it means that they are conservative.

A hydrological and balance model is elaborated for the assessment water supply securing that is based on the flow rate series ascertained for the period 1932 - 2015 (total 84 years = 1008 months). These ascertained flow rate values are used for the evaluation purposes either without correction (climatic scenario +0 °C) or with correction for the climatic change (climatic scenario +2 °C), depending on the assessment time horizon. The evaluation of the water supply securing and of the

impacts on the quantitative characteristics is therefore based on values ascertained in reality that were corrected for the prospective period conservatively.

The requirements for minimum residual flow rates are specified in Table D.47 of the documentation.

The documentation states that the required security for the supply of the power plant is 99.5% (the requirement of the notifier), the required security for minimum residual flow rates is 98.5% (according to the recommendations of the standard ČSN 75 2405 Water Management Analysis of Reservoirs).

The following facts ensue from the results:

- EDU1-4 (2000 MW_e), climatic scenario +0 °C: Requirements for water take-off for the power plant as well as requirements for minimum residual flow rates (current as well as prospective) downstream the Mohelno Water Reservoir are ensured with the security of $p_t \geq 99.9\%$. The take-off is ensured at the level of $p_t = 99.931$ %, i.e. without disturbance of supply in all months of the evaluated time series (84 years = 1008 months).
- NNS (1x1200 MW_e) + EDU1-4 (2000 MW_e), climatic scenario +0 °C: Requirements for water take-off for the power plant as well as requirements for minimum residual flow rates (current as well as prospective) downstream the Mohelno Water Reservoir are ensured with the security of $p_t \geq 99.9\%$. The take-off is assured without disturbance of supply in all months of the evaluated time series. Identical conclusion applies for the power alternative NNS (1x1750 MW_e) + EDU2-4 (1500 MW_e) + decommissioning of EDU1-4 that is covered by the envelope of the power alternative of NNS (1x1200 MW_e) + EDU1-4 (2000 MW_e).
- NNS (2x1200 MW_e) + decommissioning of EDU1-4, climatic scenario +2 °C: Requirements for water take-off for the power plant as well as requirements for minimum residual flow rates (current as well as prospective) downstream the Mohelno Water Reservoir are ensured with the security of $p_t \geq 99.9\%$. The take-off is assured without disturbance of supply in all months of the evaluated time series. Identical conclusion applies for the power alternative NNS (1x1750 MW_e) + decommissioning EDU1-4 that is covered by the envelope of the power alternative NNS (2x1200 MW_e) + decommissioning EDU1-4.

It ensues from comparing the simulated average long-term outflow rates of the power alternatives 2000 MW_e and 2x1200 MW_e separately for the current and prospective climatic conditions or from parallel mutual comparison of the simulated average long-term outflow rates under current and prospective climatic conditions separately for each power alternative that the climate change share of the decrease of average long-term outflow rate from Mohelno Water Reservoir amounts to approximately 70% considering the NNS power output of 2x1200 MW_e, while the increase of Dukovany NPP take-off is responsible for the remaining 30%.

The following table specifies the average long-term outflow rate in the Jihlava water course at the operation of evaluated power alternatives of NNS or EDU1-4 in both climatic scenarios.

Average long-term outflow rate in the monitoring point Jihlava – Mohelno - downstream

Climatic scenario	Power output alternative	Average flow rate [m^3/s]
+0 °C	EDU1-4 (2000 MW_e)	5.178
	NNS (1x1200 MW_e) + EDU1-4 (2000 MW_e)	4.565
	NNS 2x1200 MW_e + decommissioning of EDU1-4.	4.920
+2 °C	EDU1-4 (2000 MW_e)	4.544
	NNS 2x1200 MW_e + decommissioning of EDU1-4.	4.281

Note: It is the average flow-rate downstream the Mohelno Water Reservoir in the whole modelled period of 84 years (1008 months).

The documentation concludes that the requirement for $p_t \geq 99.5\%$ security of the take-off for the power plant is fulfilled always and with considerable margin for all power alternatives of the NNS, including their concurrent operation with the existing EDU1-4 (both of its operation and decommissioning). The take-off is assured without supply disturbances. The requirements for minimum residual flow rates in Jihlava River, in the monitoring point Mohelno downstream the reservoirs, are at the same time fulfilled without disturbances for all power alternatives of the NNS, including their concurrent operation with the existing EDU (both its operation and decommissioning). This is true both for the current and the prospective values.

Impact on qualitative characteristics of water courses – Jihlava River

The evaluation is carried out in the documentation for: pH, BSK_5, $CHSK_{Cr}$, dissolved substances, undissolved substances, DIS, sulphates, chlorides, calcium, total nitrogen, nitrate nitrogen, ammonium nitrogen, total phosphorus and hydrocarbons C_{10-40}. It is evident concerning great majority of indicators (i.e. undissolved substances, DIS, sulphates, calcium, ammonium nitrogen and hydrocarbons C_{10-40}), which are currently specified in the valid permit for discharging waste water from the operation of EDU1-4, that the limit values of admissible pollution of these indicator according to the Government Decree No. 401/2015 Coll. will not be exceeded in any year for any of the evaluated power alternatives. The target value is achieved even for the minimum pH values;, maximum values might be exceeded in several years in case of all evaluated alternatives. The target value of admissible pollution might be exceeded for the indicator $CHSK_{Cr}$ at the power alternative NNS 2x1200 MW_e in sporadic cases; the number of years with exceeding this limit will be higher in case of the alternative of the short-term concurrence of the NNS and the EDU1-4.

The summary evaluation of additional indicators results with very favourable outcome for the indicators BSK_5, temperature and chlorides, because the target values are not exceeded for any of the evaluated power alternatives in any year of the time series of 84 years. It ensues from the evaluation on the contrary that the target values of admissible pollution might be exceeded permanently in case of nitrate and total nitrogen in all simulated power alternatives (including simulation of the current condition). This exceeding is caused by significant supply of nitrogenous substances from the river basin upstream the Dalešice Water Reservoir and by thickening of waste waters in the operation of NNS and EDU 1–4 at the same time. The rate of exceeding the values of admissible surface water pollution grows with growing power output of the assessed alternatives. Total phosphorus is another indicator where the target value of permissible pollution may be exceeded. The target values are exceeded with probability of approximately 20% already at simulations for the current climatic condition even at the power alternative of EDU1-4 2000 MW_e (these situations are connected with periods of high and very high annual average flow rates almost exclusively); the probability of target values being exceeded increases slightly with the growing power output, it might reach approximately 27% for the short-time concurrence of NNS and EDU1-4. In spite of the fulfilled limit for surface water temperature pursuant to the Decree No. 401/2014 Coll., the warmed-up waste water discharged from NNS or EDU1-4 might have certain impact on the water temperature in Jihlava water course at all power alternatives, the climatic change alone will have prevailing impact in case of the long-term NNS operation with the power alternative of 2x1200 MW_e when the maximum temperature might be higher by 1.2 °C in average.

As ensues from the specified data, the matters of impacts on the quality of surface water are sensitive. Therefore, the optimization of water management will be strongly emphasized in further project stages so that the water quality is not impaired in Jihlava downstream the waste water outlet object over the extent that would be harmful to the environment.

Impacts on the water bodies of surface water

In total six surface water bodies are delimited in the territory of interest on Jihlava River from the monitoring point Jihlava - Vladislav down to entry of Jihlava do Nové Mlýny II water reservoir (inclusive), out of that three belong to the natural category river a three are strongly affected bodies assessed as the lake category. The evaluation of surface water bodies ensue from the Plan of Dyje Partial River Basin for the period of 2016-2021 and from the data of the monitoring in the period 2010-2012 – it is apparent that none of the assessed water bodies indicates the good state in the complex of chemical and ecological condition or potential at present.

Three above mentioned power alternatives (EDU1-4 (2000 MW_e), NNS (1x1200 MW_e) + EDU1-4 (2000 MW_e) and NNS (2x1200 MW_e) + decommissioning EDU1-4) are evaluated in the climatic scenario 0 °C in the documentation. Data for climate change are included into the evaluation, because a change of reference conditions and new setting of target values for good condition/potential of water bodies can be expected at the climate change. Possible changes of setting the target values of good condition/potential of water bodies will be taken into account in further stages of the project preparation.

The impact of NNS or EDU1-4 on the condition/potential of surface water bodies is not primarily given by the effect of NNS or EDU1-4 (that do not discharge majority of the monitored substances at all), but by the thickening, i.e. difference of the concentration of monitored substances between the extracted raw water and the discharged waste water due to the evaporation in the cooling towers. The impact of NNS or EDU1-4 decreases with the distance from the effluent point and it is practically undetectable in the water body of the middle Water Reservoir Nové Mlýny due to tributaries of Jihlava River.

It is evident from simulation results of the impact of NNS or EDU1-4 on the chemical condition of water bodies that although the concentrations of majority of indicators fulfil the standards of environmental quality, the good chemical condition is not achieved in any of the simulated power alternatives in any water body (i.e. not even at the simulated current condition). The reason is that with certain probability the average annual concentration of some of the indicators, like benzo(a)pyren, fluoranthen, benzo(g,h,i)perylene, nickel or mercury may be exceed in individual water bodies. The specified polycyclic aromatic hydrocarbons (PAH) are products of combustion in big as well as local furnaces and in motor cars and they get in the form of atmospheric deposition into the water environment. Neither the NNS nor the EDU1-4 create these substances, but they might influence their concentration in the Jihlava water course by thickening the extracted and discharged water. Identically, the NNS or EDU1-4 are not sources of mercury or nickel. Raw water abstracted from Jihlava water course already contains these heavy metals and the impact of NNS or EDU1-4 is given only by thickening the abstracted and discharged water.

It ensues from simulation results of NNS or EDU1-4 operation impact concerning the evaluation of general physically-chemical components that the indicators BSK_5,

sulphates, chlorides, pH minimal values, and ammonium nitrogen are trouble free during the entire 84 years series and for all power alternatives in all water bodies.

The limit of good condition might be exceeded for the indicators P_{total}, $N\text{-}NO_3^-$, maximum pH and temperature with certain probability in individual water bodies, with higher probability in case of the indicators P_{total} and $N\text{-}NO_3^-$ that are problematic in the current condition already, with low probability in case of the indicator pH and temperature. Phosphorus gets to surface water either from spot pollution sources (densely populated areas and the like) or from agriculturally exploited land plots as erosion phosphorus. The intensive agricultural activity is the source of nitrate nitrogen. The pH Indicator is affected significantly by the supply of phosphorus from upper part of the catchment basin and by the subsequent development of phytoplankton.

It can be concluded that in spite of possible slight concentration growth due to the impact of NNS or EDU1-4, the existing evaluation according to the Plan of Partial Dyje River Basin for the 2016-2021 period will not change as a result of the operation of any power alternative of NNS or EDU1-4. The ecological condition/potential of the general physically-chemical component of the assessed water bodies will continue to be evaluated as a medium one.

Five of the six bodies are now evaluated to be in good condition or with good or better potential from the perspective of specific pollutants.

It ensues from the simulations of power alternatives of the NNS or EDU1-4 operation and from the subsequent evaluation that the standard of environmental quality is fulfilled for majority of the wide spectrum of specific substances. The categories of water bodies do not change for specific pollutants due to the project impact according to the simulation results, the water body middle Nové Mlýny II Reservoir on the Dyje water course remains in the good and better category, other bodies remain in the medium category.

The current positive assessment results with regard to biological components according to the Plan of Dyje Partial River Basin for the period 2016 - 2021 and the water body downstream Mohelno Reservoir – i.e. Jihlava from the dam of Mohelno Reservoir to Oslava watercourse and also for Mohelno Reservoir on the Jihlava water course. Strong eutrophication and massive development of phytoplankton are reasons of adverse evaluation of the water bodies - and also bad condition of the fish biologic component in case of the water bodies on Jihlava from the Oslava water course down to the dammed water of the Nové Mlýny II. Reservoir – Middle on the Dyje water course.

It ensues from the simulations of power alternatives of the NNS or EDU1-4 operation and subsequent evaluation with regard to biologic components that the categoryies of water bodies do not change due to the project impact.

Impacts on Fish Water

The section of salmon water No. 288 “Jihlava Downstream Mohelno” was established in the length of 15.39 km downstream the Mohelno Water Reservoir on Jihlava River by the Government Decree No. 71/2003 Coll., on the Definition of Surface Water Suitable for the Life and Reproduction of the Original Species of Fish and Other Aquatic Animals and on the Determination and Evaluation of the Quality of Such Water, as amended. The section of carp water No. 299 “Lower Jihlava” is situated on the Jihlava River downstream the confluence of Jihlava with Oslava. The indicators and values of

admissible pollution of salmon and carp water, i.e. the quality of such water, are evaluated pursuant to the Government Decree No. 401/2015 Coll. and also pursuant to the Government Decree No. 71/2003 Coll.

The quality condition of surface water is evaluated for the indicator temperature in the section of salmon water No. 288 and in the section of carp water No. 299 in the documentation, which is the indicator with the most significant affectation expected. The surface water bodies Dalešice Reservoir and Mohelno Reservoir on the Jihlava water course (including also the catchment basin of Skryjský Stream) are not determined as salmon or trout water, which is why the impact on them is not evaluated in the documentation.

It ensues from the simulations performed and from the subsequent water temperature evaluation that neither the salmon nor the carp water would be affected in case of continued current operation of EDU1-4 without the NNS (zero variant) and without taking the climatic change into account. If the climatic change +2 °C is taken into consideration, the limit of maximum temperature for carp water, 28 °C, will not be affected by the continued operation of EDU1-4, while the limit of 21.5 °C for the declared salmon water will not be fulfilled, which would result in the change of salmon water section No. 288 to carp water. In analogy, neither the salmon nor the carp water will be affected at the maximum envelope power alternative of NNS 2x1200 MW_e without the climatic change, but only the limit of maximum temperature for carp water will be fulfilled at the climatic scenario +2 °C, while the limit for salmon water will not be fulfilled any more. The carp water will not be affected at the short-term concurrence of NNS 1x1200 MW_e and EDU1-4 2000 MW_e maximum temperatures specified for salmon water will not be exceeded in average in the individual years, but exceptional exceeding cannot be ruled out in the years with extremely low flow rate in the Jihlava River.

As specified in Chapter C.II.4. of the documentation Surface and Groundwater, the development of the water temperature in the Jihlava water course shows growing trend, from which it is evident that this water course will not be suitable any more for the life of salmon fish and grayling with high probability in future, regardless the execution or non-execution of the NNS. Therefore, the section of salmon water will cease to exist spontaneously due to the climatic change, even if the NNS project is not executed. It must be added that this section of salmon fish has originated thanks to the Dalešice - Mohelno that cools down the water in Jihlava River downstream Mohelno and that it is not a natural section consequently.

Thus, there will be only sections of carp water in the Jihlava River downstream the Mohelno Water Reservoir in the long-term perspective, if the climatic scenario +2 °C is envisaged. The NNS operation will not be the main factor causing these changes.

Impacts on interest protected by the Fishery Act

The impact on the declared coarse fishing grounds Jihlava 7-8 (Dalešice Water Reservoir) and Jihlava 6 (Mohelno Water Reservoir) and trout fishing ground Jihlava 5C and Jihlava 5B is evaluated with regard to the interests protected by the Act No. 99/2004 Coll., on Fish Farming, Exercise of Fishing Right, Fishing Inspection, Protection of Marine Fishing Resources and on Amending Certain Acts (Fishery Act), as amended in documentation.

The indicators of the level drop (fluctuation), water temperature, oxygen regime, concentration of nutrients, quality of habitats, phytoplancton, zooplancton, zoobenthos,

fish associations and availability for fishing are evaluated in case of coarse fishing grounds. The zero variant (i.e. continued existing operation of EDU1-4) is evaluated as having no impact on these fishing grounds both without and with taking the climatic change +2°C into account. The power alternative NNS 2x1200 MW_e is evaluated analogically as having no impact when the climatic change is not considered. The impact of NNS 2x1200 MW_e with climatic change +2 °C is evaluated as either having no effect or having insignificant effect only, with the exception of possible slight impact on the phytoplankton (manifested by increased development of cyanobacteria). In addition to this, slight impact on the level fluctuation was registered for this power alternative at the climatic change +2 °C in case of the fishing ground Jihlava 7-8 that causes possible dieback of zoobenthos and hard roe of some species in places of the level fluctuation, as well as slight impact on the availability for fishing due to the level fluctuation. The short-term concurrence of NNS 1x1200 MW_e and EDU1-4 will not impact the level, the quality of habitats, and the accessibility for fishing in case of fishing ground Jihlava 6. The short-term concurrence of NNS 1x1200 MW_e and EDU1-4 will have generally insignificant impact on other characteristics of coarse fishing ground, the impact will be evaluated as slight in case of phytoplankton only.

In the trout fishing grounds Jihlava 5B and 5C, the NNS impacts on the indicators of the flow rate, water temperature, oxygen regime, concentration of nutrients, quality of habitats, bioseston, zoobenthos, fish association and availability for fishing will be also little different only from the existing condition of EDU1-4 operation in case of various power alternatives and climatic scenarios. The impact of the changed temperature regime and related indicators is an exception. The interest protected by the Fishery Act will not be affected at al or insignificantly only compared to the current condition in case of any power alternative of NNS or EDU1-4 under current climatic conditions; slight or low significant impacts (slight increase of maximum surface water temperature resulting in change of quality and quantity of fish association and worse availability for fishing) or even significant impacts (change of quality and quantity of zoobenthos due to the temperature change) on several indicators will be exceptionally detected in case of the concurrence of NNS and EDU1-4. The temperature situation in the river fishing grounds, both the average values of annual maxima and the maximum absolute values, is significantly affected in case of climatic scenario +2° C. This influence will manifest itself even if the NNS operation is not started. Significant impact on the quality and quantity of zoobenthos and fish association and extinction of salmon water is expected due to this development connected with the climate change to decisive extent. The NNS operation in the power alternative 2x1200 MW_e may influence the temperature situation and indicators related to it insignificantly only above the extent of these changes (up to the increase of maximum temperature of the river water by 0.5 – 0.7 °C compared to the zero variant).

Impacts on small water power plants

The analysis of potentially involved small water power plants (SWPP) is carried out in the documentation with regard to treatable water volume and electrical power generation for the purpose of evaluating the impact on SWPP. The analysis refers to small water power plants from SWPP Mohelno-Dam down SWPP Cvrčovice that is the last one in the series of the seven existing water power plants. Detailed evaluation has not been carried out yet for the SWPP Dolní Kounice, which has not been constructed yet.

The expected decrease of SWPP production is an important result of performed analyses. It will be mainly due to the expected climate development (+2 °C) and the lower flow rates in Jihlava River related to it that would affect all existing sources regardless, whether the NNS is put into operation or not.

The average annual volumes of treatable flow rates are individual to certain extent and are affected by the magnitude of the capacity flow rate of the SWPP turbine (turbines) in relation to the average flow rate in the water course. However, the trend is apparent consisting in the fact the influence decreases with growing distance from the Mohelno Water Reservoir downstream the water course. It is evident from the results of electricity production balance that the average annual production of an individual SWPP decreases in the order of several percent units only due to the NNS project impact even at the envelope power alternative of NNS 2x1200 MW_e and considering the climatic change +2°C compared to the alternative of continued operation of EDU1-4 under the respective climatic scenario. The small power plant production might drop by approximately 10% during the short-term concurrence of the NNS 1x1200 MW_e and the existing EDU1-4. Two thirds of the predicted fall are related to the SWPP Mohelno-Dam that is operated by the ČEZ group so that this production drop is not an externality of the assessed solution.

In its envelope power alternative of 2x1200 MW_e, the NNS represents power increase of approx. 400 MW_e in the Dukovany site compared to the current situation, i.e. increase of the average annual production by approximately 3 TWh. Compared to this, the possible production loss of the assessed SWPPs (without the SWPP Mohelno-Dam) amounts to 1 GWh at maximum and represents thus only approximately 0.3 ‰ of the annual power supply contribution of the two new NNS units.

Impacts on groundwater

Impacts on hydrogeological conditions

The documentation states that new preference routes of groundwater flow will be created in connection with the project construction as a result of local anthropogenic change of the land plot due to the rough grading. Possible change of outflow situations might be connected with it. The groundwater level will be reduce compared with the original one due to the rough grading of the land plot. Considering the hydrogeological structure type of the territory, the project cannot interfere with nor influence the hydrogeological conditions in the wider environment of NSS premises.

Impacts on groundwater

There are no protected areas of natural accumulation of ground water or sources of ground water in the territory involved that might be disturbed by the project execution.

Impacts on the water bodies of ground waters

The NNS impact is evaluated for the groundwater bodies specified in Chapter C.II.4.2. of the documentation. Groundwater: Those monitoring objects or take-off points of groundwater are selected for the purposes of evaluating the chemical condition that are situated within the distance of 500 m from the Jihlava water course, because only there infiltration of surface water into groundwater can be expected (it concerns four monitoring objects of CHMI, used for evaluating the condition of groundwater bodies and in total six take-off points of groundwater for potable purposes, thereof five points have data about quality).

The groundwater quality might be adversely affected by potential infiltration of contaminated surface water into groundwater. It ensues from performed simulations of individual power alternatives of NNS or EDU1-4 that the condition of individual objects or take-off points does not deteriorate; on the contrary, the condition improved in several cases thanks to lower concentration in surface water - but it is a hypothetical situation only, at which contaminants are not supplied from the areal pollution sources within the catchment basin downstream Mohelno. No significant impact on the qualitative condition of groundwater is known in connection with EDU1-4 at present and it is not presumed that such impact would appear in connection with the NNS. Furthermore, no impact of the NNS on the quantitative condition of groundwater bodies is expected. Therefore, the NNS impact will not cause impaired condition of involved groundwater bodies.

More detailed information concerning the evaluation of the project impacts on groundwater bodies are specified in annex 4.1 of the documentation.

Opinion of the expert report author:

Without substantial comments concerning surface water. The notifier was asked with respect to the development of climatic changes in accordance with certain opinions to the documentation (see Chapter V.) to provide supplementary background documents concerning the matters of water supply in relation to the evaluated climatic scenarios. They are included in ***Annex 2.2.*** *of the submitted expert report as the requested supplementary background document.*

The Jihlava River represents one of performance limitations of the site. That is why the security rate of the water for the NNS operation was investigated in detail. It is demonstrated reliably that for the NNS with the net electrical output of up to 2 400 MWe, the required security for the supply for the power plant of 99.5% (the requirement of the Notice Author) will be met, the required security for minimum residual flow rates is 98.5% (according to the recommendations of the standard ČSN 75 2405 Water management analysis of reservoirs), even when considering climate change +2°C. This security will be met even during a temporary concurrence of the operation of NNS Unit 1 and EDU1-4 or EDU2-4. For details see Chapter D.I.4.1.3.1. Effects on the minimum residual flow rate in the Jihlava River and the security of water supply for the power plant.

The Dalešice – Mohelno water work system plays a compensation role in case of short-term dry periods that last several months. The Dalešice Water Reservoir has the total storage volume of 129 million m^3 water and the regulation storage space of 63 million^3 water. This storage volume is sufficient both for covering several month needs of the NNS at full power output (!) and for the preservation of minimum residual flow rate at the outflow from the Mohelno reservoir. It represents a water source practically unlimited in time for the assurance of residual heat removal from the reactors in the condition shut-down condition of the NNS or EDU1-4.

The climatic scenario 0°C was used only for the evaluation of the concurrence stage, i.e. until 2045 at maximum, when we expect no or only minimum effect of the climate change based on the existing meteorological data. The climatic scenario +2 °C until 2100 (i.e. effectively in model calculation from 2045 to 2100) was selected, because it has support in international agreements and commitments that are based on scientific findings. Flow rates in Jihlava River remain practically constant, when long-term average flow rates are concerned, and only the short-time monthly minimum values change in spite of the growing average temperature since the time the flow rate

monitoring started. If flow the rate drops, the minimum residual outflow rate from the Mohelno Water Reservoir would have to be maintained even at the expense of temporary reduction of the power output.

The team of the expert report authors formulated the following recommendations for the binding statement draft concerning the specified matters in relation to the limitations of the site that are given by the transmission network capacity, by the amount of effluents released to water course, by risks connected with future development of climate and its impact on the amount and quality of water in Jihlava River and based on the current knowledge of the site:

- ***the net electrical power of the Dukovany site will not exceed 3250 MW_e in any variant of the concurrence of NNS with EDU 1-4***

The project submitter (EDU II, or ČEZ) as well as the author of EIA documentation are fully aware of the importance of the water management matters connected with the NNS project. As a consequence of this and based on water management studies already performed within the proceeding between the project notification and the EIA documentation, the submitter decided to decrease the power output of the NNS from 3500 to 2400 MWe of net electrical power, being fully aware of the site limitation from the water management viewpoint.

The following recommendation is formulated for the binding statement draft within the further project preparation:

- ***The results of water management balances (or take-off security) should be updated within the documentation for building permit based on the new data from the contractor of the NNS, as well as on the extended flow rate series of Jihlava River in the monitoring point Jihlava - Ptáčov, on updated values of minimum residual flow rate in the monitoring point Jihlava - Mohelno Downstream valid in that time and on further actually monitored data on climatic changes (temperatures, precipitation)***

Based on these data, the security of raw water supply will be newly assessed and adequate measures (if needed) will be defined, e.g. shutting down some of EDU1-4 units. This procedure is absolutely in accordance with the used envelope method that evaluates impacts (i.e. on the raw water take-off) in their potential maxima.

The documentation substantiates the fact that the condition of the surface and ground water bodies will not be impaired and achieving good condition of this water will not be inhibited. Furthermore, an updated evaluation will be carried out for the selected design solution of the project in subsequent proceedings that will take into account the existing climatic and hydrological condition, quality of surface water and legislation requirements in time of the preparation; it will also include proposal of measures mitigating the negative impacts.

The conditions for subsequent proceedings are also formulated in this sense in the following form, whereas the requirements ensuing from the valid legislation are not specified in the binding statement:

- ***The optimization of water management should be strongly emphasized in further project stages so that the water quality is not impaired in Jihlava downstream the waste water outlet object, as it is necessary to prevent deterioration of conditions of the involved water body***
- ***Indicators, which cause impairment of chemical condition of surface water bodies exceeding the standards of environmental quality, should be monitored in raw and waste water during the further stages of the project permitting process for the purpose of evaluating the chemical condition of the surface water bodies.***

- ***It should be ensured within the documentation for the building permit that the technical and technological solution of the NNS makes possible limitation of liquid effluents (waste water) containing radioactive substances from the NNS, especially tritium (H-3), in cases of low flow rates in Jihlava River***

It is reasonable to state further that the monitoring as per the second point has already started.

Concerning surface water, the attention should be drawn by the team of expert report authors to the formal side of the wording in the documentation that an increase in compacted surfaces will result in an increase of rain water outflow into the recipient, namely in the maximum amount up to 184 000 m^3/year. It is a relatively very small amount that will not influence the existing character of the territory draining or the hydrological characteristics of the recipient significantly - the team of expert report authors does not consider it to be properly substantiated. The calculation is not included in the documentation – it ensues from the background papers for the documentation (given to the expert report author) that the long-term annual precipitation at the Dukovany site is 490.1 mm. The total coefficient of outflow rate from the NSS premises will depend on the progress of works (gradual building-up). The outflow rate coefficient 0.38 is considered conservatively, which corresponds to the build-up rate in the final condition. The total coefficient of outflow rate from surfaces of the construction site installations is expected 0.45, which corresponds to approx. 184 000 m^3/year.

Without comments of the team of expert report authors concerning impacts on groundwater.

The following recommendations of the team of documentation authors specified in Chapter D.IV.2.2. are not reflected by the team of the expert report authors in the binding statement draft, because the proposed recommendations are already included in the project:

- *The technical and technological solution of the NNS will ensure that liquid effluents containing radioactive substances will be effectively pre-treated prior to discharging with other waste water from the NNS, their residual activity will be checked, the discharge will be handled in controlled way and the liquid effluents will be diluted by blow down water from the cooling tower in the stipulated minimum ratio at the discharging.*
- *The monitoring, balancing and control of liquid effluents will be linked to the monitoring of hydrologic situation in Jihlava River so that the legislation limits of radionuclide activities are not exceeded at the monitoring point Jihlava River downstream the Mohelno Water Reservoir even in case of occurrence of extraordinary adverse hydrological situation (low flow rates).*
- *The chemical regime used in technological circuits of the NNS will take into account the principle of minimizing the effluents of low active radioactive substances as well as inactive pollutants to the ambient.*
- *The NNS will be provided with its own WWTP, in which all sewage water produced in the NSS premises will be treated.*

Without comments of the team of expert report authors concerning the impacts on fish water and interests protected by the Fishery Act.

D.I.5 Impacts on land

The permanent annexation for the closed NSS premises (power plants units location in the area A, including related infrastructure) is envisaged in the extent of approximately 88 ha; the permanent annexation for other project parts (areas C and D), i.e. the overhead part of electrical connection line and above ground parts of water system connection, do not exceed 13 ha approximately. It means 101 ha in total. Permanent annexation is not required for the area B (construction site installations). The project itself will mostly be realised on the ALR land belonging to land with protection classes II, III, and V, i.e.. land categorised in the given region as land mostly with above-average to average land capability. The occurrence of 5 types of EPEU is registered within the NSS premises - area A (4.10.00 - protection class I, 4.12.00 - protection class II, 4.26.01 and 4.29.01 - protection class III, 4.37.15 - protection class V). Majority of annexation is anticipated on land of protection class II, namely around 58% from the total annexation, lands of protection class I follow with the share of approximately 27% on the total permanent annexation, approximately 10% represent areas of protection class III and approximately 5% lands of protection class V. Up to 5 hectares of LIFFF land will also be affected within the area D (area for water system connection). It will be a permanent limitation (corridors of pipelines, including protective zone) on the area of approximately 3 ha or the annexation of approximately 2 ha for placing the raw water pumping station.

Impacts during construction or termination

The documentation states that areas of permanent and temporary annexation (construction site installations) will be used for construction (movement of construction machinery, civil engineering work itself). Temporary annexation of agricultural land during construction is above all required by the main construction site area (area A) and the construction site installations area (area B), in general it is assumed that the temporary annexation extent will be up to approx. 158 ha (construction site installations and areas being released for the main construction site). Areas of the temporary annexation will be situated on agricultural lands. The topsoil will be stripped and deposited onto a dumping site before construction commences. The humus horizon of the agriculturally exploited and other lands is 25 cm deep in average (the depths fluctuate between 15 cm and 35 cm), while it is 5 cm deep in average in case of forest lands approximately (it fluctuates from 1 cm to 10 cm). Stripping volumes within rough grading were determined in the amount up to 670000 m^3, thereof topsoil 450 000 m^3 and subsoil 220 000 m^3. Full area topsoil and subsoil stripping is expected in areas A and B only. The areas C and D are intended for constructing line elements of the related infrastructure; the land will stripped only locally here (in points and/or lines) and the original profile will be restored immediately after the works completion.

The original land profile will be restored on the land plots of temporary annexation and the land plots will be reclaimed and returned for the original use after the construction completion. The excessive topsoil and subsoil will remain stored in a dumping site in the eastern part of the area B (construction site installations) in a layer approximately 1 m thick after the construction completion. The expected amount is up to 480 000 m^3.

Opinion of the expert report author:

No comments of the team of expert report authors.

The classes of protection are defined based on the Public Notice of the Ministry of Environment No. 48/2011 Coll. on defining classes of protection dated on 22. 2. 2011.

The protection classes are determined using EPEU according to Public Notice No. 546/2002 Coll. as of 12th December 2002 that changes the Public Notice No. 327/1998 Coll. laying down the characteristics for land ecology assessment units and the procedure for keeping records on them and updating them.

Withdrawing lands from the agricultural land resources was specified more precisely in the Methodical Instruction of the Section of Forest and Land Protection of the Ministry of Environment of the Czech Republic dated on 1.10.1996, ref. No. 00LP/1067/96 that came to force on 1.1.1997. This Methodical Instruction stipulates in Article III Withdrawing Lands from Agricultural Land Resources (Section 9 of the Act) following:

1) *At the assessment of the application for withdrawal of agricultural lands from the ALR, the body of the ALR protection takes into consideration the principles of its protection pursuant to Section 4 of the Act, as well as the fact, if the required withdrawal concerns an area determined by the approved documentation.*
2) *If the agricultural land requested for withdrawal is situated beyond the area specified in Paragraph 1, the body of ALR protection proceeds pursuant to Article II and the consent issues pursuant to Section 9, Paragraph 6, of the Act, especially in cases as follows:*

   a) for publicly beneficial construction publicly (apart from line constructions),

   b) in the interest of protecting basic components of environment,

   c) for construction of family house of a physical person, on a land plot immediately adjacent to areas intended for non-agricultural use by approved documentation or adjacent to an existing build-up area up to the size of 1 200 m^2 at maximum,

   d) on areas imminently directly adjacent to existing build-up area in communities, where the documentation acquisition is not envisaged,

   e) where the consent of the ALR protection body was already granted pursuant to Section 7, Paragraph 3 of the Act.

Protection classes of agricultural land resources are determined n Article IV of this Methodical Instruction; they are specified for the purposes of ALR protection in the annex called Protection Classes of Agricultural Lands. This annex stipulates:

1. *The class I of agricultural land includes the most valuable assessed lands of individual climatic regions, mainly on flat areas or with slight slopes only that may be withdrawn from the agricultural land resources exceptionally only, mainly for projects related to recovery of environmental stability of landscape or for line constructions of essential importance.*
2. *Agricultural lands having above-average production ability within individual climatic regions belong to the protection class II. In relation to protection of the agricultural land resources, these lands are highly protected, they can be withdrawn conditionally only and also built-up conditionally only with respect to the zone planning.*
3. *Agricultural lands with average production ability and medium protection degree within individual climatic regions, which makes possible their use for eventual construction within the zone planning, are grouped in the protection class III.*
4. *Agricultural lands with prevailing under-average production ability and limited protection degree within individual climatic regions, usable for construction, are grouped in the protection class IV.*
5. *The remaining Estimated Pedologic-Ecological Units (“EPEU” only hereinafter) are included in the protection class V.; they represent especially the lands with very low production ability including shallow soil lands, very sloping land, hydromorphous soil land, gravel to stony lands and lands most endangered by erosion. These are mostly agricultural lands that are dispensable for agricultural purposes. More effective non-agricultural exploitation of these lands can be expected. They are mostly lands with lower protection degree, with the exception of delimited protective zones and protected areas and further interests of the environment protection.*

The detailed annexation paper evaluating permanent and temporary annexations of ALR and LIFFF and the calculation for compensating damages on LIFFF will be elaborated and the fee amount for permanent and temporary withdrawal of LIFFF will be stipulated after the documentation for building permit and the processed geometrical plans are approved; the land plots will be more precisely specified at the same time where the construction will be executed in a protective zone of forest. This reality must be respected regardless the impact assessment process, because it ensues from the applicable branch acts, including the requirements for stripping procedures. That is why the requirements formulated in Chapter D.IV.2.3.5 concerning the ALR are not specified among the conditions of the binding statement draft:

- *The agricultural land resources and limited land plots intended to fulfil the forest function will be annexed to the necessary extent only.*
- *It will be assured at stripping that the horizon embedded lower (waste rock) is not taken-up to larger extent. The stripping will be conducted under the supervision of soil scientist in areas high quality land occurrence (protection classes I and II).*
- *The stripped humus horizon (topsoil) and lower laying fertilizable layers (subsoil) will be properly stored at separate dumping sites so that they do not degrade.*
- *The earth extracted during the rough grading and excavation works will be stored in such a way that the erosion impact is minimized.*

According to opinion of the team of expert report authors, the following recommendations incorporated into the binding statement draft should be respected within further project preparation in relation to demands on the LIFFF:

- ***within the documentation for building permit:***
  - ***Permanent annexations of LIFFF for construction site installations, intermediate dumping sites of stripped earth and intermediate dumping sites for building materials of the actual NNS should be ruled out and temporary annexations should be minimized to necessary cases***
  - ***Permanent annexations of LIFFF for construction site installations, intermediate dumping sites of stripped earth and intermediate dumping sites for building materials in corridors of related line constructions for NNS in parts of their routes in forests should be ruled out and temporary annexations should be minimized to necessary cases***
  - ***Consistent forest reclamation should be specified in forest stands affected by the construction***
- ***The agreed minimized scope of deforestation should be carried out within the construction stage gradually and solely during dormancy periods based on precise fixing of the necessary deforestation scope in the terrain***

D.I.6 Impacts on natural resources

It ensues from the documentation that the project is not in a spatial conflict with any protected deposit area or any existing extraction area, the natural sources of the territory involved are not affected. The existing deposits of building raw materials will be used for the construction, requirements to open new sources of building materials do not arise. Impacts on the natural sources do not arise in the course of the operation terminating.

Opinion of the expert report author:

No comments of the team of expert report authors. The following is proposed in the documentation conditions for the binding statement:

- Geotechnical properties of the construction site, ascertained based on detailed engineering-geological survey, will be taken into account in the design of foundations of individual objects.

This condition is not accepted in the binding statement draft, because it is clearly a requirement for civil engineering solution regardless the process of environmental impact assessment.

D.I.7 Impacts on biological diversity

Impacts on Specially Protected Areas and Sites of Natura 2000 System

No large area SPA (specially protected area) (NP or PLA) is situated in such a position towards the existing power plant and the project that it could be significantly influenced by the project itself or related activities.

From small area SPAs, there are NR Dukovany mill, NNR Mohelno serpentine steppe, and NR U jezera (At Lake) nearest the project location. However, these are situated at a sufficient distance from areas for the project placing and construction as well as outside the main transport connection of the project (road No. II/152). Potential, however little significant impact is identified on the road No. II/392 passing across the NNP Mohelenská hadcová step (Mohelno serpentine steppe). However, the traffic intensity will not significantly change on this road and the related impacts (dust, immissions nitrogen or impact winter maintenance) will be similar to the existing condition and will be limited to the nearest vicinity of the road. Other direct or indirect impacts on the specially protected areas are not expected.

In order to assess possible project impacts on the Natura 2000 system sites and their protection objects, the nature assessment has been elaborated pursuant to Section 45i of Act No. 114/1992 Coll., as amended (Appendix 3.2 of the documentation). The results imply that the project will not have a significant adverse effect on any protection object of the Natura 2000 sites even in case of a concurrent (cumulative) effect of other activities or projects within the site. A slightly adverse effect could only arise on protection objects of two SCIs*:*

- SCI Jihlava valley (CZ0614134) - forest associations in the boundary section with the development area for location of the project water system connection. A potential slightly adverse effect was identified in case of non-observance of the development area boundaries and for reasons of possible dustiness during construction. A mitigating measure is proposed in the form of biological supervision during works in progress in the critical section that will ensure observing protective measures.
- SCI Rokytná River (CZ0623819) - all the protection objects from the point of Olešná River inlet (the Olešná River will be a recipient of rain water from the project premises through Lipňanský stream and Heřmanický stream). A potential slightly adverse effect was identified in case of inlet of contaminated rain water. A mitigating measure is proposed in the form of utilisation of tanks to catch possible leaks of oil products and sediments in the system of rain water drainage, furthermore regular monitoring of pollution (physical, chemical as well as radioactive) of rain water drainage from the project premises.

Impacts on Natural Parks, Significant Landscape Elements and Memorial Trees

No natural park or its part is in such a position in relation to the existing power plant and the project that it could be endangered or damaged by the project or activities related to the project.

Similarly, no registered significant landscape elements (SLE) will be affected by the project. Operation of the existing power plant has already had an effect on watercourses and areas that are significant landscape elements (SLE) by law, these will continue being influenced also after the project execution. Wood species will be cut down in forest stands (area D for the water management infrastructure) within the project construction, which will affect SLE declared by law. However, the stands will not be cut down to substantial and it will not affect the SLE function significantly. The resulting clear-felled areas can increase the species diversity of the SLE on the

contrary. A ground collector of rain water, retention reservoir or polder and outflow structure will be located in area B in the floodplain of Lipňanský Stream (SLE declared by law). These elements virtually maintain the function of floodplain.

The memorial tree Lípa u Lipňan (Linden near Lipňany) is situated in contact with area D intended for water system connection. A technical solution of rain water drainage in this area will be selected so as not to affect this tree. No other memorial trees are situated in the areas for the project location and construction.

Impacts on the Territorial System of Ecological Stability

All the delimited TSES component elements are situated outside the NNS location area itself. The contact of TSES elements with infrastructure connections (water system or electrical ones) will not be of substantial nature, the design preserves full function of TSES, especially the possibility to pass the territory.

Impacts on flora and fauna

According to the documentation, the project placing and construction areas are delimited so as to interfere with natural and near-natural units as little as possible and to avoid significant populations of species of plants and animals with regards to nature protection. A number of valuable biotopes is situated and well prosper currently in territory involved, with many specially protected species of plants and animals, species included in the Red Data lists or species protected by European legislation. The current operation of EDU1-4 does not have significant adverse impact on them. The construction of NNS and its subsequent operation will not change the natural conditions to such extent that significant disorder or elimination of these populations occurs. Therefore, the NNS impact on the flora and fauna will be similar like the impact of the current operation of EDU1-4.

Flora

The most valuable biotopes of the area are serpentine pine forests (L8.3), Subpannonian steppe grasses (T3.3) and rocky vegetation with blue fescue *(Festuca pallens)* (T3.1) that, however, occur beyond the areas intended for the NNS placing and construction. However, thermophilic oakwoods (L6.5), in places acidophilic oakwoods (L7.1) and oak-hornbeam forests (L3.1) are also representative. And the routes of the raw water feeder from the Mohelno Water Reservoir to the NNS and the return waste water pipeline are designed in the stands of oak-hornbeam forests. That is why the authors anticipate the possibility of interference or affection of these biotopes in this territory only.

Annexation of areas - The raw water feeder is routed partly through oak-hornbeam forest with areal occurrence of two specially protected species - purple cyclamen *(Cyclamen purpurascens)* and Cornelian cherry *(Cornus mas)*. In addition to them, the endangered greater butterfly-orchid *(Platanthera bifolia)* occurs here and there. Part of their population might be eliminated during the construction. It will be possible to mitigate this adverse impact by adopting adequate mitigating measures, namely by visible marking of occurrence spots with access precluding. If several individual are eliminated within the work zone in spite of that, they will be replaced from the close vicinity in near future. Regional elimination of any specially protected or other plant species does not impend thanks to very suitable biotopes in the surroundings. That is why the transfer to other habitats is not proposed. Sufficiently strong populations of these species occur in suitable biotopes within the area that would replace the loss, if any, without problems.

However, the raw water feeder is routed also through commercial stands with dominance of secondary planting, partly even formed by almost pure monoculture of the coast Douglas fir *(Pseudotsuga menziessii)*, that are virtually without any herb layer. It will be possible to achieve regeneration of light-demanding associations of rocky outcrops without woods and of detrital woods on shallow soils by its cutting down (making forest aisle for the pipeline) and subsequent correct management (analogically as in the route of the existing feeder at present).

The routes of waste water removal are lead mainly through ruderalized, often wet or even water logged areas. No specially protected plant species or significant association were registered here.

Extracting raw water and discharging rain and waste water- Specially protected plant species or species included in the Red Data list of the Czech Republic do not occur in the Mohelno Water Reservoir or in the whole VD Dalešice-Mohelno waterworks, from which raw water will be extracted and to which waste water will be discharged. Likewise, specially protected plant species or species included in the Red Data list of the Czech Republic do not occur in the rain water recipients (Skryjský, Lipňanský and Heřmanický Stream).

Several plant species of the Red Data list of the Czech Republic occur in the floodplain of Lipňanský stream; these could be affected by effluents of rain water to this stream during the construction. However, it will not be an interference of such extent that would result in elimination of the whole population or association and its natural spontaneous recovery will be possible.

Ionising Radiation - As follows from Chapter D.I.3.3 of the documentation Impacts of ionizing radiation - plant populations will not be exposed to radiation that would exceed the natural background or reference values stipulated for the protection of biotic component of the environment. Therefore, the impact of ionizing radiation on the flora will not be significant.

Microclimatic impacts - The reach of microclimate influences caused by the cooling towers prevails in areas with are arable land and biotopes of country roads, forest edges, and secondary forest growths without important plant species. Areas, in which occurrence of populations of specially protected plant species plants is proven, will be affected to absolutely minimum extent only. The changes of temperature, humidity or shielding will be in the order of tenths to lower units of percent; such impacts cannot be proven in plant populations. The impact of outputs from the cooling towers on the flora will not be significant.

Traffic - The increased traffic loads, especially during the construction, will increase dustiness and immissions of nitrogenous substances along the roads, on the road No. II/152 (Slavětice - Jamolice) above all. No specially protected plant species plants or plants included in Red Data list of the Czech Republic were detected along this road. The usual plant species of road side ditches, with predominance of nitrophilous and ruderal species occur here only. The impact of transport on the flora can be evaluated as insignificant.

Fauna:

Three species of molluscs significant as regard protection were noticed; they occur at sites that will not be affected by the NNS construction or operation significantly. Their population will not perish.

The territory involved shows great biotope and species diversity with regard to entomofauna. Insect species significant as regard protection were detected especially in the raw water feeder route and in the spring area of Lipňanský Stream, as well as in the area of construction site installations to smaller extent.

Opening to light and release of large amount of nutrients will occur in forest aisles during the construction of the raw water feeder and the waste water pipelines, which will result in invasion of ruderal plant species and elimination of part of the original biotope, to which three detected important insect species are tied - common tiger beetle (*Cicindela sylvicola*), snout beetle (*Acalles cf. Camelus*) and purple emperor (*Apatura iris*). However, their whole populations will not be endangered. The construction will probably have adverse effect on ants (*Formica sp.*), too. However, they occur flatly in forest stands above the Mohelno Water Reservoir and that is why they will recolonize spontaneously after the works completion. The authors also draw the attention to the possibility of disappearance of the population of the scarce swallowtail (*Iphiclides podalirius*) by reason of interferences to stands with sloe and fruit tree species in areas A and B.

The surface rain water will be drained from the area for placing the NNS and from the area of the construction site installations to Lipňanský Stream. The expected higher water flow rate may cause changes in composition of the water course fauna, including change in populations of detected important species of dragon-flies, especially of the ornate bluet (*Coenagrion ornatum*) and the blue chaser (*Libellula fulva*). However, the higher flow rates or fluctuating flow rates will not have impact on the marshland associations of Lipňanský stream or on the insect species tied here.

No water course or water surface will be eliminated due to the project execution. Unlike the current situation, some other water courses (Lipňanský Stream and Heřmanický Stream) will be affected during the NNS construction and operation by rain water discharging.

Rain water will be temporarily discharged from the construction areas to some surface water courses (Skryjský Stream, Lipňanský Stream and Heřmanický Stream).

The warmed-up waste water will be brought directly to the Mohelno Water Reservoir by piping (instead of Skryjský Stream as it is today), where the warmed-up water from the existing EDU1-4 already flows. The higher water temperature changes the natural water stratification in the reservoir and limits the reservoir winter freezing. The accumulative impact of the warmed-up water from the NNS will be hardly detectable, the water management of the reservoir (ceaseless level fluctuation) has dominant impact on its biotic components

After the operation of EDU1-4 is terminated, Skryjský Stream will not be influenced by the discharged warmed-up water any more (flowing out presently to the retention reservoir at the beginning of its course), which will have positive effect on the water quality and its reviving. On the contrary, drying of the water course during the year will affect the stream ecosystem adversely. It will be possible to eliminate this by controlled water discharge from rain water retention reservoir simulating the natural flow rate dynamics.

Municipal waste water from the NNS will be cleaned in the new biologic WWTP and subsequently discharged via the new collector to the Mohelno Water Reservoir.

With regard to the fact that surveys of fish did not prove occurrence of any important protected species in the affected water courses, the project construction or operation will not affect this group of animals significantly.

All registered species of amphibians and reptiles belong among species specially protected and they are included in the Red Data list of the Czech Republic at the same time. Adults occur in small numbers at the sites intended for the project placing and construction. The reproduction places of these two animal groups are essential with regard to their protection. Sites suitable for reproduction are situated for both groups in the area of water management infrastructure, for reptiles also in the area for the power outlet. The impact of the ionizing radiation on amphibians and reptiles is not expected. Small local populations of the sand lizard (*Lacerta agilis*) and the slowworm (*Anguis fragilis*) will be eliminated due to the weedery dissolving near the chapel of Lipňany (biotope in early succession phase) with the occurrence of thermophilic species. It would be possible to mitigate this adverse effect by establishing similar area in close proximity before the weedery dissolves

No significant reproduction biotopes will be eliminated either in the area of water management infrastructure or in the area for power outlet.

The recipients of waste and rain water (Mohelno Water Reservoir, Skryjský Stream, Heřmanický Stream, Lipňanský Stream) are not well suited for amphibians and reptiles. Several species of amphibians and reptiles occur in ponds and adjacent puddles downstream the spring area of Lipňanský Stream. However, these water surfaces will not be affected by the discharged water in any way and impacts on herpetofauna are rule out therefore. Roads intended for transport connection and supply for the construction do not pass across migration routes of amphibians and reptiles and areas quite attractive for these species are not situated in their proximity. Slight increase of mortality of more mobile species, such as common toad (*Bufo bufo*) or sand lizard (*Lacerta agilis*) is probable, however, it will not result in extinction or damage of the regional population.

There are several habitats suitable for birds in the area involved, these are especially water areas and their littorals, associating vegetation near to water courses, small groves in cultural landscape, larger forest bodies, untreated sunlit habitats, brushwoods along lanes, forest aisles under overhead high voltage lines, forest clearances and last but not least field cultures that serve as food habitats e.g. for birds of prey. The nesting of only one specially protected bird species (the red-backed shrike, Lanius collurio) was proven by the survey in the areas intended for the project placing and construction. However, nesting of specially protected species cannot be absolutely ruled out with regard to high mobility of this group of animals; on the other hand, birds are able to find an alternate nesting habitat relatively easily. The diminution of trees in case of the project construction and consequently of suitable nesting sites will be essential with regard to life demands of birds. The area of water management infrastructure will be affected by felling above all, however it will affect also other areas such as lines of wood species along old lanes, groves and the like (e.g. weederies in early phases of succession in the area of construction site installations). These negative impacts It will be possible minimalize these adverse impacts by proper timing of cutting down stands. The annexation of agricultural land may have negative effect on the population of the grey partridge.

Birds might be affected by the towers and conductors of electrical power lines adversely in addition to the above mentioned impacts. New lines of very high voltage (power outlet at the voltage level of 400 kV) will be established within the project The technical design of the line or tower structure precludes killing birds by electrical current (the distance between phase conductors or between live and non-live parts of the lines is approximately 5 metres and more, while the body dimensions of even the largest birds are much smaller), the visibility of 400 kV conductors is more marked compared to high voltage lines of lower transmission capacity and minimizes the possibility of collision with conductors or towers (robust structures, apparent multiple strand phase conductors, it is not a new element in the territory); nevertheless, it is recommended that the respective structures are designed with respect to preventing injuries of birds by electrical current.

Mammals are a very mobile group of animals, which brings the advantage that they can leave the inconvenient territory and populate it again after it is put to suitable condition. On the other hand, the agility of smaller mammals brings the risk of their intrusion to the areas of the construction site. This problem can be easily prevented by implementing suitable mitigating measures. Two specially protected species of mammals (Eurasian beaver and hazel dormouse) were noticed by the survey only, but occurrence of other two such species (red squirrel, bicolored shrew) is probable in the areas intended for the project placing and construction. The project execution will result in annexation of agricultural lands, to which small species of common mammals (rodents, insectivores), in some cases also larger species such as the European roe deer, the red fox or the European hare, are tied. However, no regional or local population of any species will be eliminated by the annexation. Three specially protected species may be limited to certain extent, namely the hazel dormouse and the red squirrel in the area of water management infrastructure and the bicolored shrew in the area of construction site installations. However, all three species will be newly settled after the area construction is completed.

A long distance migration corridor and migration a territory significant for the migration of large mammals are delimited along Jihlava River and Dalešice-Mohelno Waterworks. Development areas of the project will partly reach into these elements, namely the area for electric power outlet and the area for water management connection. The long distance migration corridor or migration significant territory will not be adversely affected by them, only such facilities will be placed in these areas that will not represent a barrier or disturbing element for the migration of large mammals. Higher traffic intensity may increase incidental collisions of mammals with motor cars; other adverse impacts due to traffic are not expected.

Impacts on ecosystems

The project of the NNS construction and operation is executed in a territory, where agroecosystems with low biodiversity prevail dominantly. It affects other types of ecosystems minimally only, whereas it does not even annex most of these other ecosystems permanently, it only changes them partly and in such a way that their species diversity will not change significantly. The location as well as operational impacts of the project are optimal from this perspective, the biologic diversity of the territory involved will not be limited due to the project.

The project therefore complies with recommendations, specified in the document Instructions for Incorporating Climatic Changes and Biological Diversity to the Environmental Impact Assessment (EU, 2013). This generally requires that “no net

loss” principle of biologic diversity is assured. The project will not result in degradation of ecosystem services, loss or degradation of natural habitats, loss of species diversity or loss of genetic diversity.

Other biotic impacts

Average annual activity concentrations of tritium in surface water forecast for the NNS operation (eventually in concurrence with the operation or de-commissioning of EDU1-4) do not exceed the NEK-RP value of 1000 Bq/l pursuant to the Government Decree No. 401/2015 Coll. and at the same time are very significantly (by several orders) lower than values, in case of which changes of water organisms were detected. The expected activity concentration of tritium in the recipient thus complies with requirements of good environmental condition of surface water bodies and will not cause any detriment of ecosystems and water organisms in the involved catchment basin of Jihlava River and the following catchment basins.

Impacts during construction or termination

The project location and construction areas are selected so that the project impact on the natural environment is minimised, i.e., including the period of construction. No facts ensue from the evaluation of the construction impacts on the atmosphere and construction impacts on the noise situation that indicate significant affectation of the natural environment. None of the delimited areas interferes with biotopes that are exceptional or otherwise precious in terms of nature protection. Construction having been completed, the territory involved will be restored and provided with space for natural regeneration and migration of organisms from the vicinity. The built-up area of the NNS will be treated as regards vegetation to the possible extent and will be maintained in such condition that invasive plant species do not spread. The same applies to soil dumping sites.

Opinion of the expert report author:

Impacts on fauna, flora, ecosystems and biological diversity

Without substantial comments of the team of expert report authors concerning the impacts on fauna, flora, ecosystems and biological diversity, some aspects are commented hereinafter.

The nature evaluation, as well as the biologic evaluation, are elaborated by authorized persons.

Impacts on the Natura 2000 sites

The separate assessment of the submitted nature evaluation makes the Annex No. 1 of the expert report. It can be stated that the nature assessment under review ensued from large set of documents, data and information of comprehensive nature, based on which it was possible to assess both individual effects and their accumulation with other factors.

Potentially affected Sites of Natura 2000 system (SCI Jihlava Valley) are correctly identified, the evaluation regarding the shielding plume is carried out, too, and data concerning effects of waste water on water courses that are part of some SCI delimited on the water courses as accepting recipients are also presented. Partial inessential discrepancies were identified between particular evaluations of impacts and the summary evaluation that are commented more in detail in the respective assessment.

The following recommendations are formulated in the binding statement draft as regards the impacts on the sites of Natura 2000 system:

- ***within documentation for zoning proceeding of the project for the solution of discharging waste water with content of radioactive substances from NNS to Mohelno water reservoir, to localize consistently the route of the respective pipeline above the left bank of Skryjský stream downstream the confluence with Luha water course by reason of consistent respecting the border of SCI CZ0614134 Jihlava Valley that is situated above the right bank of the water course downstream the confluence – in particular is it the section between the entry of Skryjský Stream and its confluence with Luha water course of the length of approximately 0.3 km of Skryjský Stream***
- ***Tanks for catching eventual leaks of oil products and sediments will be part of the system of discharging rain water from the NNS to the catchment area of Olešná within the documentation for zoning proceeding so that the protection subject in SCI CZ0623819 Rokytná River is not affected***
- ***The environmental supervision should pay special attention to SCI CZ0614134. Considering the presence of sensitive biotopes – subjects of protection in SCI CZ0614134 - Jihlava Valley at the boundary section with development area D (right bank of the Skryjský Stream upstream its outflow to the Mohelno Reservoir), biological surveillance will be present during construction work in this development area to ensure that the defined border of the development area is not breached***
- ***If excessive dust pollution threatens during the civil works, the person conducting the biological supervision will ensure through the contractor that execution measures are adopted limiting the occurrence of excessive dustiness and the potential contamination of areas within the SCI CZ0614134 Jihlava Valley(e.g. by spraying the surfaces of the construction site and service roads in contact with areas of the SCI by water on dry days)***
- ***The organization of transportation to the construction site should be arranged within principles of construction organization so that the thoroughfare of trucks through the driving difficult road passing the SCI Jihlava Valley and the NNP Mohelno Serpentine Steppe is limited as much as possible In order to prevent considerable increase of traffic across SCI CZ0614134 - Jihlava Valley (and NNR Mohelno Serpentine Steppe) on road II/392 in phase of construction***
- ***It should be ensured consequently that the minimum residual flow rate in Jihlava river is maintained at least at the same value as during the operation of the existing NPP Dukovany at the monitoring point Jihlava-Mohelno downstream the Mohelno water reservoir after the NNS commissioning, which will ensure the protection of biotopes in Jihlava river within SCI CZ0614134 - Jihlava Valley taking into account the legislation valid at that time period***
- ***It should be ensured that the outflow rate of Jihlava River from the Mohelno Water Reservoir will be monitored with regard to physical – chemical parameters (temperature, oxygen content, pH, amount of organic substances, nitrogen, phosphorus, and other substances stipulated in the water right decision) each year after putting the NNS into trial operation; the monitoring of the water plants biotopes should be conducted as an indicator of discharged water quality in Jihlava River within SCI CZ0614134 - Jihlava Valley once each 5 years at minimum; the results from mapping the structure and extent of these biotopes in the years 2013, 2014 and 2016 might be used as comparison values; if the condition of these biotopes deteriorates, corrective measures should be adopted***
- ***It should be ensured that the rain water discharged from the NSS premises to the catchment basin of Olešná water course will be regularly (at least 4 times a year) monitored with regard to their pollution, including the measuring of the tritium concentration level in this water, so that the protection subjects of SCI CZ0623819 - Rivera Rokytná are not affected; the scope of monitored indicators will be discussed and agreed with the competent water right authority***

- ***It should be ensured that rainwater discharged from the NNS site to the basin of Skryjský stream will be monitored regularly (4 times a year at least) with regard to its pollution including measuring the level of tritium concentration in this water, so that it does not influence subjects of protection in CSI CZ 0614134 - Jihlava Valley. The extent of monitored indicators will be discussed agreed by the respective Water Right Office***

Impacts on specially protected areas

No comments of the team of expert report authors.

Impacts on natural parks, significant landscape elements and memorial trees

No comments of the team of expert report authors

Impacts on the territorial system of ecological stability

No comments of the team of expert report authors.

Impacts on flora and fauna

Outputs of this part are mostly presented logically and digestedly in relation to ascertained data as regards occurrence and demands of specially protected species of plants and animals, eventually species otherwise significant from nature protection points of view. The expert report authors miss more detailed evaluation of impacts on wood species in out of forest stands; the data on eventual conflicts are strewed either in descriptions of monitored sites, or in descriptions of impacts on certain animal groups at specific sites. Although the measures for prevention, elimination or minimization of impacts are proposed in text evaluating impacts on fauna and flora, the actual respective chapter of Annex No. 3.1 of the documentation does not summarize the recommendations in detail. Otherwise, without comments after detailed reading up this part of the documentation and Annex No. 3.1 concerning the biological evaluation

The following recommendations are formulated with regard to impacts on the flora and fauna in the binding statement draft that do not ensue from the existing design solution of the project:

- ***Within the project zone proceeding documentation for the solution of waste water removal from NNS to the Mohelno Water Reservoir, the routing of the respective pipeline has to be localized solely along the existing pathway with green trail mark in the forest sections upstream the confluence of Skryjský Stream with the Luha water course; concurrence with technical elements (for example roads) should be preferred in other sections, too.***
- ***A comprehensive dendrological survey determining the preserved and cut down wood species individuals should be elaborated in further phases of project documentation, within the elaboration of the project documentation for building permit at the latest, after the positions of individual NNS objects in the area A, the layout structure of construction site installations in area B and the positions of planned infrastructure elements in areas C and D are specified more precisely.***
- ***It should be ensured that environmental (biological) supervision will be established for the entire course of the project construction on contractual basis prior to its commencement that will supervise observing the conditions stipulated for nature protection and monitor the construction areas with regard to occurrence of plants and animals. The contractor of environmental services will be appointed at the same time that will deal with required protective and preventing measures proposed by the biological supervisor. The biological supervision will assure within its activity that all measures implemented for the nature protection are in detail registered, documented and archived and passed to the contractual partners by means of running and final reports.***

- ***It should be ensured that surveys of flora and fauna of the territory involved will be carried out during the last 2 vegetation periods before the project construction commencement in order to identify and localize the most precious associations and the occurrence of specially protected species of plants and animals; an application for granting exception from protective conditions of the involved specially protected species will be filed at the competent body of nature protection based on results of these surveys prior to the construction commencement; adequate mitigating and compensating measures will be specified more precisely based on results of these surveys prior to the construction commencement***
- ***Monitoring of the occurrence of introduced and invasive plant species should be ensured at the areas involved during the construction; they must be eliminated immediately in case occurrence.***
- ***It should be consistently assured that the rain water retained in retention tanks will be discharged gradually so that equalized outflow rate is achieved to the maximum technically realistic extent.***

Impacts on ecosystems

The respective chapters can be considered as correctly processed with regard to the methodical approach, extent and outputs. The expert report authors consider as needful to remind that the areas D for water management infrastructure are addressed as corridors for the time being, rather than specific, technically designed line constructions and that is why it was necessary to put on some of the recommendations presented above. Apart from that, without comments of the team of the expert report authors.

Other biotic impacts

No comments of the team of expert report authors.

Impacts during construction or termination

No comments of the team of expert report authors.

D.I.8 Impacts on the landscape and its ecological functions

Impacts on landscape character

Impacts of the project on the landscape character are evaluated in detail in Annex 3.3. of the documentation. Illustrative 3D volume models and visualisation are part of the documentation.

According to the documentation, the project execution will not result in a new feature of the affected landscape area. At present, the landscape dominant feature of the regional significance is already present in place – the existing EDU1-4 site, the form of which is not essentially different from the project under assessment. The power plant is highly technical work that through the impact of its form and dimensions (proportions), or the mass, will always be a well perceptible artefact. The power plant is an artificial vertical as well as quite horizontal accent that attracts person's attention while perceiving the landscape at a relatively great distance.

From the visual point of view, the height and the mass of individual elements (of cooling towers above all) within the existing site is the most significant feature of EDU1-4, furthermore very dense networking with overhead lines of electric energy distribution using towers mostly from trusses that intensify a portion of high-tech features within the landscape. Impacts on the landscape also include related objects outside the EDU1-4 site itself, where Dalešice and Mohelno reservoirs have a more significant impact in addition to above EHV towers. At present, their total expression can be perceived as neutral when above all dams with related objects have visually negative impacts, while water surfaces and banks of both waterworks are generally perceived in the landscape in question as positive elements. The pumping station and related roads serving for the power plant on the southern bank of Mohelno have a much lesser impact.

This character of the impact will persist after the NNS execution, whereas it will be accented by placing the new objects and their bigger mass and height (concerning cooling towers above all) and will last until the objects of the existing power plant are demolished. Therefore, the visual co-effect of the EDU1-4 and NNS premises will be of relatively long-term nature and will not be terminated in the time of terminating the operation of the existing EDU1-4.

Features arisen from the project execution will result in changes in area based relations that will exceed the local significance in a number of aspects.

The project at a distance above 30 km (outside affected land area) will be perceptible only with difficulty during good visibility and will not play any part in the landscape scenes. This is valid for the current situation as well.

The project will introduce no new geometric shapes into the landscape. The proposed solution (or individual power output alternatives) essentially corresponds to the current EDU1-4 solution, only dimensions or quantity of individual power plant site elements are changed.

According to the documentation, the project will not cause any significant change in perception of a ratio of natural characteristics or nature oriented characteristics to artificial (cultural) characteristics in favour of artificial ones. This change has already been caused by the EDU1-4 existing site, and although its further changes according to the proposed NNS solution will result in some changes on this account, their significance will not be determining with respect to the current situation, however.

Furthermore, these changes can oscillate from a partial increase (in the concurrence period of EDU1-4 with the NNS) to a partial decrease (after EDU1-4 operation terminates).

The project execution will not result in a decrease in landscape granularity or heterogeneity of the affected landscape area.

A harmonic scale and relations are not an attribute of the current landscape throughout the area of the perceptible visibility zone (0-5 km). Thus, the project execution will not become a cause of disturbance of the harmonic scale and relations. This disturbance will partially increase or decrease dependent on the phase of concurrence period of operation of NNS with EDU1-4. Thus, the harmonic scale and relations will not be an attribute of the landscape even after the project execution.

Thanks to a visual contact with the current EDU1-4 silhouette, the harmonic scale and relations are not an attribute of the current landscape in the majority of the visually affected area (5-10 km). Thus, the project execution will not become a cause of disturbance of the harmonic scale and relations. This disturbance will partially increase or decrease dependent on the phase of concurrence period of operation of NNS with EDU1-4. Thus, the harmonic scale and relations will not be an attribute of a larger part of the visually affected landscape even after the project execution.

The harmonic scale and relations are an attribute of the current landscape for a larger part of the visually affected landscape within the zones of 10-20 km or 20-30 km. Thus, the project will not become a cause of disturbance of the harmonic scale and relations.

The area visually affected by the project will be relatively large due to impacts of the project character, terrain configuration, and vegetation cover (also valid for the current situation).

After the project has been executed (regardless of its solution alternative), the EDU1-4 and NNS sites will continue being:

- the fundamental feature in the area within the zones of perceptible visibility (0-5 km) and strong visibility (5-10 km) without the NNS changing the significance order of features within this part of affected landscape area,
- the co-determining feature in the area within the zone of medium strong visibility (10-20 km) without the NNS changing the significance order of features within this part of affected landscape area,
- the supplementary feature in the area within the zone of poor visibility (20 - 30 km) without the NNS changing the significance order of features within this part of affected landscape area.

According to the documentation, the project impact (regardless of its solution alternative) will not cause a change in the expression of existing fundamental and co-determining features and values of the landscape character. The project execution impact (regardless of its solution alternative) will not cause any other more significant disturbance or suppression of unique and significant features and values of the landscape character.

As compared with the current situation, the project execution in any alternative or concurrence period of EDU1-4 with NNS will at most have an additional weak up to medium strong visual impact on the localities having been already affected representing the specially protected area within the meaning of the Act on Nature and Landscape Protection (No. 114/1992 Coll.).

As compared with the current situation, the project execution in any alternative or concurrence period of EDU1-4 with NNS will have a visual impact on significant landscape elements at a distance within 5 km and partially behind it as well (however, at most within 10 km) above all . Considering the subject protection and distance of these sites, there will be a weak additional disturbance of natural values of the landscape character at most.

Despite the presence of frequent cultural monuments and cultural dominant features in the area under assessment, the project execution in any alternative or concurrence period of EDU1-4 with NNS will no further result in any more significant visual impact as compared with the current situation. This is due to the fact that in the majority of cases they will not be visually in contact with the project under assessment or they are situated at the large distances from the project. The relatively fundamental negative impact of the current EDU1-4 premises on substantially affected dominants will not be increased markedly by the NNS project execution.

The execution of the NNS project will have an impact on nine areas of the natural parks. Thereof two parks reach into the perceptible visibility zone (0-5 km) and six parks into the strong visibility zone (5-10 km). As compared with the current situation, the project in any alternative or concurrence period of EDU1-4 with NNS will at most have an additional weak up to medium strong impact on these areas. An additional impact outside the 10 km boundary will already be little perceptible only and thus weak at most.

The nearest areas visually in contact with the project are situated behind the state boundary in the Austrian territory at a distance from 37.5 km further. The project is distinguishable with great difficulty up to undistinguishable in the landscape scene at such distances (relevant visual influence is indicated up to the distance of 30 km from the project). Therefore, the negative impacts on the landscape character or visual values of the landscape cannot be anticipated in the Austrian territory.

The nearest areas visually in contact with the project are situated behind the state boundary in the Slovakia territory at a distance from 75 km further. The project is no longer distinguishable in the landscape scene at these distances. Therefore, the negative impacts on the landscape character or visual values of the landscape cannot be anticipated in the territory of Slovakia.

Impacts on shielding of the area

Impacts of the project on shielding of the area are evaluated in detail in Annex 3.3. of the documentation. In total 26 reference points in build-up area of communities (Slavětice, Rouchovany, Dukovany, Mohelno, Hrotovice, Horní Dubňany and Litovany) and 7 sites[7] of Natura 2000 (SCI Jihlava Valley, SCI Velký kopec, SCI Ve Žlebě, SCI Široký, SCI Kozének, SCIs Oslava and Chvojnice Valleys, and SCI Rokytná River) are evaluated in detail.

The total average annual shielding time will not exceed 10 h/year in any point after the project execution and thus will remain little significant (the three points mentioned, RB19 Rouchovany and RB12 and RB13 Slavětice) to insignificant (all other points).

[7] The last two listed SCIs, i.e. SCIs Oslava and Chvojnice Valleys and SCI Rokytná River are situated out of the possible influence of the shielding.

SCI Jihlava Valley and SCI Velký kopec will stay the most affected SCIs, the average annual shielding time will increase there by 0.2 to 0.3 h/year compared to the existing condition. However, the total annual shielding time of the potentially most affected SCI Jihlava Valley will be very much local related, which is documented by the 90th percentile of the shielding time - the total annual shielding time will be lower than approximately 1.6 h/year in 90 % of the area.

The impact of the existing EDU1-4 steam plumes on the most exposed residences can be assessed as being of little significance. After the NNS is put into operation, the annual shielding time due to steam flume may amount to approximately 53 h/year in Slavětice (the most affected area), i.e. to approximately 2.9 % of the total sunshine per year. This impact is evaluated as significant. The impact in other localities can be assessed as being of little significance (Rouchovany) or insignificant (the other villages).

It should be noted that these results that steam flume shielding is expected in case of the time limited concurrent power operation of EDU1-4 and NNS only. The flume will be produced only by the units under power operation (contrary to building objects, the shielding of which is effective permanently). That is why the evaluated impact is overestimated, the time of shielding will be shorter in reality

Concerning the shielding of Natura 2000 sites by steam flumes, it ensues from the results of climatic analyses that the SCI Jihlava Valley is the only site potentially affected. Shielding is not indicated in other SCIs.

Impacts on recreation use of the landscape and the possibility to pass the territory

The project will not have an adverse impact on the recreation use of the territory and the road system of the territory involved usable for recreation purposes according to the documentation. No infrastructure for recreation use is situated in the areas for the NNS placing and construction (area A) or for the construction site installations (area B). The cycle track No. 5175 and the hiking trail connecting Rouchovany with the Jihlava valley, which are routed around the premises of EDU1-4 from the western side, will be moved out of the area intended for the NNS placing and construction. The project elements located in the areas of electrical and water system connections (areas C and D) will not be of a barrier kind and therefore, they will not limit the possibility to pass the territory.

As regards the wider territory used for recreation, (typically related to Jihlava, Oslava and Rokytná water courses and the linked network of recreation and tourism infrastructure, including communities), the existing condition will be neither affected nor changed. The recreation use the possibility to pass the area will neither be directly affected in negative or positive way.

Opinion of the expert report author:

Impacts on landscape character

The respective study has been prepared by one of the co-authors of the applied methodology and may be regarded as correctly elaborated. The study is provided with high quality visualisations and it was ascertained by the correct analysis of the visibility of NSS premises that even a tower higher by 10 – 15 m would have the same visual impact like the assessed tower of 186 m. The authors took into account several impacts. Slightly more adverse impact was indicated for two towers of 164 m than for one tower of 186 m with regard to the effect on landscape character; if two units are

constructed, four towers in one row would represent a large visual block. Further aspects represent the impacts on the shielding (by towers, flumes), the impact on increase of local humidity, icings, fogs. After all aspects were compared, it was concluded that one tower per unit would have the total impact slightly lower than two towers per unit (slightly more adverse impact was identified here).

Impacts on shielding of the area

Without comments of the team of expert report authors concerning the selected methodical approach and the form of presenting the input relations and outputs.

The following recommendations are formulated in the binding statement draft:

- ***Such solutions as regard urban development and architecture should be preferred within the design documentation of the project for building permit that take into account the contexture with existing territory arrangement and adjust the architectonic design of the project (including the colour design) for the sake of integration to the landscape, including taking into account the architectonic contexture with the existing premises of EDU1-4***
- ***Within the further project preparation (before the application for the building permit is filed), the possibility should be verified of optical screening of the NSS premises from the community Rouchovany by new structure elements of green vegetation, e.g. using the position of the ridge to the north from Rouchovany between the community and Olešná valley, partly also the ridge to the south from the planned construction site installations in area B along the pathway from the chapel around the Hlinsko hill and in the agricultural ground Pod alejí. This screening should be implemented in case of positive result***

D.I.9 Impacts on tangible property and cultural heritage including architectonic and archaeological aspects

The documentation states that the project does not affect any tangible assets of third parties. It does not require a change in the residential structure of the territory involved or demolition of the existing buildings.

The operation of the project will not affect any architectural and/or historical monuments. The state of monuments situated in the vicinity will be maintained during the project operation and their as well as character of their environs will be preserved.

The operation of the project will not affect any existing archaeological site.

The monuments to former communities Skryje, Lipňany and Heřmanice are situated in the areas for the project location and construction or in their near vicinity. These represent surviving and maintained chapels in former community and further small historical solitary architecture (memorials, crosses). These monuments are specified more in detail in Chapter C.II.9. of the documentation Tangible assets and cultural heritage. The mentioned monuments are mostly situated on peripheries of areas for the project location and construction, outside permanent annexation. Therefore, a direct requirement for their clearance or relocation does not arise. Such measures will be taken for protection of monuments in the course of civil engineering works that will prevent their damage or other depreciation. A temporary exclusion or limitation of the possibility of visiting them can be expected. After the construction is completed, the area of monuments will be rehabilitated and restored to the condition adequate to their significance.

In case of archaeological occurrences and regarding their latency, a possible occurrence cannot be rule out in the course of the earthwork. This fact would be dealt

with by announcement to the competent body of historical monuments preservation and by performing archaeological salvage survey pursuant to the Act No. 20/1987 Coll., o state preservation of historical monuments, as amended, according to instructions and requirements of the body of historical monuments preservation.

Opinion of the expert report author:

It can be stated according to the team of expert report authors concerning the submitted project that it is necessary to act within the meaning of the Act No. 20/1987 Coll. on state preservation of historical monuments as amended within the submitted project, regardless the process of environment impact assessment.

The following recommendation is formulated for the binding statement draft in accordance with the documentation requirements:

- ***The chapel of the former community Lipňany that is situated in the area of construction site installations should be protected during the period of civil works by a fence, including the protection against incidental damage by motor vehicles (e.g. by crash barriers); the area of Lipňany chapel should be rehabilitated, the chapel refurbished and made accessible again, after the NNS construction is completed.***

D.I.10. Impacts on Transport and Other Infrastructure

Impacts on Transport Infrastructure

The documentation states that the expected development background traffic intensity on the roads within the territory involved will be continuously determined by regular counts (in five year intervals up to now, only in 2016, after six years), whereas other two or three counts will be conducted prior to the project execution. They will correspond (same like the counts up to now) to the current state of the territory, the state of the economic cycle, the petrol price, and other factors influencing the transport demands.

As far as railway transport is concerned, impact of use of railway transport can be identified as insignificant, the site railway connection has a capacity reserve that is more than sufficient. Impacts on other transport infrastructure of the territory involved (air, cycle, etc.) do not arise in practice.

All the roads, at which the vehicle transport related to the NNS operation will be carried out, have a sufficient capacity and are properly equipped for the transport.

The documentation states that the impact of the total transport load after the increase of transport intensity on most of the affected roads during the project operation can be considered to be relatively insignificant in terms of transport.

Impacts on other infrastructure

The documentation states that the NNS execution will have no additional impact on the territory infrastructure except for its own networks required for the project operation (electric power outlet to the transmission network, standby power supply, water supply system, waste water drainage system). Possible changes of the affected infrastructure network will be returned to the original condition or a condition required by their administrators. Take-off points will continue being supplied during execution by electric power and other media (water, gas, etc.).

Impacts during construction or termination

The documentation states that the highest percentage increase in load of the road network during NNS construction is expected in the construction vicinity on road no. II/152. An increase of approx. 650 heavy-duty vehicles and approx. 1 850 cars per day is anticipated on this route (using the western as well as eastern access to the NPP) due to transport induced by construction. With respect to the relatively low background intensity on road II/152, this represent relatively high percentage increases (more than 60% in case of passenger transport and more than 100% in case of freight transport).

Opinion of the expert report author:

First of all, attention must be drawn to the fact that the current wording does not contain the mentioned chapter. Otherwise without comments of the team of authors, since the recommendations concerning the described aspect were already formulated in previous chapters of the submitted expert report.

D.I.11 Other environmental impacts

Impacts on geomorphological conditions

The geomorphological situation will be affected by the project execution at the land plot of the NNS only. The current topography shape of the land plot, with the highest parts in the middle of the area for placing the 1st unit of the NNS (approximately 390 m a.s.l.) and at the west boundary of the construction site towards Slavětice (up to approximately 391 m a.s.l.) and with inclination to north-east down to 378 m a.s.l. and to south-east down to the level of 370 m a.s.l., will be levelled by rough grading (RG) during the construction. The actual RG consists in establishing two basic "earth banks" in case of all variants dealt with. The bank in the place of situating the main production unit is designed with the altitude of the graded terrain of 389.00 m a.s.l. and the bank in place of situating the cooling tower (towers) is designed with the altitude of the graded terrain of 384.00 m a.s.l.

Impacts on geologic situation and rock environment

The impact of the project execution on the rock environment is insignificant. The direct impact consists in the interference with top layers of bedrock, i.e., above all Quaternary and Neocene deposits, partially a regolith, up to sufficiently good-bearing moderately-weathered underlying rocks. The impact is limited only to the construction area without other accompanying impacts outside the land plot for the NNS placing. Integrity and quality of the rock environment will not be influenced during operation.

Impacts on geologic and palaeontological monuments

Geological or palaeontologal monuments will not be affected by the project.

Impacts during construction or termination

According to the documentation, the rock environment will be influenced during construction by execution of excavations and footing bottoms, followed by execution of foundations of individual objects. This influence on the rock environment is evaluated as negligible.

A geomechanical condition of bedrock will be decisive for assessment of mutual relationship of construction and bedrock. Categorisation of soils and rocks in the territory involved, incl. division into individual geotechnical types, has already been carried out within previous surveys and assessed in detail in the older survey documents. This question will be updated within additional engineering geological studies that will predict possible occurrences of zones with rocks that could have adverse physical and chemical properties. These would then have to be removed from the footing bottoms, and this impact on the rock environment is assessed as negligible.

No other additional impacts on the rock environment, natural resources and geological or palaeontological monuments are assumed after termination of operation.

Opinion of the expert report author:

First of all, attention must be drawn to the fact that the current wording does not contain the mentioned chapter. The team of authors has no comments otherwise, while the documentation recommends to adopt the following measures:

- *The available possibilities of reducing the production of inactive waste will be taken into account within the preparation, construction and operation. In case of waste, its further use will be preferred; if it is impossible, the waste will be recycled, increased in value (with regard to material or energy) and disposed of as the last option only.*

- *Increasing the value of building waste (grinding, classifying, re-using within the construction site or out of it) above all, as well as of biologically degradable waste, will be assured to maximum possible extent during preparation, construction and operation.*
- *The preparation of the store of spent nuclear fuel for will start sufficiently in advance for the NNS.*

The expert report authors do not include the specified recommendations in the binding statement draft, because the requirements either ensue from the respective branch acts or are not directly related to the evaluated project.

D.II. Characteristics of risks for public health, cultural heritage and environment at possible incidents, disasters, and abnormal conditions and anticipated significant impacts ensuing from them

The content of the specified Chapter can be summarized as follows:

Radiation risks

Safety characteristics of NNS

The reactors of the III+ generation envisaged in the assessed project of NNS have improved safety characteristics compared to reactors of foregoing generations. Their development is initiated by the effort to improve operation-reliability indicators of the generation II reactors and to enhance the safety characteristics furthermore. Details in Chapter B.I.6. of the documentation. Description of Technical and Technological Solution.

Potential risks having impact on nuclear safety and radiation protection

An abnormal occurrence of the nuclear facility (failure, incident, accident) can occur due to failure of one or more components as a result of an internal or external cause. Acts of sabotage and terrorism on the nuclear facility (including intentional plane crash) are specific types of event with external cause.

All types of possible abnormal occurrences must be assessed within the licensing process of the nuclear facility, and practical impossibility of their occurrence or acceptability of their consequences must be proved, while assessment of radiation consequences is of the greatest importance. Proving the acceptability must be above all based on a deterministic principle when an event consequence is quantified and its acceptability for safety of the nuclear facility and negligible consequences for the environs are proved. The evaluation and assessment of extremely unlikely events is admissible on probabilistic basis. The assessment of a level of protection against an act of terrorism and sabotage is part of the physical protection assurance documentation that is to be approved by SONS and is subject to a special treatment (i.e. secrecy).

The systems important from the standpoint of the nuclear equipment safety must be resistant to a simple failure and a failure with common cause, including resistance against extreme external risks. The resistance is ensured by means of safety margins, redundancy and diversity. Redundancy is ensured by means of multiple backup of the safety systems carrying out the same function (usually double up to triple redundancy for generation II units, usually triple up to quadruple redundancy for generation III and III+ units), physical separation of individual redundant systems and their functional independence. The redundancy is ensured mainly at the level of active systems and to the extent needed also for passive safety systems (passive safety systems do not need power supply and control system activity for their functions and their resistance against simple failure is generally higher).

The diversity is assured in such a way that basic safety functions – reactor shut-down, heat removal from fuel, limiting the release of radioactive substances from the containment in case of integrity failure of the primary circuit – are provided independently by two or more functionally different systems ruling out the possibility of originating failure with common cause, e.g. by using another physical principle of function, from another equipment manufacturer, and the like. Using passive safety

systems as back-up systems to the performance of active safety systems is another possibility of diversity.

Proving the acceptability of consequences of possible NNS contingencies (failures, incidents, and accidents) will be the subject of follow-up proceedings carried out for the selected NNS design according to the Atomic Act. Within the process of the environmental impact assessment (EIA), the impact on the ambient and on the population is evaluated for representative envelope cases of abnormal radiation occurrences, among which a design basis accident and a major accident with fuel melting in the core belong.

In case of design basis accidents (during which a severe damage and fuel melting does not occur), a potential source of release of radionuclides to the vicinity of the power plant is their content in the primary circuit coolant and possibly also their content in free volumes under cladding of fuel rods in case that damage of cladding occurs in a part of the fuel rods.

In case of major accidents (during which fuel melts in the reactor core) a potential source of release of radionuclides to the vicinity is their content in the fuel above all (besides their content in the primary circuit coolant and possibly also their content in free volumes under cladding of fuel rods). Fuel melting is accompanied by a release of radionuclides from fuel to the containment followed by an release from the containment to the environs through microleaks of the containment. In accordance with SONS and WENRA requirements, the safety systems must for the new reactors ensure the full functionality of the containment and restrict consequences of a major accident in accordance with the criterion K3 (see chapter B.I.6.2.2.3. Requirements for Radiation Protection)

The analyses of representative design basis accidents must follow the generally accepted envelope approach in the EIA process[8], i.e. such approach, at which the representative source term (that characterises the rate of the release of radionuclides to the vicinity in order to assess radiological consequence) and other selected parameters are determined so that radiological consequences corresponding to this source term will be worse with a sufficient reserve (while taking a rate of uncertainties into account) than those arising from results of subsequent safety analyses (e.g. in the Preliminary Safety Report) within the licensing process.

The radiologic consequences of a representative design basis accident and severe accident are assessed for the EIA process in the documentation by means of proved calculation programs that are used both by the supervisory body of the Czech Republic (SONS) and by other international state organizations for the evaluation and prediction of the radiation situation and radiologic consequences of abnormal occurrences.

Characteristics of abnormal occurrences

Accessibility of consequences of abnormal occurrences is assessed depending on the probability with which the abnormal occurrence may occur, whereas the limits of abnormal occurrence consequences laid down by the national legislation regulations and international requirements must not be exceeded. In general, criteria of maximum acceptable consequences for more probable types of abnormal conditions are determined more strictly than for less probable abnormal occurrences. Seriousness of

[8] IAEA NG-T-3.11: Managing environmental impact assessment for construction and operation in new nuclear power programmes (2014)

abnormal occurrences ensues from the actual sate of the power plant. The NNS abnormal conditions are divided into:

- Abnormal operation.
- Emergency conditions:
  - design basis accidents (DBA),
  - design extension conditions (DEC):
    - multiple failures under design extension conditions,
    - major accidents under design extension conditions.
- Practically excluded conditions.

These states are characterised as follows:

Abnormal operation includes single defects and failures assumed to occur at least once per operation time of a nuclear unit. The typical cases of this category include loss of external power, failures in the reactivity control system, short-term opening of steam generator safety valves, small pipe break (auxiliary piping, instrumentation and sampling lines), etc. Abnormal operation leads to the reactor scram in the worst possible case. The nuclear unit is able to operate again after this condition ends, i.e. the causes and consequences of the abnormal operation are removed. The function of no physical barrier may be lost at events belonging to the category of abnormal operation It means that the fuel system must not be damaged and the fuel elements covering, the primary circuit or the containment must not be disturbed due to abnormal operation. In case of events belonging to the category of abnormal operation, no complete function loss may occur in any of the safety systems (however, loss of an independent division of safety systems may occur). The radiation impact of the abnormal operation on the ambient must be minimum, characterized by fulfilment of the K1 criterion (Chapter B.I.6.2.2.3. of the documentation. Requirements for Radiation Protection), so that authorised limits for radionuclide effluents into the environment will not be exceeded, i.e. a dose optimisation limit, which is related to exposure from effluents from NNS and other nuclear facilities at the Dukovany site, will not be exceeded for the critical group of population.

Design basic accidents (DBA) are defects and failures that should not occur during the period of operation but their occurrence cannot be practically excluded during the period of operation and therefore the design reckons with their occurrence. Disruption of large piping (main feed water or steam pipeline, primary circuit, tube/tubes in steam generator), mechanical failure in the system of reactor scram, rotor seizure or break of main circulation pump, ejection of fuel assembly, false opening and incomplete closing of some of the safety valves of the primary or secondary circuit, loss of working and stand-by sources and the like belong among typical actuating events of this category incidents. Safety systems of nuclear unit must be able to ensure protection of barriers and limiting the consequences of design basis accidents for the vicinity to acceptable level with sufficient power and time margin and sufficient reliability. The basic criterion K2 (see the documentation Chapter B.I.6.2.2.3. of the documentation) is used with regard to radiation consequences of this category of accidents. Requirements for Radiation Protection) that requires that any NNS incident, which does not result in the core melting or damage of irradiated nuclear fuel in the storage pools, will not result in an release of radionuclides that would require to apply sheltering, iodine prophylaxis, and evacuation of population anywhere in the NNS vicinity.

Design extension conditions (DEC) are such incidents or accidents that are not taken into account within the design basis accidents but they are analysed in the design with

use of best estimate methodologies, and for which the radiological consequences remain within the defined criteria of acceptability. These are incidents and multiple failures with very low probability of occurrence. Design extension conditions are divided into:

- Multiple failures, at which the core fuel does not melt or the irradiated nuclear fuel is not damaged in the storage pools,
- severe accidents, at which the core fuel melts.

While the reactors being currently in operation were not originally designed for these conditions and their resistance was increased by modernisations carried out later, the generation III and III+ reactors have the capability to cope with or minimize the consequences of design extension conditions, including major accidents, already included in the design. The most important properties include extended resistance to a loss of all electric power supplies (Station Blackout), resistance to a large plane crash, and ability to cope with events connected with fuel melting without a failure of the containment. Examples of multiple failures as part of the design extension conditions include: abnormal states with failure of the reactor trip system, a loss of all electric power supplies (Station Blackout), a full loss of all feed water supply systems for the steam generators, a leak of the primary circuit with partial failure of the emergency cooling system, a break of a tube/tubes of the steam generators accompanied by failure of the secondary circuit integrity (breach of steam pipeline or opening and incomplete closing of steam generator safety valves), a loss of spent nuclear fuel storage pool cooling, multiple failures in the systems of cooling water and essential service water, removal of heat to the vicinity or the final heat absorber, multiple events with a common cause of an internal or external origin.

Design extension conditions, during which a severe damage of the fuel system does not occur, are by analogy subject to the criterion K2 (see documentation, Chapter B.I.6.2.2.3. Requirements for Radiation Protection) that requires that any failure will not result in a release of radionuclides that would require protective measures of sheltering, the iodine prophylaxis and the evacuation of population anywhere in the NNS vicinity.

For major accidents with core meltdown the K3 criterion applies (see documentation, Chapter B.I.6.2.2.3. Requirements for Radiation Protection), i.e., maintenance of the containment functionality, which is a prerequisite for practical exclusion of large or early releases of radionuclides from the containment, measures being introduced for protection of population and environment must be limited to space and time (i.e., no permanent move of population, no necessity of evacuation from the immediate vicinity of the power plant, limited sheltering of persons, no long-time restrictions of consumption of foods), and sufficient time must be available for adopting the measures.

To have the possibility of mitigating accident consequences exceeding the design extension conditions, the NNS design will include all technical and organisational means that are necessary for the operating organisation to perform all its obligations given by the Atomic Act for the case of occurrence of a radiation accident. The introduction of respective protective measures will be based on criteria given by legislation of the Czech Republic and WENRA and IAEA recommendations.

Practically excluded conditions are such conditions, the occurrence of which is provably physically impossible or extremely improbable to a high extent of credibility. It concerns the emergency scenarios resulting from rupture of the reactor vessel or too

high reactivity introduction and the severe accidents that might lead to early or large releases of radioactive substances into the ambient. It is required that such technical and organizational measures are adopted that will prevent the origination of such scenario so that the probability of scenarios resulting in large or early release of radioactive substances to the power plant vicinity are extremely low (the level of <1E-7/year is used usually).

Definitions of groups of actuating events for the NNS project

The design of NNS will include analyses of the nuclear facilities responses to all types faults and failures that might occur during the NNS operation and to their selected combinations. All actuating events in the NNS design will be divided into groups according to categories defined above (abnormal operation, design basis accidents (DBA) and design extension conditions (DEC)) mainly according to the frequency of their occurrence. The actuating events will be divided pursuant to the Annex of SONS No. 329/2017 Coll., on requirements for nuclear facilities design, to the safety instruction JB-1.7 of SONS, to the recommendations of WENRA for new as well as operated power plants (2013, 2014) and to the recommendations of IAEA (Deterministic Safety Analysis for Nuclear Power Plants, No. SSG-2, 2009) to the following groups:

1. Actuating events for powered operational modes:
   a) increase of heat removal from the primary circuit via the secondary circuit,
   b) decrease of heat removal from the primary circuit via the secondary circuit,
   c) decrease of the primary coolant flow through the reactor,
   d) reactivity failures and changes of power distribution,
   e) increase of coolant amount in the primary circuit,
   f) loss of coolant from the primary circuit (LOCA),
   g) releases of radioactive substances from systems or components,
   h) thermo-hydraulic response of the protective containment of nuclear reactor to the design basis accidents,
   i) pressure-temperature shocks,
   j) load of internal parts of the reactor during the event with primary coolant escape (LOCA).
2. Actuating events for unpowered operational modes:
   a) events with failure of the reactivity control,
   f) loss of coolant from the primary circuit (LOCA),
   c) loss of the residual heat removal as a consequence of interruption of the primary coolant circulation,
   d) loss of the residual heat removal as a consequence of a failure of piece of equipment (for example closing the main shut-off valve, loss of flow through the technological condenser, loss of essential service water, loss of power supply, etc.),
   e) increase of coolant amount in the primary circuit,
   f) events with failures of the cooling of the spent nuclear fuel storage pool,
   g) falls of burdens caused by failure of lifting devices,
   h) damage of the spent nuclear fuel storage pool during the refuelling.
3. Actuating events under the design extension conditions (DEC):
   a) conditions of abnormal operation with failure of automatic protection of the reactor,
   b) multiple failures such as: complete loss of AC power supply (SBO), break of the main steam pipeline with subsequent break of small pipes in the steam generator, break of primary circuit piping of small diameter with subsequent failure of the high pressure or low pressure emergency cooling of the core, uncontrolled coolant thinning (concentration decrease of boric acid in the coolant), complete loss of cooling of the spent nuclear fuel storage pool during normal operation, loss of the end heat absorber during normal

operation and further actuating events according to the safety instruction JB-1.7 of SONS),

c) major accidents.

The detailed list of all typical actuating events for PWR reactors is specified in the Annex No. 2 to the JB-1.7. safety instruction of SONS. This list takes into account also requirements of all analogical lists specified in the documents of WENRA and IAEA and is of recommendation nature. Depending on the specific type of the reactor that will be selected for the NNS, the list of events used for the NNS in the licensing process pursuant to the Atomic Act may be extended or modified otherwise after reasoning.

Characteristics of seriousness of events according to the international classification scale INES

If abnormal occurrences arise at nuclear equipment, the INES (International Nuclear Event Scale) serves the purpose of providing immediate information, from which the safety significance of the occurrence and its probable consequences are evident. This scale was established by an expert group that was jointly nominated by IAEA and OECD/NEA as a tool of fast information for the competent bodies, organizations and general public about events at the nuclear equipment that is provided in uniform manner from the perspective of seriousness of abnormal occurrences in nuclear power plants.

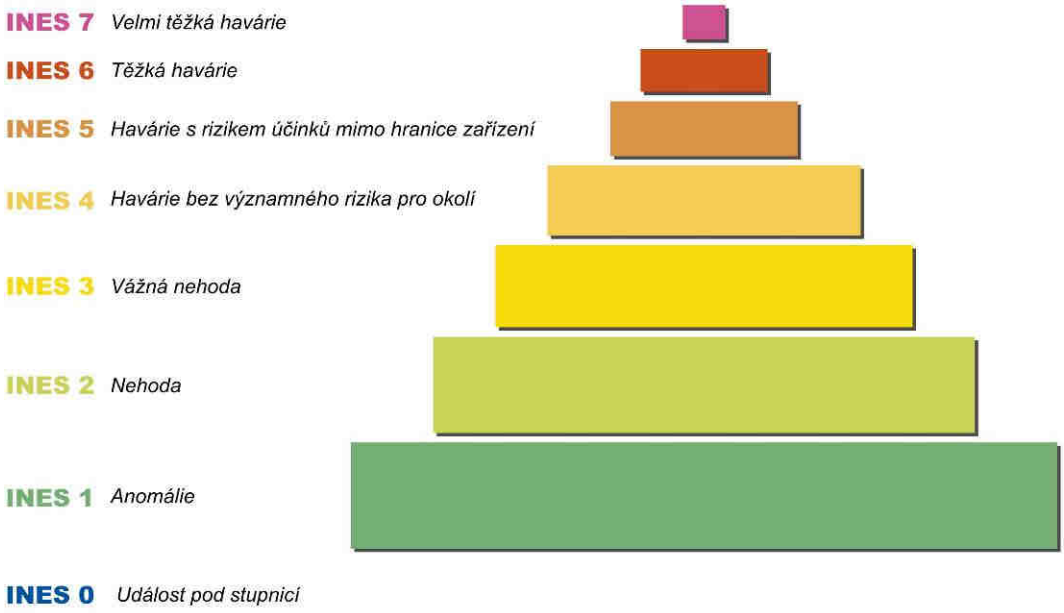
Comprehensible communication between nuclear experts, media and general public is made possible according to this scale thanks to the reasonable arrangement of abnormal occurrences as per their significance. The scale names with simple terms and quantifies abnormal occurrences (operational deviations, incidents, accident) for the case that they would occur at the nuclear equipment.

Abnormal occurrences at nuclear facilities are evaluated according to this scale based on three basic criteria:

- impact on people and environment
- impact on the individual protective barriers and on controlling the equipment, in which considerable amounts of radioactive substances are handled,
- impact on the defence in depth.

Abnormal occurrences are classified into seven degrees according to the INES scale that are evident from the following figure.

INES scale for evaluation of nuclear safety related events:



Velmi těžká havárie	Major accident
Těžká havárie	Serious accident
Havárie s rizikem účinků mimo hranice zařízení	Accident with wider consequences
Havárie bez významného rizika pro okolí	Accident with local consequences
Vážná nehoda	Serious incident
Nehoda	Incident
Anomálie	Anomaly
Událost pod stupnicí	Event below scale

The following approach is used for the classification of events to the specific degrees:

- events classified in higher degrees (INES 4 to INES 7) are called accidents,
- events classified in lower degrees (INES 1 to INES 3) are called Incidents or anomalies and
- events without safety significance (INES 0) are classified as below scale.

The scale evaluates only those events that are related to nuclear safety. Events that are not related to nuclear safety are classified as out of scale. For example, industrial accidents at nuclear facility or other events having impact on the operation of turbine or generator or other systems only that have no safety function and radioactive substances are not handled in them belong to this category.

The evaluation according to the INES scale was extended also for events related to radioactive radiators, to sources of ionizing radiation and to transportation of emitters or nuclear materials at present.

The INES scale serves the purpose of general information only and does not substitute internal criteria for the classification of the incident or accident seriousness in individual countries and the system implemented legislatively in the given country takes always precedence at the evaluation of abnormal occurrence (in case of the Czech Republic, it is the categorization of abnormal radiation occurrences pursuant to the Atomic Act).

With regard to international relations, each member country of IAEA is obliged to inform the IAEA coordination centre about each incident or accident at a nuclear facility within

stipulated term. Absolute majority of events recorded from nuclear power plants is below the 3rd degree. Accidents with effect on the ambient (stage 4) are exceptional and the historical accident at A1 NPP in Jaslovské Bohunice (1977) can be mentioned as an example. Two nuclear power plant accidents of degree 5 have occurred worldwide up to now: NPP Windscale (England, 1957) and NPP Three Mile Island (USA, 1979). An accident of degree 6 has not occurred worldwide yet. The accidents of NPP Chernobyl (Ukraine, 1986) and NPP Fukushima Daiichi (Japan, 2011) were classified in the highest 7th degree.

According to the user's manual of SONS (2016) for the application of INES scale, the abnormal occurrences, evaluated in this documentation, would be probably classified as follows:

- as degree 3 (serious contamination in area where the design does not envisage that, but with small probability of significant irradiation of inhabitants) up to degree 4 (event resulting in release to the environment corresponding to activity of radiation equivalent release of the magnitude order of tens to hundreds TBq of I-131 into the atmosphere) for the case of assessed envelope design basis accident.
- as degree 4 (event resulting in release to the environment corresponding to activity of radiation equivalent release of the magnitude order of tens to hundreds TBq of I-131 into the atmosphere) up to stage 5 (event resulting in release to the environment corresponding to activity of radiation equivalent release of the magnitude order of hundreds to thousands TBq of I-131 isotope into the atmosphere) for the case of assessed envelope design basis accident.

It will be in principle excluded, if the strict design requirements stipulated by the legislation of the Czech Republic and the WENRA recommendations are observed at all levels of defence in depth, that abnormal occurrence happens in this nuclear facility, which is classified with higher stage than the stage 5. This declaration is technically based especially on the explicit requirement to maintain containment integrity even in case of severe accident with fuel melting, the requirement for containment integrity at the effect of all relevant external threats and practical exclusion of early or large releases due to severe accident.

Characteristics of environmental risk

The risk connected with possible consequences of abnormal radiation occurrence, i.e. event resulting in significant release of radioactive substances into the environment, can be evaluated according to the extent of measures that would be necessary to protect the endangered population and according to the contamination level of the affected environment.

The potential severity of the radiation consequences of abnormal occurrences is related to the level of radioactive fission product activity in the reactor and to the extent of damage to barriers preventing the release of radioactive substances into the environment.

Fissionable products and other radioactive substances are situated mainly in the actual fuel structure of the nuclear reactor core and also under the cladding of fuel rods (in the gap between the actual fuel and the protective fuel cladding tube) and, last but not least, in the primary circuit coolant. The total activity of fissionable products at the reactor powered operation depends mainly on the fuel composition, the fuel amount in the core and its burn-up rate in time of the occurrence and represents the order of 1E+20 Bq multiples.

The isotopes of noble gases, iodine and caesium can be only found of fissionable products in the primary circuit coolant and under the cladding of fuel rods in significant amount, but their activity in the coolant is in the order hundred thousand times lower than in the fuel. Other relevant isotopes, e.g. Sr, Te, Ru, La, Ce, Ba, etc., occur in the coolant in insignificant amounts. The radioactivity of isotopes in the gaseous gap under the cladding represent only fraction of percent of the total activity inventory of the fuel. That is why the seriousness of radiologic consequences of abnormal occurrences differs substantially depending on the fact, if the loss of integrity of the reactor cooling circuit occurred only or the cladding of fuel rods was also damaged (gas untightness) or even the fuel melted.

The population might be endangered by the passing cloud of radioactive gases and aerosols after the release of radioactive substances from the nuclear equipment. The cloud is potential source of both external and internal irradiation that might occur by inhaling the radioactive substances. The radioactive aerosols would fall out during the progression of the cloud and the ground would be contaminated. The contamination rate of the ground depends also on meteorological conditions in the time after the origination of the abnormal radiation occurrence and on the fact, if it rained in the given place in time of the cloud passing. Even after the cloud passing, the contamination of earth surface causes external irradiation as well as internal irradiation by sucking the contaminated dust in and may represent long-term impairment of environment affecting to different extent all inhabitants as well as flora and fauna. Transport of the activity through food chains is significant with regard to the health risk for population, as it leads to internal irradiation by the so called ingestion - i.e. mainly by consuming contaminated agricultural products. Since it is known that radioisotopes of iodine, caesium and some noble gases (especially xenon) have the biggest share in the committed effective dose, the information on potential releases of these radioisotopes is especially important for assessing the urgency of immediate response measures.

The risk related to possible consequences of radiation accident (i.e. event resulting in inadmissible release of radioactive substances into the environment) can be evaluated according to the extent of measures needed to protect the endangered population and according to the contamination level of the affected environment.

Restricting the exposure of persons and the environment during a radiation abnormal occurrence is performed by means of safety measures, which are as follows:

- immediate emergency response measures including sheltering, iodine prophylaxis, and evacuation;
- subsequent safety measures including changing residence, control of consuming food and water contaminated by radionuclides, and control of using feedstuffs contaminated by radionuclides.

Emergency response measures in radiation accidents will always be taken if their benefit outweighs their cost and the damage they entail, and they should be optimised in terms of form, scope, and duration so as to provide as much benefit as reasonably achievable.

A protective measure of immediate response is always regarded as substantiated pursuant the Public Notice of SONS No. 422/2016 Coll., if the anticipated irradiation of any individual might lead to imminent detriment of health.

Substantiated protective measures of immediate response pursuant to SONS Public Notice No. 422/2016 Coll. are as follows:

a) sheltering, if the averted effective dose is higher than 10 mSv for the sheltering period lasting 2 days at maximum,
b) iodine prophylaxis, if internal contamination by radioactive iodine threatens and the averted committed effective dose in the thyroid gland caused by iodine radioisotopes is higher than 100 mSv,
c) evacuation, if the sum of the effective dose received up to now at the incident exposure including the effect of protective measures already executed and the effective dose that might be averted by the evacuation is higher than 100 mSv for first 7 days after the event origination.

Substantiated consequential protective measures pursuant to SONS Public Notice No. 422/2016 Coll. are as follows:

a) restrictions in using food, water and feed-stocks contaminated by radionuclides, if the averted annual committed effective dose is higher than 1 mSv,
b) relocating the inhabitants, if it is not possible to ensure effective dose to inhabitants at the return to the affected area lower than 20 mSv for the period of subsequent 12 months.

The admissible radiologic consequences of abnormal occurrences are limited in the legal regulations of the Czech Republic and in WENRA and IAEA recommendations for new nuclear sources so that an release of radioactive substances at design basis accidents must not require any protective measures beyond the nuclear facilities and, even at severe accidents, the radioactivity release must not cause significant irradiation or health damage of inhabitants in close proximity to the nuclear power plant or result in implementing long-term and large-area restrictions by regulating the food chains and exploitation of land or water surfaces. The environmental risk of abnormal radiation occurrences is limited to acceptable level by this.

Acceptability criteria of abnormal occurrences within emergency conditions

Criteria according to SONS statement, Criteria according to WENRA recommendations and Intervention Level and Target Values for Protective Measures are included in the documentation.

Determination of the source term for the evaluation of the radiological impacts of abnormal occurrence.

The expression source term means the amount, isotope composition and time distribution of radioactive substances released from the containment or other part of the power plant to the environment in case of abnormal radiation occurrence. The source influences the possible radiologic consequences of abnormal radiation occurrence in a decisive manner. Each analysed scenario of abnormal radiation occurrence is characterized by specific source term, the parameters of which are given by the extent of damage of certain technological system, by the inventory of radioactive substances within the system and by the condition of individual protective barriers during the event. Apart from the source term, the following main factors influence the consequences of abnormal radiation occurrence: current meteorological conditions, season of year and geographic and demographic characteristics of the power plant vicinity.

The source term for individual types of abnormal radiation occurrences is determined in the documentation so that the radiologic consequences corresponding to this source term are worse with sufficient margin than those that would from future safety analyses for any selected design, taking into consideration the uncertainty rate. Therefore, the calculation prediction of radiologic consequences for the purposes of environmental impact assessment may be more general, as it is carried out with sufficient margin and

the detailed evaluation will be conducted for the selected project solution in preliminary and operational safety reports of the new nuclear source.

Source terms are described for individual types of abnormal radiation occurrences in detail in the documentation.

It ensues from the comparison of the reference source term for NNS used in the documentation with specific source terms specified in available safety reports of reference units that the source term for the NNS is overrated with sufficient margin compared to the suppliers' data.

Results of evaluating radiologic impacts of abnormal radiation occurrences

It can be stated based on the detailed evaluation in the documentation:

Conclusion concerning the evaluation of radiation consequences of design basis accidents (initiated in the reactor cooling system – ground-level release):

The criteria of SONS as well the recommendations from WENRA are fulfilled for this category of events. The event does not result in the release of radionuclides with certainty that requires implementation of immediate response protective measures of sheltering, iodine prophylaxis and evacuation of inhabitants in NNS vicinity. The event consequences also do not result with certainty in the need to implement subsequent protective measures, such as temporary resettlement. The need to restrict using food, water and feedstuffs contaminated by radionuclides can be ruled out with high certainty rate (95 %) in distances over 3 km. The event will cause only very small or local restrictions of placing food at the market with 50 % probability. Any exceeding the intervention level in food is ruled out 1 year after the events. The event has no radiologic transboundary impacts on the inhabitants of neighbour states. In the territory of Austria, the event will cause the requirement to ban sales of milk produced from 175 ha of grassland at maximum with small probability of 5 % only. The sales of local agricultural products will not be prohibited in territories of other states for a certainty.

Conclusion concerning the evaluation of radiation consequences of design basis accidents (initiated out of the reactor cooling system – high-level release):

The criteria of SONS as well the recommendations from WENRA are fulfilled for this category of events. The event does not result in the release of radionuclides with certainty that requires implementation of immediate response protective measures of sheltering, iodine prophylaxis and evacuation of inhabitants or subsequent measures such as temporary resettlement or restrictions in using food, water and feedstuffs contaminated by radionuclides wherever in the NNS vicinity. The event will not cause any restrictions of placing food at the market with 50% probability. Any exceeding the intervention level in food is ruled out 1 year after the events. The event has no radiologic transboundary impacts on the inhabitants of neighbour states. The sales of local agricultural products will not be prohibited in territories of any of the neighbouring states with certainty.

Conclusion to the evaluation of radiation consequences of major accident:

The criteria of SONS as well the recommendations from WENRA are fulfilled for this category of events. The event does not result in the release of radionuclides with certainty that requires evacuation of inhabitants wherever in NNS vicinity. The need of sheltering and iodine prophylaxis is ruled out with high certainty rate (95 %) in distances over 5 km from the NNS. It can be anticipated that no need will exist to

consider resettling in the NNS vicinity and this measure can be ruled out in the distance of 3 km from the NNS with 95% probability. Measures of restricting consumption and sales of agricultural products will be time limited to maximum 1 year and the will be also limited as regards area. The sales limitations of agricultural products will not exceed 100 thousand tons. Cross-border effects and impacts will be low with regard to doses. The highest annual doses for inhabitants of foreign countries will not exceed 1.8 mSv including ingestion of contaminated food, with more than 95% probability, and 0.7 mSv without the ingestion. The expected loss of agricultural production abroad concerns only Austria and should not exceed 30 tons of milk, if EU rules are applied for restrictions to place contaminated production on the market of EU countries.

Risk of act of terrorism

Requirements imposed on securing nuclear equipment and nuclear material in the Czech Republic are defined by Act No. 263/2016 Coll., Atomic Act, and its implementing Public Notice No. 361/2016 Coll., on securing nuclear equipment and nuclear material.

The state is responsible for external protection of nuclear equipment as regards terrorist attack risk, while the operator is responsible for internal protection by means of the project design and organization of the security system. The primary protection against deliberate attacks is the responsibility of state. The state can use number of means (intelligence services, army, police, monitoring terrorist activities, protection of air space, prevention in air transport conditions, special units and the like), the application of which through the Defence Ministry of the Czech Republic, the Interior Ministry of the Czech Republic and SONS means that the danger of successful terrorist attack on the nuclear facilities is eliminated and minimized with high probability.

According to the statement from the Ministry of Interior of the Czech Republic Ref. No. MV-28234/OBP-2017 as of 2.3.2017 that is included in Annex 6.3 of the documentation, it is not possible from understandable reasons to disclose secret information and specific operational procedures of individual security units.

The NNS design solution will ensure sufficient protection digital systems and networks against cyber (computer) attack. The cyber safety will be addressed systematically by means of the program (system) of cyber safety assurance. The entire digital infrastructure will be analysed within this program with the objective to identify critical infrastructure. Adequate measures will be adopted to prevent cyber attacks on this infrastructure based on this. The program will also include defining and introducing activities with the objective to maintain cyber safety in the course of the whole life cycle of the NNS.

Sufficient internal safety measures will be adopted within the NNS preparation in order to assure protection of the NNS against terrorist attacks, including possible attack using civil airliner, and sabotages. These security measures will include above all:

- a link to intelligence and information services provided by the state,
- an integrated technical system of physical protection (TSPP),
- controlled access to particular areas of the NNS,
- assurance of physical guarding by security staff and assurance of intervention by the Police of the Czech Republic,
- cyber security,
- technical solution of the NNS designed for increased resistance in cases of terrorist attack and sabotage actions,
- safety measures in the air transport and protection of the air space.

Technical physical protection system means an integrated, automated system designed to check and monitor the entry of persons and means of transport into the individual areas of in the nuclear power plant, tracing, evaluation, monitoring, and signalling of any breach of such areas and for the transfer of audiovisual information on the breach to the control centre that uses means of computer, security, communication and audiovisual technology.

The system of technical means of the physical protection will fulfil the following functions:

- to detect the attack – beginning of the violation including the access control,
- to obstruct the progress of the violator
- to react on the violation.

The threat of airplane crash due to deliberate attack is a risk sphere monitored specifically. After the attacks on New York and Washington on September 11. 2001, all states with an advanced nuclear power engineering increased protection of all the nuclear facilities against terrorist attacks, including those carried out by means of a large airliners. As compared with impacts of planes due to accidental causes, this is a totally different problem and the protection method is also fundamentally different above all based on preventive measures.

The new nuclear source will especially comply with the following recommendations formulated in the document WENRA Report as regards the design resistance against intentional crash of commercial airliner: Safety of New NPP Designs (2013), namely that the airplane crash will not result in fuel damage in the core or in the system of nuclear fuel storage and that the radiation consequences will be within the O2 criterion of WENRA (no or limited only radiologic impact beyond the premises of the nuclear facility). Performing the basic safety functions necessary for putting the power plant into safe state and maintaining the plant in it must be preserved.

For example, the following adverse effects will be also considered in the analyses evaluating the effects of airplane crash:

- direct and secondary effects of the airplane crash on mechanical ruggedness of the safety significant constructions (containment and building) and systems needed for achieving and maintaining safe state of the power plant after the airplane crash;
- vibration effects on safety significant constructions and systems needed for achieving and maintaining safe state of the power plant after the airplane crash;
- effects of burning and/or explosion of aviation fuel on the endurance integrity of safety significant constructions and systems needed for achieving and maintaining the power plant in safe condition after the airplane crash.

Buildings or respective building parts that contain nuclear fuel or fulfil basic safety functions will be designed so that penetrating the aviation fuel to these building is prevented. Fires caused by the aviation fuel will be assessed as various types of fire, e.g. the fire ball or the pool fire and their combinations. Other consequential fires that may result from fall of an aircraft will be also considered and taken into account.

All reference suppliers of the NNS technologies confirmed the resistance of their power plant units against fall of an airplane, including large airliner, in the technical information. It will be required from the contractor of the NNS that the contractor evaluates the effects of a fall of big airliner realistically and proves fulfilment of the respective recommendation of WENRA as specified above.

Detailed analyses of breakdown consequence of the NNS objects in case of airplane crash and other external events caused by human acts may be potentially abusable for preparation of sabotage or terrorist attack. That is why these resistance certificates, their prerequisites and results will be classified secret information in terms of the Act No. 412/2005 Coll.

A risk of act of terrorism against the new nuclear power source (NJZ) shall be assessed in the following phases of the design preparation and development, and eliminated by standard means and procedures of the physical protection of nuclear facilities, used in the existing practice in accordance with requirements of international and national legislative regulations.

The power plants Dukovany and Temelín are classified with regard to defence assurance in the category "Non-military Facilities Important for the State Defence" in accordance with stipulation of Section14 Paragraph. 1, Letter a) and Paragraph. 3 of the Act No. 219/1999 Coll., on armed forces of the Czech Republic, and stipulations of Section 29, Paragraph 2 of the Act No. 222/1999 Coll., on defence provision of the Czech Republic, in terms of Act No. 320/2002 Coll. and the defence of these nuclear power plants is assured by the Army of the Czech Republic in case of extraordinary security measures declared by the government of the Czech Republic or in case of a military conflict. A similar approach will be applied for the NNS, too.

Risks related to transport of radioactive substances

Basic transports of materials, related to the nuclear power source operation, include transport of fresh fuel from the producer (supplier) to the NNS, transport of treated radioactive waste from the NNS to the storage of radioactive waste, transport of spent nuclear fuel from NNS to the storage of spent nuclear fuel, and transport of spent nuclear fuel from the storage to the place of permanent storage (or reprocessing). The risk control at transportation of radioactive substances is based on principles embodied in legal regulations:

- A permit must be issued for the transportation, i.e. approval of the permitting authorities pursuant to valid law of the Czech Republic, law of the dispatching state and law of transit states;
- the transport must take place according to approved procedures and related requirements of national and international legislative regulations and contracts of the Czech Republic;
- transport procedures must take possible risks into account and minimize the probability of accident occurrence
- material being transported must be stored in approved transport casks (or transport packages and storage packages) that provably ensure that no radioactive material will leak to the vicinity in case of an accident and subcriticality will not decrease below a permissible limit in case of nuclear fissionable materials, i.e., nor in case of water floods;
- the dose rate on the cask surface and in a specified distance from it and the surface contamination must not exceed limit values stipulated by the respective regulation.

Concerning transportation of fresh nuclear fuel, it is possible to expect 5 transports of fresh fuel to the site per year in average during usual NNS operation taking into consideration the current operation of EDU1-4 units, whereas stocking-up with fuel for several years in advance and thus the related adequate increase of the number of transports is expected in accordance with the state energy concept prior to putting the NNS into operation. Due to the fact that the production of fresh nuclear fuel for the NNS cannot be expected in the Czech Republic realistically, It will be supply from

abroad, using one or more of usual transportation methods - railway, motor car, shipping or air transport.

Transportation of spent nuclear fuel from the NNS to the spent nuclear fuel storage will be executed depending on the storage placing either within the NSS or EDU1-4 premises, or to another location. The spent nuclear fuel can be transported by railway or on road. The transports will be in the order of units per year at maximum in both cases.

The transport of radioactive substances is much less risky in relation to the environment and population compared with transportation of other hazardous goods (transportation of other types of fuel, from power engineering perspective) and its amount and frequency of transports are low. The possibility of releases of radioactive substances into the environment is minimized during the transportation. Procedures are drawn up for each transport, i.e., how to restrict possible radiation consequences of an accident so that health of population is not jeopardised. Concerning the transport of radioactive substances, strict limits are stipulated in Public Notice of SONS No. 379/2016 Coll. for the dose rate both on the surface of the cask, in which the radioactive substances are transported, and in specified distance from this cask. The actual radiation load of inhabitants from transport of nuclear substances is therefore very low. The value of the individual effective dose during one thoroughfare of a vehicle transporting radioactive substances reaches the level of several nSv at maximum, which is a dose absolutely negligible with regard to possible radiation impacts.

Radiation risk related to human activities at the site and its vicinity

The preliminary assessment indicates that an abnormal radiation occurrence on another nuclear facility at the site might have an impact on the nuclear safety of the NNS, as well as events connected with spreading clouds of toxic substances resulting from traffic incidents on the road II/152 and an incidental airplane crash on the NNS must not be omitted either Other risks ensuing from the human activity at the Dukovany site may be regarded as negligible based on the evaluation. Measures will be adopted in the project design for the protection against all events and their effects on the NNS that will ensure protection of structures, systems and equipment important with regard to nuclear safety and protection of the operating personnel.

The NNS design solution will assure the protection of NNS against design events specified hereinafter that ensued from preliminary evaluation of external (unintentional) risks resulting from human activities in vicinity of the NSS premises:

a) The NNS design solution will assure the protection of NNS against consequences of abnormal radiation occurrence on any of other nuclear facilities situated at the site of Dukovany NPP.
b) Measures to prevent sucking the toxic cloud into the ventilation of attended areas (control room and control work places) will be part of design bases of the NNS project in order to exclude the negative effects of events with the toxic cloud spreading.
c) Load caused by incidental fall of an airplane corresponding to airplane with stipulated specification will be considered as project design event for systems, structures and components important with regard to nuclear safety in the NNS design.
d) The NNS project will be resistant to crash of big airliner, whereas this event will be assessed as design extension conditions without fuel melting and dealt with using approach taking primarily into account the WENRA recommendations for new reactors.
e) The NNS design will comply with standards and principles of electromagnetic compatibility (EMC conception). The electromagnetic environment, in which the systems and equipment work, will be defined in the design. The systems will be designed in such a way so that they

can work without operating ability impaired due to electromagnetic interference in the given environment. In addition to this, the systems and equipment must observe the limits of interference emitted into the electromagnetic environment. Interfaces (coupling routes) between systems and the electromagnetic environment must be properly treated if needed (protections, interference limiters, etc.). Interfaces between the units and the network and between the units themselves will be designed in accordance with EMC principles.

Non-radiation risks

From the non-radiation point of view, the project represents in principle a routine industrial operation that does not give rise to a significant risk of occurrence of accident events with negative consequences to the environment and/or population. In connection with operation, it is impossible to potentially exclude emergency situations related to an escape of contaminated waste waters (by a damage of the sewerage tightness or a failure of function of the oily water treatment plant), an escape of substances stored (chemicals, driving fuels, lubricants and heat-carrying agents, cleaning means, etc.) from the storage tanks or pipe bridges, or transport. The possibility of igniting the media or other materials is not potentially excluded either.

The mentioned risks have a low level of the probability of occurrence and their elimination does not require any special preventive or elimination measures except for usual measures or those prescribed by respective regulations (building, safety, fire, transport or others), including the act on major accident prevention. Consequences of the mentioned type of events can be dealt with by readily available means.

Opinion of the expert report author:

The part of the documentation “D – Comprehensive characteristics and evaluation of possible significant project impacts on the environment and public health”, part D.II. is elaborated to the extent stipulated by the Annex No. 4 of the EIA Act. The quoted annex of the EIA Act requires that characteristics of risks for public health, cultural heritage and environment due to possible incidents, disasters and abnormal conditions are specified in the EIA documentation, as well the expected significant impacts ensuing from them. The documentation describes possible accidents and abnormal conditions and procedures for their prevention.

Chapter “D.II. Characteristics of the risks for public health, cultural heritage and environment due to possible incident, disasters and abnormal conditions and expected significant impacts ensuing from them“ is processed to extent sufficient for assessing the project impacts on the environment with regard to the nature of the evaluated project, and the expert report author has no substantial reservations concerning this chapter.

The conditions for the binding statement draft aiming to minimization of the above defined risks are formulated in previous parts of the submitted expert report.

D.III. Complex characteristics of the project impacts according to Part D, Points I and II from the viewpoint of their size and significance including their interactions including a particular focus on the possibility of cross-border impacts

The documentation states that the extent of impacts will mostly be local, given by the extent of areas for location of the project and its nearest vicinity. A wider extent of impacts can only occur through the project outputs to the environment (typically radioactive as well as non-radioactive effluents into atmosphere and watercourses, noise or other factors) and visual impacts.

Regarding radioactive effluents and their very low level, the existing impacts of radioactive effluents from the nuclear facilities in the site as well as the generally insignificant nuclear power share of the population exposure to radiation, no significant adverse impacts of the project are expected. The extent of the project impacts will therefore quantitatively as well as qualitatively correspond to the extent of impacts of the existing nuclear facilities in the site that are insignificant (deep within permissible limits) and subject to regular monitoring and checking.

In terms of other factors, the site is dimensioned for the placing of the new source as regards space and capacity. The project will be placed in the area imminently adjacent to the existing premises of the Dukovany power plant (EDU1-4) and its infrastructure, i.e. in the area with intensive exploitation for industrial activity (electrical power generation). This will not change the existing arrangement of the territory significantly.

As far as the extent of impacts is concerned, a visual impact (i.e. impact on landscape) has to be considered a significant factor. The project will consist of spatially dominant objects located in a dominant position. It will therefore be visible from a great distance. On the other hand, this impact has currently been present at the site as a result of visual impacts of the existing EDU1-4 power plant. The extent of visually affected area will increase only insignificantly after the NNS has been built, and will correspond to the existing situation regarding quality.

The impacts on the qualitative characteristics of surface water represent further ascertained factor. These impacts also occur in the territory under the existing condition already, regardless to the operation of the existing power plant EDU1-4, the contribution of which to the water quality indicators is of low significance. Contributions of EDU1-4 consist especially in thickening the waste water compared to the extracted raw water, and in consequent increase of the concentration of individual water quality indicators. However, it is an impact of low significance with regard to the balance, i.e. the flow of substances. This condition will persist even after the NNS execution, whereas a more significant affectation can be anticipated especially in the period of the concurrent operation of the NNS and EDU1-4.

Noise impacts must be also included among the significant impacts, not because of the noise from the actual operation (which is solved reliably thanks to the more than sufficient distance from the protected area), but by the reason of related traffic within the wider road network, especially during the project construction period.

No significant facts were identified in any of the monitored areas (population and public health, atmosphere and climate, noise, radiation and further physical or biological characteristics, ground and surface water, land, natural resources, biological diversity, tangible property and cultural heritage, transport infrastructure or others) in the course

of the documentation preparation that would indicate unacceptable affectation of the environment or public health within the territory involved.

Similar conclusions apply also to the evaluation of the project risks. It ensues from analyses of consequences of radiation abnormal occurrences that the criteria of risk admissibility according to SONS or WENRA will not be exceeded for representative cases of design basis accidents and severe accidents. Other possible risks are taken into account in the evaluation at same time that are related to the natural characteristics of the site and to the human activities at the site.

Actions for coping with extraordinary radiation measures are described.

The affected areas as well as so-called representative inhabitants (i.e. persons being the most affected by the project and its radiation and/or non-radiation effects) are situated in the immediate vicinity of the project site. The distance of the nearest residential areas of the surrounding communities is of the order of units of kilometres. All requirements for the protection of environment and public health are already observed in this nearest area according to the evaluation results.

Distances of the project from state borders of neighbour states are in the order of tens to hundreds kilometres. The occurrence of significant transboundary impacts is virtually ruled out in this context, if fulfilling the protection requirements of the environment and public health is assured in the nearest territory involved. However, regardless of this fact, the project environmental impact documentation includes analyses of radiation effects for the border areas of the nearest adjacent states, namely both for normal operation of the project and (in particular) a representative conservative case of a basic design accident and a major accident. These analyses confirm that influences are not caused by the NNS operation that might have significant adverse impact on the neighbour states. Consequences of design basis accidents and severe accidents are described in the previous Chapter.

Opinion of the expert report author:

No comments of the expert report author. Adequate conditions for the project preparation, construction and operation are incorporated into the conditions of the binding statement draft for the competent authority.

D.IV. Characteristics and expected effect of measures proposed for the prevention, exclusion and decrease of all significant adverse impacts on the environment and public health

Measures for prevention, exclusion and decrease of all significant adverse impacts on the environment and public health designed in the documentation are specified in Chapter D.IV. documentation and structured as follows:

General measures

General measures for prevention, exclusion and decrease of adverse impacts or their compensation consist in these spheres:

- the project location outside the specially protected areas, in the area with well accessible infrastructure,
- use of the best available technologies of generation III+ reactors,

- assuring nuclear safety, radiation protection, securing nuclear equipment and nuclear material and measures for coping with abnormal radiation occurrence in accordance with requirements of valid legislative regulations of the Czech Republic, recommendations of WENRA and IAEA or other standards of the industry,
- minimisation of radiation effects on population or construction workers and employees in accordance with ALARA principle,
- minimisation of demands for environmental sources and outputs to the environment,
- observance of all the legal regulations and standards in the sphere of the environment and public health.

Basic description of these measures implemented within the NNS design is included in Chapter B.I.6. of the documentation. Description of Technical and Technological Solution.

Specific measures are proposed in addition to this generally applicable extent of measures that ensue from the reality ascertained in course of elaborating the documentation. However, measures are not included among them that ensue from the generally binding legal or other regulations. A declaration of commitment to observe legal obligation cannot be regarded as a measure for prevention, exclusion and decrease of adverse impacts.

Specific measures

Conceptual measures

The conceptual measures are not related to design solution of the project or to the follow-up project controls. Their purpose is to create conditions for integrating the project into the territory and its territorial protection. The measures are primarily intended as recommendations for respective zoning and planning or other authorities, deciding on the territory arrangement and relations within it.

Conceptual measures are as follows:

- No other building projects and changes of the area will be made possible by the zone planning documentation in the existing protective zone without permanent settlement at the Dukovany site ("construction moratorium") than those related to using the area for the new nuclear source, for the operated EDU1-4 and for other nuclear facilities at the site, including related infrastructure networks. The exploitation of agricultural lands for agricultural purposes is not affected by this.
- The prohibited air space LKP9 Dukovany will be examined and, if need be, modified so that it protects also the NSS premises preventively and effectively.
- In other processes of evaluating environmental impacts of other projects at the site and its vicinity (if any), the requirement will be submitted to take into account concurrent impacts of such newly planned project with the NNS.
- Defining the zone of emergency planning pursuant to the Atomic Act will be processed as a part of the documentation for permitting the construction of nuclear facilities.

These are principle preventive measures that are included in the project and therefore, the team of the expert report authors did not take them over to the conditions of the binding statement draft.

Technical and technological measures

The technical and technological measures are directly related to the project design solution. They are recommended as conditions binding statement to the assessment of environmental of the project execution. The technical and technological measures are as follow:

- The technical and technological solution of the NNS will ensure that the envelope environmental parameters, specified in the documentation of the project impacts on the environment (Chapter B.II. Data on inputs and B.III. Data on outputs) will not be exceeded. *Principle condition of the EIA process*
- The technical and technological solution of the NNS will ensure that the dose optimization limit of representative person will not be exceeded that is related to irradiation from effluents from all operated units located at one site; the same applies to the authorized limit of radioactive effluents to the atmosphere and the authorized limit of liquid radioactive effluents that will be stipulated in further stages of the permitting process.
- The technical and technological solution of the NNS will ensure that none of the emergency conditions not belonging to the category of severe accidents would result in release of radionuclides that would require implementing the protective measures of sheltering, iodine prophylaxis and evacuation of inhabitants wherever in the NNS vicinity.
- The technical and technological solution of the NNS will ensure that such design measures will be adopted for severe accidents (accident with sever fuel damage) that it would not be necessary to evacuate the inhabitants and to introduce long-term restrictions of food consumption in the immediate vicinity of NNS.
- The technical and technological solution of the NNS will ensure practical exclusion of the possibility of such severe accident (accident with severe fuel damage) that might lead to an early or large release.
- The technical and technological solution of the NNS will take into account requirements of the ALARA principle for protection of inhabitants and employees.
- The technical and technological solution of the NNS will take into account the need of its future decommissioning with regard to the ALARA principle and minimization of impacts on the environment.
- The principles of minimizing the radioactive waste production will be applied in the technical and technological solution of the NNS.
- The technical and technological solution of the NNS will ensure that liquid effluents containing radioactive substances will be effectively pre-treated prior to discharging with other waste water from the NNS, their residual activity will be checked, the discharge will be handled in controlled way and the liquid effluents will be diluted by blow down water from the cooling tower in the stipulated minimum ratio at the discharging.
- The technical and technological solution of the NNS will ensure the possibility of limiting the liquid effluents (waste water) containing radioactive substances from the NNS, namely tritium (H-3), in case of low flow rates in Jihlava River.
- The monitoring, balancing and control of liquid effluents will be linked to the monitoring of hydrologic situation in Jihlava River so that the legislation limits of radionuclide activities are not exceeded at the monitoring point Jihlava River downstream the Mohelno Water Reservoir even in case of occurrence of extraordinary adverse hydrological situation (low flow rates).
- The chemical regime used in technological circuits of the NNS will take into account the principle of minimizing the effluents of low active radioactive substances as well as inactive pollutants to the ambient.
- The NNS will be provided with its own WWTP, in which all sewage water produced in the NSS premises will be treated.
- The function of the NNS ventilation systems will be designed so that radioactive substances are removed from gaseous radioactive effluents prior to entering the ventilation stack effectively and with high efficiency.
- The NNS design solution will ensure protection of the NNS against consequences of a radiation abnormal occurrence of any other nuclear facilities situated at the site
- The project solution of the NNS will ensure protection of the NNS against consequences of possible external events of natural origin and consequences of possible events caused by human activity in the NNS vicinity.

- The NNS project will be resistant to crash of big airliner, whereas this event will be assessed as design extension conditions and dealt with using approach taking primarily into account the WENRA recommendations for new reactors.
- The design of NNS will comply with standards and principles of electromagnetic compatibility (EMC conception). Apart from the ability to preserve their own functionality in the given environment, the NNS systems and equipment will meet the limits of the level of interference emitted to the electromagnetic environment.

Measures for protection individual of components of the environment and public health

The measures for protection of individual components of the environment and the public health are related to the facts ascertained within the evaluation of the project impacts on the environment and the public health. They are recommended as conditions binding statement to the assessment of environmental of the project execution.

The measures for protection of individual components of the environment and the public health are as follows:

Population and Public Health

- Protective measures for the construction period (modifications of carriage ways, increased drive fluency and reduced drive speed, etc.) will be considered with special attention in communities affected by the traffic related to NNS construction where increased noise loads would be confirmed within noise monitoring prior to and during the construction
- The impact of the rough grading works and construction activities on the atmosphere quality will be minimized, namely by adopting preventing measures in order to eliminate the dustiness.
- Measures will be considered in the NNS project design that decrease the individual effective dose of the representative person, caused especially by discharging liquid effluents (waste water) containing radioactive substances from the NNS.
- Contact with the nearby communities and the general public should be ensured in the sphere of communicating and informing about the course of the project preparation and execution and its potential impacts on the ambient during the entire period of the NNS preparation, construction and operation, including flexible reactions to arising suggestions and queries.
- The health condition of inhabitants will be evaluated in the period prior to putting the NNS into operation and subsequently in intervals of 10 years; the results will be made accessible for the general public.
- The general public should be regularly informed about on the impact of the NNS operation on the environment by summary annual reports published on the web sites of the operator.

Air and Climate

- Impacts on the atmosphere quality will be minimized in the period of the NNS construction, namely by adopting preventing measures in order to eliminate the dustiness in accordance with atmosphere quality improvement program of the South-east Zone (code BD3 "Limiting dustiness from construction activity"). The selection of adequate combination of measures will be will be emphasized with regard to dominant impact construction site traffic that minimize impact of emissions from vehicles driving on the construction site roads (e.g. optimization of the length of transportation routes at the construction site, using compacted construction site roads, cleaning the vehicles, roads and handling areas, limited speed of transportation mechanisms and the like), eventually measures that minimize dust emissions from other activities (e.g. minimizing or ruling out free depositions of fine grained materials, maintaining open surfaces sufficiently wet and the like).

Noise and other physical and biological characteristics

- A detailed acoustic study should be elaborated after the civil contractor is selected that would evaluate the noise impact of the selected solution on the nearest or potentially most involved affected outdoor area or protected outdoor area of buildings of nearby communities.
- Noise will be measured in the areas potentially most affected by the construction related traffic prior to the construction commencement and an acoustic study will be prepared evaluating the impact of construction related traffic on the acoustic situation. Measures will be adopted (if needed) based on these data that will lead to reduction of noise loads (e.g. traffic organization measures, reduction of vehicles speed, replacing windows at affected objects and the like).
- Civil works at the main construction site will be limited to the day time (between 6:00a.m. and 10:00 p.m.), with exception of the works that must be carried out without interruption because of technological reasons (e.g. concreting and related transportation at the site).
- Civil works in proximity of the community Slavětice (vicinity of the switching station) will be limited to the day time excluding early morning and late evening hours (i.e. between 7:00 a.m. and 9:00 p.m.).
- The work staff and material will be transported in day time during the construction, with exception of specific activities limited in time or acoustically insignificant (e.g. transport of oversize or heavy components, exceptionally assurance of works that must be carried out without interruption from technological reasons and the like).The work staff as well as the materials will be transported in the day time only in the course of the construction, with the exception of specific time-wise limited or acoustically insignificant activities (e.g. transport of over-size or heavy components, works conducted exceptionally that must be carried out without an interruption from technological reasons and the like).
- It will be evaluated based on monitoring reports concerning EDU1-4 and NNS in the documentation for individual phases of the NNS permitting process pursuant to the Atomic Act, whether significant change in effluents of radioactive substances occurred and whether the collective effluents from the NNS and EDU1-4 exceed the envelope used in the documentation of the project impacts on the environment. A causal analysis will be carried out and a revised evaluation of the health impacts will be elaborated in case of exceeding.
- It will be evaluated in the documentation for individual phases of the NNS permitting process pursuant to Atomic Act based on from the reports of the EDU1-4 and the NNS monitoring, whether significant adverse trends of radioactive substances concentration in the environment occur. If this trend is detected, a causal analysis will be carried out and the need of corrective actions will be evaluated.
- Measuring will commence at sources of effluents from NNS (ventilation stack, check tank and waste water tank) and in modernized/extended parts of the monitoring system in the vicinity prior to the start of putting the NNS into operation. Furthermore, the functionality will be evaluated of the measuring near the sources and of the ambient monitoring system at putting the NNS into operation and at the NNS operation.
- At the end of the trial operation, the validity will be verified and confirmed of non-exceeding the assumptions and results of the documentation of the project impacts on the environment in relation to the expected impacts of ionizing radiation from NNS in concurrent effect with EDU1-4 or further nuclear facilities at the site.
- The lighting of NSS premises will be designed so that the light pollution of the ambient is minimized.

Surface and Ground Waters

- Technical, technological and organization measures will assure that legislation limits of radioactivity indicators pursuant to Government Decree No. 401/2015 Coll. are not exceeded due to liquid effluents from the NNS in Jihlava River downstream Mohelno Water Reservoir
- Technical, technological and organization measures will assure that legislation limits of radioactivity indicators pursuant to Government Decree No. 401/2015 Coll. are not

exceeded due to liquid effluents from the NNS in water-mains potable water. This measures concern especially those monitoring points where potable water sources are partly subsidized by water from Jihlava River.

- Therefore, the optimization of water management will be strongly emphasized in further project stages so that the water quality is not impaired in Jihlava downstream the waste water outlet object over the extent that would be harmful to the environment.Therefore, the optimization of water management will be strongly emphasized in further project stages so that the water quality is not impaired in Jihlava downstream the waste water outlet object over the extent that would be harmful to the environment.
- In further stages of the permitting process of the project, for the purpose of evaluating chemical condition of surface water, the monitoring of indicators of raw and waste water will continue that cause deterioration of the chemical condition of surface water bodies exceeding the standards of environmental quality for surface water bodies.

Land

- The agricultural land resources and limited land plots intended to fulfil the forest function will be annexed to the necessary extent only.
- It will be assured at stripping that the horizon embedded lower (waste rock) is not taken-up to larger extent. The stripping will be conducted under the supervision of soil scientist in areas high quality land occurrence (protection classes I and II).
- The stripped humus horizon (topsoil) and lower laying fertilizable layers (subsoil) will be properly stored at separate dumping sites so that they do not degrade.
- No construction site installations or earth dumping sites will be established on land plots intended to fulfil the forest function out of the construction site and the necessary working zones.
- The earth extracted during the rough grading and excavation works will be stored in such a way that the erosion impact is minimized.
- The employed building machinery will be maintained in good technical condition so that the land environment is not contaminated; maintenance of mechanisms (exchange of lubrication fillings, etc.) will be carried out in areas only that are secured with regard to water management aspects and were prepared in advance for this purpose.

Natural sources

- Geotechnical properties of the construction site, ascertained based on detailed engineering-geological survey, will be taken into account in the design of foundations of individual objects.

Biodiversity

- Environmental (biological) supervision will be established for the entire course of the project construction prior to its commencement that will supervise observing the conditions stipulated for nature protection and monitor the construction areas with regard to occurrence of plants and animals.
- Flora and fauna surveys of the territory involved will be conducted prior to the project construction commencement in order to identify and localize the most valuable associations and the occurrence of specially protected species of plants and animals . An application for granting exception from protective conditions of the involved specially protected species will be filed at the competent body of nature protection based on results of these surveys prior to the construction commencement. Adequate mitigating and compensating measures will be specified more precisely based on results of these surveys prior to the construction commencement.
- The protective zone of the memorial tree Lípa u Lipňan (Linden near Lipňany) will be visibly marked prior to the construction commencement and the access to it and its injuring will be prevented.

- Before the weedery situated in the area of construction site installations (if still existing in the time of the project construction) is destroyed, similar substitutive biotope will be established for the species occurring there in its proximity.
- The occurrence spots of specially protected plant species situated beyond the working zone will be marked during the construction of the raw water feeder and the access to them and their damaging will be precluded.
- Upon agreement with the appointed environmental supervision of the construction and in proper time, migration barriers will be installed in places of expected and possible penetration of reptiles, amphibians or small mammals to the areas of the construction site and transport routes of building machinery that would prevent such penetration. If needed, amphibians will be appropriately transferred to reproduction site or sites in the period of their reproducing.
- If needed (in case of penetration of specially protected species to construction areas), professional transfer of animals to suitable sites will be ensured.
- The occurrence of introduced and invasive plant species will be monitored in the involved areas in the course of the construction. They will be immediately eliminated, if they occur.
- Such structures of towers of overhead electrical lines will be selected and installed that will avert killing birds by electrical current.
- The possibility to pass the landscape along Jihlava River (or Dalešice-Mohelno waterworks) for large mammals will be preserved, affectation of the migration corridor (if any) will be solve by adequate migration objects.
- After the project construction is completed, measures will be adopted upon agreement with the nature protection body on selected sites (especially within reclamation of the construction site installations) that will support the reproduction of amphibians (puddles) and reptiles (small dry walls).
- After the project construction is completed, bird boxes will be hanged upon agreement with the nature protection body in selected forest stands and on trees in free landscape.
- After the project construction is completed, an adequate management will be implemented upon agreement with the nature protection body in the raw water feeder route that will lead to recovery of natural associations.
- Rain water retained in the retention reservoirs will be discharged gradually so that the natural flow rate dynamics is simulated as much as possible.
- The sewage water from NNS will be cleaned in the new biologic WWTP prior to its discharge to the Mohelno Water Reservoir and its quality will be monitored.
- All executed measures will be registered, documented and archived in detail.

Landscape

- Urban development and architecture solution will make part of the project documentation that will take into account the link with the existing territory arrangement and adjust the architectonic design of the project (including the colour design) with respect to the architectonic link with the existing premises of EDU1-4 in such a way that it is integrated into the landscape.
- The project design documentation will include the design vegetation modifications that will be addressed with respect to integration of the project to the landscape. Autochthonous woody species will be used for the vegetation modification.

Tangible assets and cultural heritage

- The chapel of the former community Lipňany that is situated in the area of construction site installations should be protected during the period of civil works by a fence, including the protection against incidental damage by motor vehicles (e.g. by crash barriers);
- The area of Lipňany chapel will be rehabilitated, the chapel refurbished and made accessible again, after the construction is completed.

Transport and other infrastructure

- The possibility of using railway will be taken into account for transportation of selected building materials (cement, lime).
- The state of the involved road network will be described and diagnosed prior to the NNS construction. If necessary, carriage ways and objects of the road network will be modified so that they do not degrade significantly due to the construction
- The roads affected by the construction will be repaired after the construction is completed. The precise extent of repairs will be based on the diagnostics and surveys performed prior to the NNS construction and after it.

Others

- The available possibilities of reducing the production of inactive waste will be taken into account within the preparation, construction and operation. In case of waste, its further use will be preferred; if it is impossible, the waste will be recycled, increased in value (with regard to material or energy) and disposed of as the last option only.
- Increasing the value of building waste (grinding, classifying, re-using within the construction site or out of it) above all, as well as of biologically degradable waste, will be assured to maximum possible extent during preparation, construction and operation.
- The preparation of the store of spent nuclear fuel for will start sufficiently in advance for the NNS.

Opinion of the expert report author:

Attention should be drawn as regards the above chapter that other measures that must be respected are those that were generated within evaluation of impacts on NATURA 2000 and that are not included in the above mentioned chapter of the documentation.

The documentation for evaluating the impact of the assessed project was elaborated in the extent of Annex No. 4 of the Act No. 100/2001 Coll. as amended. Adequate measures formulated in the documentation were modified or supplemented based on received opinions to the documentation and recommendations of the author expert report author; they are specified in Chapter IV. hereinafter. The assessment by this expert report of proposed measures for preventing, ruling out, decreasing or compensating adverse impacts on the environment and public health and their monitoring. It can be stated generally that the extent of measures formulated in the assessed EIA documentation may be regarded as sufficient.

D.V. Characteristics of forecasting methods, underlying assumptions, and evidence for finding and assessment of significant impacts on environment

The methods of evaluating impacts on individual spheres of the environment and the public health are specified in detail in Chapter D.V. of the documentation including the used background documents.

Opinion of the expert report author:

Chapter D.V. Characteristics of the Used Forecasting Methods and Initial Assumptions and Evidence for Ascertaining and Evaluating Significant Project Impacts on the Environment is elaborated in extent corresponding to requirements of Annex No. 4 of the EIA Act and sufficient to assess the project impacts on the environment. Without comments of the team of expert report authors.

D.VI. Characteristics of difficulties (technical deficiencies or deficiencies in knowledges) encountered at the documentation processing and of main uncertainties ensuing from them

No lack of difficulties (technical deficiencies, deficiencies in knowledges or uncertainties) that would make it impossible to clearly specify possible impacts of the project on the environment and public health occurred in the development of the documentation. The environmental properties of nuclear power sources with PWR type reactors are well known, data on significant parameters of facilities of individual reference designs is available. Data on the existing nuclear facilities at the site and their environmental impacts are also available.

Opinion of the expert report author:

Chapter “D.VI. Characteristics of All Difficulties (Technical Deficiencies or Deficiencies in Knowledges) that Occurred at Elaborating the Documentation and Main Uncertainties Ensuing from Them” is elaborated in extent sufficient to assess the project impacts on the environment. No comments of the team of expert report authors.

E. Comparison of project solutions variants

The project is not submitted in more variants. Reasoning of this fact is included in Chapter B.I.5.2. of the documentation. Description of considered variants.

Opinion of the expert report author:

No substantial comments of the team of expert report authors elaborating team. Attention may be drawn to the fact that the team of the expert report authors formulated the recommendation for the binding statement draft that the net electric power output does not exceed 3250 MWe at the Dukovany site in any variant of the NNS concurrence with EDU 1-4, concerning the specified matters in relation to the limitations due to the transmission network capacity, to the amount of effluents released to water course, to risks connected with future development of climate and its impact on the amount and quality of water in Jihlava River and based on the current knowledge of the site.

F. Conclusion

The impacts on population and public health and impacts on the environment, including impacts on atmosphere and climate, noise and further physical and biological characteristics (including impacts of ionizing radiation), surface and groundwater, land, natural resources, biological diversity (including impacts on animals, plants and ecosystems), landscape, tangible property and cultural heritage, transport and other infrastructure or other environmental impacts are evaluated in the documentation. The impacts on the biologic diversity are assessed with special attention to the Sites of Community Importance.

The evaluation includes ascertaining, describing, assessing and evaluating the anticipated direct and indirect impacts of the project executing as well as non-executing on the environment. Both impacts of the project operation and the impacts of its preparation and execution as well as the impacts of terminating the project operation are evaluated. Both the usual operation of the project and the possibility of arising emergency conditions are taken into account (including the project vulnerability towards severe incidents or disasters). The assessment of potential cross-border impacts makes part of the evaluation. The documentation also contains the proposal of measures for preventing adverse impacts on the environment and for ruling out, decreasing, mitigating or minimizing these impacts (including measures for monitoring possible significant impacts).

Opinion of the expert report author:

The documentation states that no facts were ascertained that would rule out or conditionally rule out the execution of the project at the selected site. It concerns the project that does not load the environment by its impacts above an admissible limit, it means that legal limits will not be exceeded. The risks resulting from the operation are also acceptable. The measures for elimination or reduction of adverse impacts on individual components of the environment are proposed in respective chapters.

Part F “Conclusion” is processed in the scope sufficient for environmental impact assessment of the project. The expert report author agrees with the conclusion of the assessed EIA documentation and recommends the project for execution under the assumption that the conditions will be respected that ensued from the process of the environmental impact assessment, as formulated in the binding statement draft.

G. Generally comprehensible summary of non-technical character

The summary of non-technical nature contains data about the project as well as the conclusions of individual partial spheres of evaluating the possible project impacts on the environment in brief and comprehensible form in the documentation.

Opinion of the expert report author:

Chapter “Part G Generally Comprehensible Summary of Non-technical Nature” is elaborated in extent sufficient for the assessment of the project impacts project on the environment. No comments of the team of expert report authors.

H. ANNEXES

Annex No. 4 of the EIA Act requires obligatory documentation annexes as follows:

- Opinion of the competent building authority to the project with regard to zone planning documentation
- Opinion of the nature conservation body, if required pursuant to Section 45i, Paragraph. 1 of the Act No. 114/1992 Coll., as amended by Act No. 218/2004 Coll.,
- Reference list of used sources
- Date of the documentation elaborating
- Name, surname, domicile and phone number of the documentation author and of persons that took part in elaborating the documentation
- Signature of the documentation author

The assessed EIA documentation contains the specified annexes. Further annexes are not obligatory and their listing is specified in the Part II.1 Documentation Completeness of the expert report.

Opinion of the expert report author:

Chapter “H – Annex” fulfils the requirements for EIA documentation stipulated by Annex No. 4 of the Impact Assessment Act.

II.3. Ranking of variants (if submitted) with regard to impacts on the environment

The project is presumed in one (active) variant only. Reasoning of this fact is included in Chapter B.I.5.2. of the documentation. Description of considered variants.

The zero variant can be also defined based on the documentation that means maintaining the current condition without the project execution. Thus the current condition of the environment would not change.

Opinion of the expert report author:

No comments of the team of expert report authors.

II.4. Evaluation of significant project impacts on the environment that reach over state borders

The documentation states that distances of the project from state borders of neighbour states are in the order of tens to hundreds kilometres. The occurrence of significant transboundary impacts is virtually ruled out in this context, if fulfilling the protection requirements of the environment and public health is assured in the nearest territory involved. However, regardless of this fact, the project environmental impact documentation includes analyses of radiation effects for the border areas of the nearest adjacent states, namely both for normal operation of the project and (in particular) a representative conservative case of a basic design accident and a major accident. These analyses confirm that influences are not caused by the NNS operation that might have significant adverse impact on the neighbour states. Details in Part II of this expert report - D.III. “Complex characteristics of the project impacts according to Part D, Points I and II from the viewpoint of their size and significance including their interactions with particular focus on the possibility of cross-border impacts”.

Opinion of the expert report author:

No comments of the team of expert report authors. Information about the NNS radiation impacts on Austria in the distance of 380 km from the NNS was supplemented as a requested supplementary background document pursuant to Section 9 of Act. No.100/2001 Coll., as amended, based on requirements from the Austrian side within the consultations carried out, namely for the source term “DEC, severe accident, ground release”.

In the course of dealing with the requirement/question, the effective and equivalent doses were determined for all 3 source terms (2 times DBC and 1 time DEC) used in the EIA documentation in the territory of Austria up to the distance of 380 km from the Dukovany NNS. Values of effective dose after 2 days, after 7 days, after 30 days and after 365 days and the equivalent dose for the thyroid gland by iodine inhalation in the category “adults” and “children” (in the given case conservatively children of 1-2 years of age) were tabulated within the supplement.

Details in ***Annex No. 2. 2.*** *of the submitted expert report.*

III. ASSESSMENT OF TECHNICAL SOLUTION OF PROJECT WITH RESPECT TO ACHIEVED DEGREE OF KNOWLEDGE CONCERNING POLUTION OF ENVIRONMENT

The technical solution of the project is described sufficiently in the documentation, it corresponds to demands for protection of the environment and of the population health. The technical solution of the project consisting in execution of power plant units with reactor of PWR type, generation III+ and net electrical power up to 2400 MW_e can be considered as possible provided that all legislation requirements concerning the method of the construction execution are observed. Commercially available units of III+ generation will be used and none of the available projects complying with legal requirements is precluded.

The power plant units include all the necessary civil engineering objects and technological equipment of the primary circuit, the secondary circuit, external cooling circuits, external plants and other plants, including all the related and induced investments for the project construction and operation.

Incorporation of the measures to the civil design, which serve the purpose of the environment and public health protection, continues to be the necessary requirement. These measures must be based on the EIA documentation, on this expert report and on further findings from the process of the project preparation as well as on findings ascertained during the preparation of the area for the project execution.

IV. ASSESSMENT OF MEASURES PROPOSED FOR PREVENTION, EXCLUSION, DECREASE OR COMPENSATION OF ADVERSE IMPACTS ON THE ENVIRONMENT AND PUBLIC HEALTH AND FOR THEIR MONITORING

The documentation in the extent as per Annex No. 4 of the Act No. 100/2001Coll., as amended, was elaborated for the assessment of the impact of construction and operation of the evaluated project.

The team of documentation authors specified a compact system of measures corresponding to the pre-design project phase in Chapter D.IV, whereas the majority of presented measures are intended for the project preparation phase emphasizing the requirements that can be particularized (developed) in the subsequent design preparation phases only. If some presented measures are already included in the project or ensue directly from branch acts as a specific obligation, the team of expert report authors did not reflect them in the binding statement draft.

Furthermore, the team of expert report authors summarized all proposal of measures for the prevention, exclusion, decrease or compensation of adverse impacts of the project on the environment that:

- were already presented in the documentation including Nature assessment (if they are not part of the project or do not ensue from respective branch acts)
- were required within the opinion to the documentation and were accepted by the expert report author
- ensued from interstate consultations
- ensued from public hearing concerning the project
- suggested by the author of the expert report

The team of expert report authors recommends to accept the following measures (as conditions for the binding statement draft) for prevention, exclusion, decrease or compensation of adverse impacts of the construction and operation of the evaluated project on the environment and public health:

Conditions for the project preparation phase:

1) Within the project zone proceeding documentation for the solution of waste water removal from NNS to the Mohelno Water Reservoir, the routing of the respective pipeline should be localized solely along the existing pathway with green trail mark in the forest sections upstream the confluence of Skryjský Stream with the Luha water course; concurrence with technical elements (for example roads) should be preferred in other sections, too.

2) Within documentation for zoning proceeding of the project for the solution of discharging waste water with content of radioactive substances from NNS to Mohelno water reservoir, to localize consistently the route of the respective pipeline above the left bank of Skryjský stream downstream the confluence with Luha water course by reason of consistent respecting the border of SCI CZ0614134 Jihlava Valley that is situated above the right bank of the water course downstream the confluence – in particular is it the section between the entry of Skryjský Stream and its confluence with Luha water course of the length of approximately 0.3 km of Skryjský Stream.

3) Tanks for catching eventual leaks of oil products and sediments will be part of the system of discharging rain water from the NNS to the catchment area of Olešná within the documentation for zoning proceeding so that the protection subject in SCI CZ0623819 Rokytná River is not affected.

4) More detailed documenting of the civil engineering solution for shelters, emergency control centre, technical support centre, external emergency support centre, back-up emergency control centre and back-up technical support centre, including the time schedule of their execution, within the documentation for building permit of the NNS.

5) It should be ensured within the documentation for the building permit that the technical and technological solution of the NNS makes possible limitation of liquid effluents (waste water) containing radioactive substances from the NNS, especially tritium (H-3), in cases of low flow rates in Jihlava River.

6) The results of water management balances (or take-off security) have to be updated within the documentation for building permit based on the new data from the contractor of the NNS, as well as on the extended flow rate series of Jihlava River in the monitoring point Jihlava - Ptáčov, on updated values of minimum residual flow rate in the monitoring point Jihlava - Mohelno Downstream valid in that time and on further actually monitored data on climatic changes (temperatures, precipitation)

7) The lighting of the NSS should be resolved within the documentation for building permit in such a way that significant light pollution of the ambient does not occur e.g. by installing directional light sources.

8) Within the documentation for building permit:
   a) Permanent annexations of LIFFF for construction site installations, intermediate dumping sites of stripped earth and intermediate dumping sites for building

materials of the actual NNS should be ruled out and temporary annexations should be minimized to necessary cases

b) Permanent annexations of LIFFF for construction site installations, intermediate dumping sites of stripped earth and intermediate dumping sites for building materials in corridors of related line constructions for NNS in parts of their routes in forests should be ruled out and temporary annexations should be minimized to necessary cases

c) Consistent forest reclamation should be specified in forest stands affected by the construction.

9) Such solutions as regard urban development and architecture should be preferred within the design documentation of the project for building permit that take into account the contexture with existing territory arrangement and adjust the architectonic design of the project (including the colour design) for the sake of integration to the landscape, including taking into account the architectonic contexture with the existing premises of EDU1-4.

10) Within the further project preparation (before the application for the building permit is filed), the possibility should be verified of optical screening of the NSS premises from the community Rouchovany by new structure elements of green vegetation, e.g. using the position of the ridge to the north from Rouchovany between the community and Olešná valley, partly also the ridge to the south from the planned construction site installations in area B along the pathway from the chapel around the Hlinsko hill and in the agricultural ground Pod alejí. This screening should be implemented in case of positive result.

11) A comprehensive dendrological survey determining the preserved and cut down wood species individuals should be elaborated in further phases of the project documentation, within the elaboration of the project documentation for building permit at the latest, after the positions of individual NNS objects in the area A, the layout structure of construction site installations in area B and the positions of planned infrastructure elements in areas C and D are specified more precisely.

12) The method/principle of eventual compensation for using the respective traffic network should be discussed with the owners of involved roads within further phase of the project preparation project, taking into account the nature of the traffic invoked by the project, the condition of the road network, the service obligations of the transport infrastructure owners and the tax obligations of the commodity forwarders, (after more precise determination of final transportation routes from the source of main commodities to the NNS construction site and resulting transport intensity in the construction stage); the agreed method/principle of compensation should be implemented without delay.

13) It should be proved in further phases of the permitting process that:

a) no or only small radiologic impacts will be stipulated for design basis accidents as well as for design extension conditions without fuel melting, i.e. neither the implementation of any protective measures of immediate response will be needed for the population in the NNS vicinity nor any or only small need of implementing restrictions (limited with regard to time and area) will exist in the sphere of food and agricultural products.

b) for severe accidents (design extension conditions with core melting), space- and time-limited radiological impacts will be required according to the WENRA recommendations, which will ensure compliance with the following requirements:

- the need of evacuation will be ruled at a distance of more than approximately 3 km

- the need of sheltering and iodine prophylaxis will be ruled out in distance greater than approximately 5 km
- agricultural production at a distance of more than approximately 5 km will be suitable for consumption one year after the radiation accident
- No permanent relocation will occur wherever beyond the premises of the power plant (this is interpreted for practical application as no permanent relocation in the distance from the reactor greater than 800 m)

14) The NNS design solution must ensure protection of the NNS against consequences of a radiation abnormal occurrence at any other nuclear facilities situated at the site.

15) Elaborating design of the radiation situation monitoring within further project preparation of the NNS.

16) To include measures in the NNS design solution that would reduce individual effective doses of a representative person caused especially due to the discharge of liquid effluents (waste water) containing radioactive substances from NNS

17) To monitor continuously the development of climatic conditions within further phases of the project preparation and in case of provable changes, react to them in the project preparation especially with regard to assuring NNS demands for water

18) Indicators, which cause impairment of chemical condition of surface water bodies exceeding the standards of environmental quality, should be monitored in raw and waste water during the further stages of the project permitting process for the purpose of evaluating the chemical condition of the surface water bodies.

19) site will not exceed 3250 MW $_{e.}$ in any variant of the concurrence of NNS with EDU 1-4

20) It should be ensured that the envelope environmental parameters, specified in the documentation of the project impacts on the environment will not be exceeded within the technical and technological solution of the NNS (Chapter B.II. Data on inputs and B.III. Data on outputs).

21) The optimization of water management should be strongly emphasized in further project stages so that the water quality is not impaired in Jihlava downstream the waste water outlet object, as it is necessary to prevent deterioration of conditions of the involved water body.

22) Within further project preparation, continuous more precise specification of the requirements for nuclear safety assurance of the new nuclear source in the tender documentation in accordance with the valid nuclear legislation.

23) set up as one of benchmark the specification of guarantees for minimization of negative environmental impacts of construction and for the total duration of construction in the selection process for the construction contractor; take into account requirements for application of modern and progressive construction practices (using less noisy and more environmental friendly technologies) in the selection process.

24) The description and diagnostics of the condition of the involved road network should be ensured prior to the NNS construction. Ensure executing modifications of roads and road network objects, if necessary so that they do not degrade

significantly due to the construction taking into account the service and maintenance activities and obligations of the road owners.

25) Elaborate a detailed acoustic study after the civil contractor has been selected that would evaluate the noise impact of the selected solution on the nearest or potentially most involved protected outdoor area or protected outdoor area of buildings of nearby communities

Conditions for the execution (construction) phase of the project:

26) Prior to the construction start, noise should be measured in areas potentially most involved by the construction related traffic based on the actual situation in time of the construction commencement; an acoustic study evaluating the impact of construction related traffic on the acoustic situation will be also elaborated; based on these data, eventual measures should be adopted leading to decrease of noise load (e.g. traffic organization measures, reducing the speed of vehicles, replacement of windows at the involved objects and the like).

27) To prefer the possibility to use railway for the transportation of selected commodities (especially building commodities) taking into account the railway infrastructure condition, loading possibilities, and railway access to the commodity sources.

28) The agreed minimized scope of deforestation should be carried out within the construction stage gradually and solely during dormancy periods based on precise fixing of the necessary deforestation scope in the terrain.

29) Minimization of impacts on the atmosphere quality should be assured in the period of the NNS construction, namely by application of preventive measures to eliminate dustiness in accordance with the program atmosphere quality improvement of the zone South-East (code BD3 “Limiting Dustiness from Building Activity”). The selection of adequate combination of measures will be will be emphasized with regard to dominant impact construction site traffic that minimize impact of emissions from vehicles driving on the construction site roads (e.g. optimization of the length of transportation routes at the construction site, using compacted construction site roads, cleaning the vehicles, roads and handling areas, limited speed of transportation mechanisms and the like), eventually measures that minimize dust emissions from other activities (e.g. minimizing or ruling out free depositions of fine grained materials, maintaining open surfaces sufficiently wet and the like).

30) Principles of construction organization should be elaborated that will contain the following requirements with regard to minimizing the impacts on the noise load in construction stage and the impacts on the surface and groundwater:
    a) the inhabitants of the nearest houses will be in advance informed about the prepared construction and the length and nature of the individual construction stages
    b) All civil works connected with delivery of building and technological materials will be conducted in proximity of residential build-up areas in day time only, with the exception of acoustically insignificant activities, for example such as the transportation of oversize and heavy components, when the night time is more favourable for such transportation thanks to lower traffic intensity, and with exception of material deliveries assuring works that must be carried out without interruptions from technological reasons – these works will be defined within construction organization principles in advance.

c) all noisy civil works will be carried out in proximity of protected objects in day time only, namely from 06.00 a.m. to 10.00 p.m.
d) The civil works in proximity of the community Slavětice (vicinity of the switching station) will be limited to the day time excluding the early morning and late evening hours (between 07:00 a.m. and 9:00 p.m.)
e) a check measuring of the noise will be carried out at the nearest residential build-up area at the beginning of the civil works and sound protection measures will be put in concrete terms
f) machines with lower guaranteed noisiness will be used within the construction; noise exigent works will be combined with works of low noisiness, operation of substantial noise sources will be shortened in one day – the works will be divided into several days with shorter time segments – with the exception of ensuring works that must be conducted without interruptions from technological reasons – these works will be defined in advance within the construction organization principles
g) an emergency plan will be elaborated for the construction in terms of the Act No. 254/2001 Coll., on Water and Amendments to Some Acts (Water Act), as amended, with the content of which the whole working staff of the construction will be acquainted

31) To ensure contact with nearby communities and general public in the road area during the whole period of the NNS preparation, construction and operation and inform them on the progress of the project preparation and execution and on its potential impacts on the ambient, including flexible reaction to arising suggestions and queries.

32) It should be ensured that environmental (biological) supervision will be established for the entire course of the project construction on contractual basis prior to its commencement that will supervise observing the conditions stipulated for nature protection and monitor the construction areas with regard to occurrence of plants and animals. The contractor of environmental services will be appointed at the same time that will deal with required protective and preventing measures proposed by the biological supervisor. The biological supervision will assure within its activity that all measures implemented for the nature protection are in detail registered, documented and archived and passed to the contractual partners by means of running and final reports.

33) The environmental supervision should focus with special attention on the SCI CZ0614134 in connection with the previous condition. With regard to the presence of sensitive biotopes, protection subjects, in SCI CZ0614134 Jihlava Valley in the boundary sections with the development area D (right bank Skryjský Stream upstream its outfall into Mohelno Water Reservoir), it should be ensured also in this development area during the civil works that the delimited boundary of the development area D respects the defined SCI consistently and that its border is not crossed.

34) If excessive dust pollution threatens during the civil works, the person conducting the biological supervision will ensure through the contractor that execution measures are adopted limiting the occurrence of excessive dustiness and the potential contamination of areas within the SCI CZ0614134 Jihlava Valley (e.g. by spraying the surfaces of the construction site and service roads in contact with areas of the SCI by water on dry days).

35) It should be ensured that surveys of flora and fauna of the territory involved will be carried out during the last 2 vegetation periods before the project construction commencement in order to identify and localize the most precious associations

and the occurrence of specially protected species of plants and animals; an application for granting exception from protective conditions of the involved specially protected species will be filed at the competent body of nature protection based on results of these surveys prior to the construction commencement; adequate mitigating and compensating measures will be specified more precisely based on results of these surveys prior to the construction commencement

36) The organization of transportation to the construction site should be arranged within principles of construction organization so that the thoroughfare of trucks through the driving difficult road passing the SCI Jihlava Valley and the NNP Mohelno Serpentine Steppe is limited as much as possible In order to prevent considerable increase of traffic across SCI CZ0614134 - Jihlava Valley (and NNR Mohelno Serpentine Steppe) on road II/392 in phase of construction.

37) Monitoring of the occurrence of introduced and invasive plant species should be ensured at the areas involved during the construction; they must be eliminated immediately in case occurrence.

38) The roads affected by the construction should be put to the condition after the completion of the project construction that will ensue from discussing with the owner of the roads; the exact extent of necessary repairs will be based on the diagnostics and survey, executed prior to the NNS construction and after the construction taking into account intensity of the construction related traffic generated by the project compared to other traffic and taking into account maintenance obligations of the road owner and operator.

39) The chapel of the former community Lipňany that is situated in the area of construction site installations should be protected during the period of civil works by a fence, including the protection against incidental damage by motor vehicles (e.g. by crash barriers). The area of Lipňany chapel should be rehabilitated, the chapel refurbished and made accessible again, after the NNS construction is completed.

Conditions for the phase of the project operation:

40) Health condition of the inhabitants should be evaluated in the more distant exposure area E2 (districts Třebíč, Znojmo and Brno-venkov) inn the time 1 year at minimum prior to putting the 1st unit into trial operation and subsequently in intervals of 10 years and the results should be disclosed to the general public.

41) The general public should be informed regularly about the impact of the NNS operation on the environment by collective annual reports published on the web sites of the operator.

42) It should be ensured consequently that the minimum residual flow rate in Jihlava river is maintained at least at the same value as during the operation of the existing NPP Dukovany at the monitoring point Jihlava-Mohelno downstream the Mohelno water reservoir after the NNS commissioning, which will ensure the protection of biotopes in Jihlava river within SCI CZ0614134 - Jihlava Valley taking into account the legislation valid at that time period

43) It should be ensured consequently that the rain water retained in retention tanks will be discharged gradually so that equalized outflow rate is achieved to the maximum technically realistic extent.

Conditions for monitoring and analysing the project impacts on the environment:

44) The noise from the operation should be measured at the time of starting the trial operation and subsequently also at the time of starting the usual NNS operation; the measuring should also include the evaluation of the occurrence of the tone component of the noise; if a conflict with hygienic noise limit is detected additional noise protection measures must be adopted in order to meet the limits.

45) It should be ensured that the outflow rate of Jihlava River from the Mohelno Water Reservoir will be monitored with regard to physical – chemical parameters (temperature, oxygen content, pH, amount of organic substances, nitrogen, phosphorus, and other substances stipulated in the water right decision) each year after putting the NNS into trial operation; the monitoring of the water plants biotopes should be conducted as an indicator of discharged water quality in Jihlava River within SCI CZ0614134 - Jihlava Valley once each 5 years at minimum; the results from mapping the structure and extent of these biotopes in the years 2013, 2014 and 2016 might be used as comparison values; if the condition of these biotopes deteriorates, corrective measures should be adopted.

46) It should be ensured that the rain water discharged from the NSS premises to the catchment basin of Olešná water course will be regularly (at least 4 times a year) monitored with regard to their pollution, including the measuring of the tritium concentration level in this water, so that the protection subjects of SCI CZ0623819 - Rivera Rokytná are not affected; the scope of monitored indicators will be discussed and agreed with the competent water right authority.

47) It should be ensured that rainwater discharged from the NNS site to the basin of Skryjský stream will be monitored regularly (4 times a year at least) with regard to its pollution including measuring the level of tritium concentration in this water, so that it does not influence subjects of protection in CSI CZ 0614134 - Jihlava Valley. The extent of monitored indicators will be discussed and agreed by the respective Water Right Office.

V. SETTLEMENT OF ALL COMMENTS RECEIVED TO THE EIA DOCUMENTATION

This part is not translated.

VI. TOTAL ASSESSMENT OF THE PROJECT ACCEPTABILITY WITH REGARD TO IMPACTS ON THE ENVIRONMENT AND PUBLIC HEALTH

The project is executed in the territory of Vysočina regions and communities Dukovany, Slavětice, Rouchovany.

The environmental documentation in the extent of Annex No. 4 of Act No. 100/2001 Coll. as amended was processed by the authorised person Ing. Petr Mynář, who is the holder of certificate of competency, authorisation Ref. No. 1278/167/OPVŽP/97, the extension of authorisation No. 23110/ENV/16.

The documentation of impacts of the project “New Nuclear Source at Dukovany Site“ assesses the project impacts on population, on atmosphere and climate, on acoustic situation, on surface and groundwater, on agricultural land resources and land plots intended to fulfil the forest function, on rock environment, on fauna, flora, ecosystems, TSES and SCI, on landscape and landscape character and on tangible property and cultural heritage.

Number of partial expert studies focusing on detailed analysis and evaluation of individual project aspects as regards the environment and public health were elaborated as expert background for processing the documentation of the project.

The extent of the project impacts is mainly local, given by the scope of areas for the project placing and their nearest vicinity. A wider extent of impacts can only occur through the project outputs to the environment (typically radioactive as well as non-radioactive effluents into atmosphere and watercourses, noise or other factors) and visual impacts.

Regarding radioactive effluents and their very low level, the existing impacts of radioactive effluents from the nuclear facilities in the site as well as the generally insignificant nuclear power share of the population exposure to radiation, no significant adverse impacts of the project are expected. The extent of the project impacts will therefore quantitatively as well as qualitatively correspond to the extent of impacts of the existing nuclear facilities in the site that are insignificant (deep within permissible limits) and subject to regular monitoring and checking.

In terms of other factors, the site is dimensioned for the placing of the new source as regards space and capacity. The project will be placed in the area imminently adjacent to the existing premises of the Dukovany power plant (EDU1-4) and its infrastructure, i.e. in the area with intensive exploitation for industrial activity (electrical power generation). This will not change the existing arrangement of the territory significantly.

As far as the extent of impacts is concerned, a visual impact (i.e. impact on landscape) has to be considered a significant factor. The project will consist of spatially dominant objects located in a dominant position. It will therefore be visible from a great distance. On the other hand, this impact has currently been present at the site as a result of visual impacts of the existing EDU1-4 power plant. The extent of visually affected area will increase only insignificantly after the NNS has been built, and will correspond to the existing situation regarding quality.

The impacts on the qualitative characteristics of surface water represent further ascertained factor. These impacts also occur in the territory under the existing condition already, regardless to the operation of the existing power plant EDU1-4, the contribution of which to the water quality indicators is of low significance. Contributions of EDU1-4 consist especially in thickening the waste water compared to the extracted raw water, and in consequent increase of the concentration of individual water quality indicators. However, it is an impact of low significance with regard to the balance, i.e. the flow of substances. This condition will persist even after the NNS execution, whereas a more significant affectation can be anticipated especially in the period of the concurrent operation of the NNS and EDU1-4.

Noise impacts must be also included among the significant impacts, not because of the noise from the actual operation (which is solved reliably thanks to the more than sufficient distance from the protected area), but by the reason of related traffic within the wider road network, especially during the project construction period.

No significant facts were identified in any of the monitored areas (population and public health, atmosphere and climate, noise, radiation and further physical or biological characteristics, ground and surface water, land, natural resources, biological diversity, tangible property and cultural heritage, transport infrastructure or others) in the course of the documentation preparation that would indicate unacceptable affectation of the environment or public health within the territory involved.

Similar conclusions apply also to the evaluation of the project risks. It ensues from analyses of consequences of radiation abnormal occurrences that the criteria of risk admissibility according to SONS or WENRA will not be exceeded for representative cases of design basis accidents and severe accidents. Other possible risks are taken into account in the evaluation at same time that are related to the natural characteristics of the site and to the human activities at the site. Actions for coping with extraordinary radiation measures are described.

The affected areas as well as so-called representative inhabitants (i.e. persons being the most affected by the project and its radiation and/or non-radiation effects) are situated in the immediate vicinity of the project site. The distance of the nearest residential areas of the surrounding communities is of the order of units of kilometres. All requirements for the protection of environment and public health are already observed in this nearest area according to the evaluation results.

Distances of the project from state borders of neighbour states are in the order of tens to hundreds kilometres. The occurrence of significant transboundary impacts is

virtually ruled out in this context, if fulfilling the protection requirements of the environment and public health is assured in the nearest territory involved. However, regardless of this fact, the project environmental impact documentation includes analyses of radiation effects for the border areas of the nearest adjacent states, namely both for normal operation of the project and (in particular) a representative conservative case of a basic design accident and a major accident. These analyses confirm that influences are not caused by the NNS operation that might have significant adverse impact on the neighbour states.

It is possible to express consent with the execution of the submitted project, provided the recommendations are respected that are proposed in the binding statement draft for assessing the impacts of the project on the environment. Based on all mentioned facts, it is possible to formulate the following with regard to assessment of acceptability of the project concerning the impacts on the environment:

CONCLUSION:

the project documentation in the extent of Annex No. 4 was submitted for the assessment

“New Nuclear Source at the Dukovany Site”

Elaborated by Ing. Petr Mynář, who is the holder of certificate of competency, authorisation Ref. No. 1278/167/OPVŽP/97, the extension of authorisation No. 23110/ENV/16.

The documentation was assessed pursuant to the requirement of Section 9 of the Act No. 100/2001 Coll., on Environmental Impact Assessment and amending some related acts as amended in the extent pursuant to Annex No. 5 this Act. The documentation is elaborated according to the requirement of this act with respect to adequate informative value for assessing the magnitude and significance of impacts on individual components of the environment and public health. Requirements recommended by the expert report author for the project preparation can be met prior to the construction is commencement, other recommendations are prerequisites for the project operation stage according to the expert report author. With regard to data included in the documentation and provided recommendations specified in draft statement to the competent authority are respected, the expert report author

recommends

to execute the project

New Nuclear Source at the Dukovany Site

providing the conditions proposed in the submitted expert report are respected

VII. DRAFT OF BINDING STATEMENT ON THE ENVIRONMENTAL IMPACT ASSESSMENT OF PROJECT IMPLEMENTATION

This part in not translated.