Jacobs

NEW NUCLEAR SOURCE OF SMR AT THE TEMELÍN SITE

NOTIFICATION OF THE PROJECT

October 2024

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List of Abbreviations

ALARA	As Low As Reasonably Achievable
AOPK	Nature Conservation Agency of the Czech Republic
ASEK	Update of the State Energy Policy
AZ	Reactor Core
BAPP	Auxiliary Building
BAT	Best Available Techniques
BPEJ	Rated Soil Ecological Unit
BWR	Boiling Water Reactor
CCS	Carbon Capture and Storage
ČEPS	part of the business name of ČEPS, a. s. (this is not an abbreviation)
ČEZ	part of the business name of ČEZ, a. s.
CGS	Czech Geological Survey
CHMÚ	Czech Hydrometeorological Institute
ČOV	Wastewater Treatment Plant
CR	the Czech Republic
ČSN	Czech Technical Standard (or previous Czechoslovak Technical Standard)
DBA	Design Basis Accident
DEC	Design Extension Conditions
DGS	Diesel Generator Station
DOKP	Affected Landscape Area
Dukovany NPP	Dukovany Nuclear Power Plant
EIA	Environmental Impact Assessment
Temelín NPP	Temelín Nuclear Power Plant
ETS	Emissions Trading System
EU	European Union
SCI	Site of Community Importance
FBR	Fast Breeder Reactor
GMM	Gaussian Mixture Model
MCP	Main Circulation Pump
BF	Brownfields
HVB	Main Production Unit
HVL	Upper Vltava
HTR-PM	High-Temperature Gas-Cooled Reactor Pebble-bed Module
CHKO	Protected Landscape Area
CHOPAV	Natural Water Accumulation Protected Area
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
IČ	Identification Number
ID	Identification
I.O	Primary Circuit
II.O	Secondary Circuit
IP	Interactive Element
JČK	South Bohemian Region
JE	*depending on context:* Nuclear Power Plant *or* Nuclear Power Industry
k.ú.	Cadastral Area
CA	Cambisol
KO	Compensation Circuit
KÚ	Regional Authority
LASZ	Large Scale Aerial Seismic Source Zones
LB	Left Bank
LBC	Local Biocentre
LBK	Local Biocorridor
LC	Least Concern
LED	Light-Emitting Diode

LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
LRKO	Environmental Radiation Monitoring Laboratory
LPIS	Land Parcel Information System
LWR	Light Water Reactor
MEO	Slightly Endangered (Soil)
MPO	Ministry of Industry and Trade of the Czech Republic
MSKS	Minimum Stabilised Critical State
MÚ	Section Manager
MZe	Ministry of Agriculture of the Czech Republic
MŽP	Ministry of the Environment of the Czech Republic
NAP	National Action Plan
NBK	Supra-Regional Biocorridor
NDOP	Species Occurrence Database
NEA	Nuclear Energy Agency, part of the OECD
NECP	National Energy and Climate Plan
EQS	Environmental Quality Standard
NEO	Non-endangered (Soil)
NJZ	New Nuclear Source
NJZ Dukovany NPP	New Nuclear Source at the Dukovany site
NJZ Temelín NPP	New Nuclear Source at the Temelín site
NOAEL	No Observed Adverse Effect Level
NP	National Park
NPK	Maximum Permissible Concentration
NPP	National Natural Monument
NPR	National Nature Reserve
NT	*depending on context:* Low Pressure *or* Near Threatened Species
OECD	Organisation for Economic Co-operation and Development
OOP	Nature Conservation Department
ORP	Municipality with Extended Powers
UN	United Nations
OZE	Renewable Energy Sources
PAH	Polycyclic Aromatic Hydrocarbons
RB	Right Bank
SG	Steam Generator
PGA	Peak Ground Acceleration
PHWR	Pressurized Heavy Water Reactor
PO	Bird Protection Area
PP	Natural Monument
PR	Nature Reserve
PUPFL	Lands Intended for Forest Area
PÚR	Land Development Policy
PWR	Pressurised Water Reactor
RAO	Radioactive Waste
RBC	Regional Biocentre
RC	Rankine (steam cycle)
AA	Annual Average
ŘSD	Road and Motorway Directorate of the Czech Republic
SASZ	Small Scale Aerial Seismic Source Zones
SEED	Site and External Events Design Review Service
SEKM	Registration System of Contaminated Areas
SHARE	Seismic Hazard Harmonisation in Europe
SKK	Systems, Structures and Components
SMR	Small Modular Reactor
SMR Temelín NPP	New Nuclear Source of SMR at the Temelín site
SPP	Steam separator reheater
SRKO	Environmental Radiation Protection Station
SÚJB	State Office for Nuclear Safety
SÚRAO	Radioactive Waste Repository State Authority
SÚRO	National Radiation Protection Institute

SVJP	Spent Nuclear Fuel Storage
SVJP Temelín NPP	Spent Nuclear Fuel Storage at the Temelín site
SVJP Dukovany NPP	Spent Nuclear Fuel at the Dukovany site
TACR	Technology Agency of the Czech Republic
TDS	Teledosimetric System
TG	Turbo-generator
RPV	Reactor Pressure Vessel
TSFO	Technical System of Physical Protection
ÚAN	Area with Archaeological Findings
ÚJV	part of the business name of ÚJV Řež, a. s. (this is not an abbreviation)
ÚSES	Territorial System of Ecological Stability
US EPA	United States Environmental Protection Agency
US NRC	United States Nuclear Regulatory Commission
ÚRAO	Radioactive Waste Disposal
v.v.i.	Public Research Institute
VD	Waterworks
VJP	Spent Nuclear Fuel
VKP	Significant Landscape Element
VN	Water reservoir
VPEK	National Energy and Climate Plan of the Czech Republic
VT	High Pressure
VÚ	Water body
VUMOP	Research Institute for Soil and Water Conservation, public research institute
VVER	Pressurized Water Reactor (Russian: Vodo-Vodjanoj Energetičeskij Reaktor), Russian designation for PWR
VVN	Extra High Voltage
WAM	With Additional Measures
WAM	With Existing Measures
WENRA	Western European Nuclear Regulators Association
WNA	World Nuclear Association
ZCHD	Specially Protected Species
ZOPK	Act on Nature and Landscape Conservation
ZPF	Agricultural Land Resources
ZÚR	Landscape Territory Development Principles
ZVN	Extremely High Voltage

Introduction

Notification of the project (hereinafter referred to as the "Notification")

NEW NUCLEAR SOURCE SMR AT THE TEMELÍN SITE

(hereinafter referred to as the "Project") has been compiled in accordance with Section 6 and Annex No. 3 to Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended (hereinafter referred to as the "Act"). It serves as the basic document for the investigation process to be performed according to Section 7 of the Act, and aims at specifying information that is suitable to be included in the Project environmental impact documentation.

The aim of the Notification is to provide basic data on the Project, its possible effects on the environment and risks arising from its construction and operation. Given the fact that according to Annex No.1 to the Act, this is a category I Project and so is always subject to assessment, the Notification is the preliminary document of the process of assessing the effects of the Project on the environment and public health (hereinafter referred to as the "Environmental Impact Assessment"). Therefore, its purpose is not to provide detailed and/or comprehensive information on the Project environmental effects but to present the Project, the affected territory, the environment state in the affected territory, and identify possible Project effects on the environment and public health, including potential concurrent effects.

In accordance with the Act, the purpose of the Notification is to provide this basic information:

- on the Project developer,
- on the Project technical and technological solution and its environmental demands,
- on options of the Project solution (if considered),
- on the state of the environment in the affected territory,
- on possible Project effects on public health and the environment,
- to support other relevant supplementary data.

The detailed Environmental Impact Assessment will be the subject of further follow-up documents being compiled in the course of the assessment process, in particular the Project environmental impact documentation. This will be compiled according to Section 8 of the Act and will contain the comprehensive characteristics and assessment of the Project effects on public health and the environment and take the investigation process result into account.

The Notification was compiled in the period of October 2023 to October 2024.

A.

(DATA OF THE DEVELOPER)

A. DATA OF THE DEVELOPER

A.I. Business Name

1. Business Name

ČEZ, a. s.

A.II. Company ID No.

2. Company ID No.

45274649

A.III. Registered Office

3. Registered Office (address)

Duhová 2/1444
140 53 Praha 4

A.IV. Developer's Authorised Representative

4. Name, surname, address and telephone number of the developer's authorised representative

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B.

B. DATA OF THE DEVELOPER

B. DATA OF THE PROJECT

B.I.

BASIC DATA

I. Basic Data

B.I.1. Project Name and Classification

1. Project Name and Classification according to Annex No.1

B.I.1.1. Project Name

New Nuclear Source of SMR at the Temelín Site

B.I.1.2. Project Classification

According to Annex No. 1 to Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended, the Project is classified as follows:

point:	8
Project:	Nuclear power plants and other nuclear reactors, including the dismantling or final closure of such power plants or reactors, with the exception of research facilities for the production and conversion of fissile and fertile materials whose maximum power does not exceed 1 kW of continuous thermal power.
category:	I (always subject to assessment)
limit:	not limit is stated
competent authority:	Ministry of the Environment

The Project falls under Section 4 (1) a) of the Act as the projects stated in Annex No. 1 to this Act of category I and changes to these projects, if the change to the Project reaches in its own capacity or scope the respective limit values, if stated these projects and changes are always subject to the assessment of the effects of the Project on the environment.

The Ministry of the Environment of the Czech Republic is responsible for carrying out the Environmental Impact Assessment of the Project.

B.I.2. Project Capacity

2. Project Capacity (Scope)

The basic Project capacity data are as follows:

net electrical power: up to 500 MW_e

For more detailed information on the Project parameters of the Project, see Chapter B.I.6. Description of the Project technical and technological solutions (page 22 of this Notification).

B.I.3. Project Location

3. Project Site (region, municipality, cadastral area)

The Project is situated on territories of the following territorial units:

State	*Region*	*District*	*ORP*	*Municipality*	*Cadastral area*
Czech Republic	South Bohemia	České Budějovice	Týn nad Vltavou	Temelín	k. ú. Křtěnov k. ú. Kočín k. ú. Temelínec k. ú. Březí u Týna nad Vltavou
				Dříteň	k. ú. Chvalešovice

The Project location is clearly shown in the following figures.

Fig. B.1: Extended Layout of Project Location

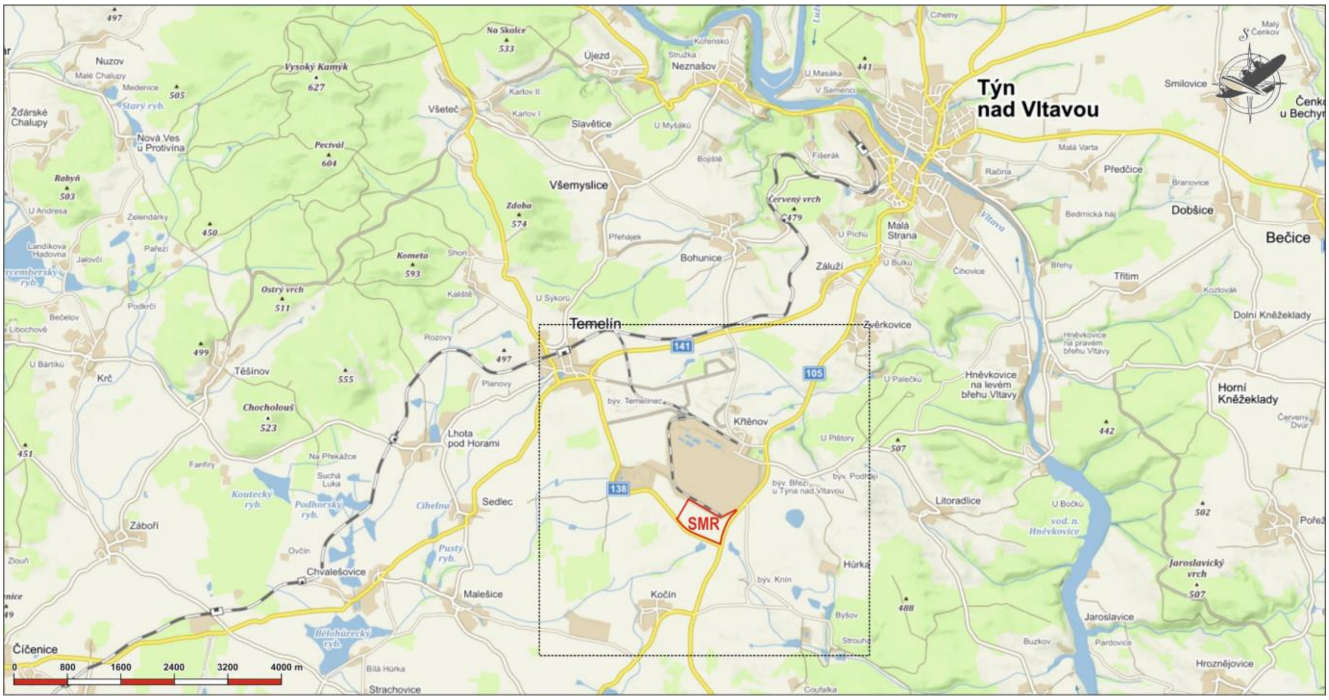
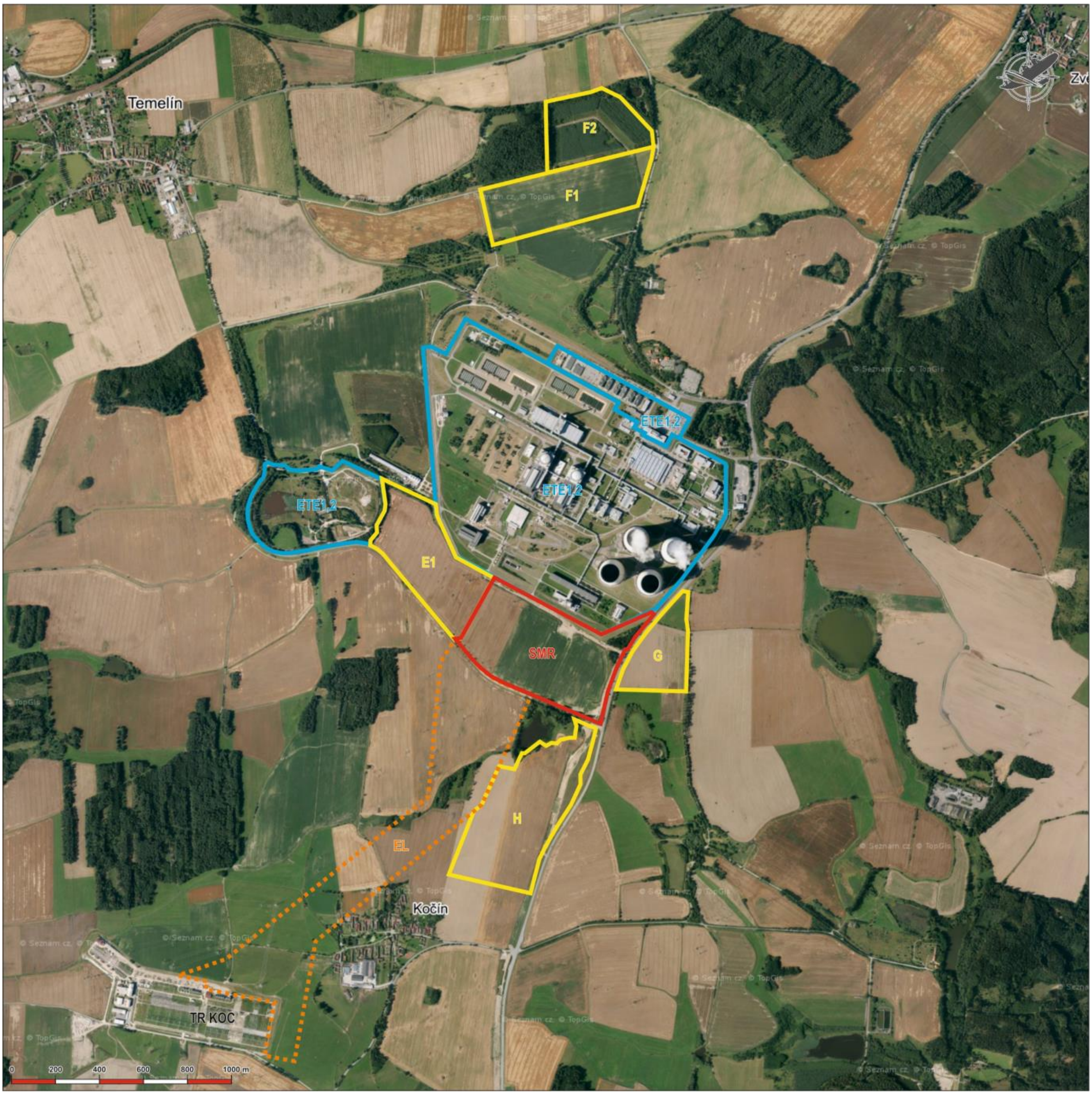


Fig. B.2: Clear Layout of the Project Location



Legend:

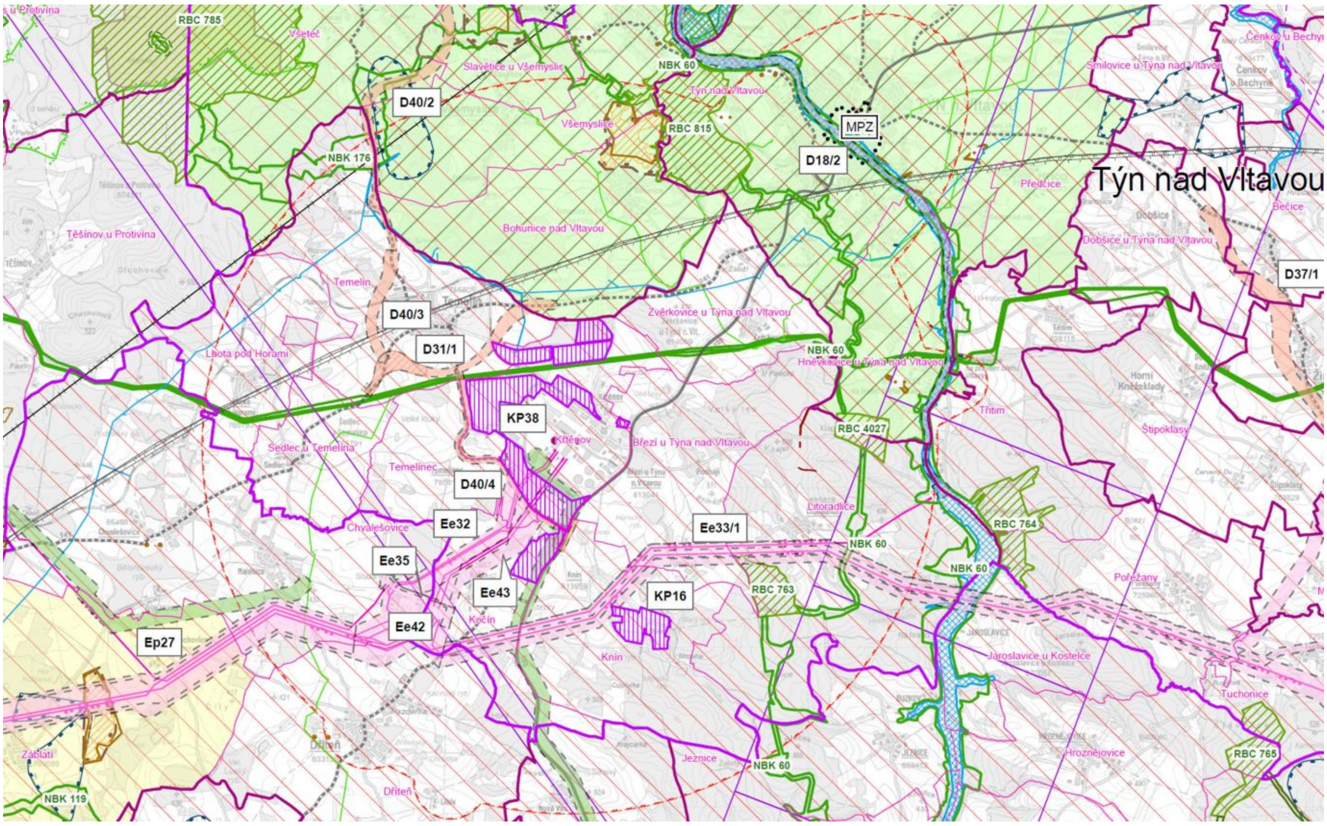
SMR	area for location of SMR Temelín NPP, main construction site
EL	offsite power transmission corridor
E1	construction site equipment area
F1, F2	temporary construction site equipment areas
G, H	areas considered for extending the construction site equipment
Temelín NPP 1,2	area of the existing Temelín Nuclear Power Plant
TR KOC	existing Kočín transformer station

The Project is situated in relation to the existing site of the Temelín Nuclear Power Plant (Temelín site) owned by the Project developer, used for the generation of electrical energy and heat with which it shares the infrastructure relations (particularly the water management connection).

The South Bohemia Landscape Territory Development Principles as amended by the 13th update issued by the municipal council of the South Bohemian Region by Decision No. 216/2024/ZK-34, include the delineation of areas of international and national importance for production and industry KP38 Temelín to enable the implementation of new nuclear sources (NJZ) not just in the form of completion of unit 3 and 4 of the Temelín Nuclear Power Plant, but also in the form of small and medium modular reactors (SMR), including related civil and technological objects and construction site equipment areas. In addition, the Landscape Territory Development Principles delineate the Ee43 corridor for offsite power transmission from the NJZ to the Kočín substation and extend the Ee42 area for the connection of ZVN and VVN to the Kočín substation.

The layout of the territory according to the South Bohemia Landscape Territory Development Principles as amended by the 13th update is clearly shown in the following figure.

Fig. B.3: Section of the coordination drawing of the South Bohemia Landscape Territory Development Principles (ZÚR JČK) as amended by the 13th update



Area G, which is not drawn into the updated Landscape Territory Development Principles is found according to the applicable land-use plan of the Temelín municipality on the stabilised area of unbuilt territory of agricultural land resources (ZPF) with permissible use for technical and transport infrastructure for the purposes of the Temelín Nuclear Power Plant.

These areas and corridors will, according to 80 (3) of Act No. 283/2021 Coll., the Building Act, as amended, be introduced (after possible clarification, if appropriate), to the land-use plans of the affected municipalities of Temelín and Dříteň.

For the purposes of compiling this Notification, the area and vicinity of the Project are the so-called affected territory.

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

4. Nature of the Project and Possibility of Accumulation with Other Projects

B.I.4.1. Nature of the Project

New Building of the New Nuclear Source of SMR.

The Project involves the construction and operation of the new nuclear source of SMR, including one power unit consisting of one or two nuclear reactors, including all related civil objects and technological systems (technological equipment), used to generate and for offsite power transmission and assurance of the safe operation of the nuclear facility.

B.I.4.2. Possibility of Accumulation with Other Projects

Potential cumulative effects are due to the concurrent effect with other projects in the territory that exist[1] or being prepared. The Project is situated in the territory of the Temelín energy network (i.e. territory adjacent to the Temelín Nuclear Power Plant, the Hněvkovice and Kořensko waterworks and the Kočín transformer station), used over the long-term for energy purposes (generation of energy and heat), equipped with all the necessary infrastructure relations.

The following nuclear facility is operated at the Temelín Nuclear Power Plant site:

- two units of the Temelín Nuclear Power Plant (Temelín NPP 1,2),
- spent nuclear fuel storage (SVJP),
- fresh nuclear fuel storage as part of the auxiliary building Temelín NPP 1,2 (BAPP),

then the following facility is being prepared here:

- new nuclear source at the Temelín site (NJZ Temelín NPP, Temelín NPP 3,4 resp.)[2],
- the extension of the capacity of spent nuclear fuel storage (SVJP)[3].

For more detailed information on these facilities, see Chapter B.I.6.4. Specific Data of Other Facilities on Site (page 55of this Notification).

The effect concurrent with these facilities is the decisive cumulative effect and is fully taken into account in the Project assessment. The same applies to the related infrastructure relations (mains of raw water from the Hněvkovice cross section, mains of raw water from the Kořensko cross section, offsite power transmission and offsite power reserve to/from the Kočín transformer station) and their environmental demands.

Other factors and projects with the potential of significant accumulation of effects with the effects of the notified Project are not identified. Thus, the environmental effects of the SMR Project are verified in the background to the above-mentioned projects and also the overall environmental background of the affected territory and its development trends.

The SMR Project is, or will, comply with the land planning documentation at various levels (landscape territory development principles, municipal land-use plans), which coordinates territorial development. The occurrence of significant concurrent/cumulative effects is limited from this point of view at the conceptual level. Further development of the affected territory will not be static and it is reasonably assumed that prospective new projects, situated in the territory, will also be assessed from the point of view of the effects on the environment and public health. Given 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 the case of a decision on its location on the site. This storage will be situated in the area for the facility of the SMR or in the adjacent area. Part of its preparation will include an environmental impact assessment that is a separate project being subject to the assessment (Category I, Point 12 of Annex No. 1 to the Act) according to Act No. 100/2001 Coll., on Environmental Impact Assessment. This assessment will take into account the current state of knowledge and technical level of storage at the time of its preparation and will assess the possibility of the implementation of the storage from an environmental point of view, even with regard to the actual concurrent effects on the territory. However, possible concurrent effects of this storage are considered in this Notification at the conceptual level.

B.I.5. Justification of the Project Location, Description of Options under Consideration

5. Justification of the Project location and description of options considered by the developer specifying the main reasons leading to the selection of the given solution including comparison of effects on the environment

B.I.5.1. Justification of the Project Location

B.I.5.1.1. Data for Justification of the Project Location

The selection of the Temelín site is based on taking into account the current availability of the required areas and infrastructure and operation relations in the Czech Republic, including legislative requirements for the location of nuclear power facilities.

The Project is located in the area immediately adjacent to the existing Temelín Nuclear Power Plant site (Temelín NPP site). The reason for this location is land-planning preparedness and the availability of space for locating the Project, including the necessary areas for the temporary

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1 The term “existing project” factually means the same as the “existing design/facility”. The Ministry of the Environment uses this term in its methodological processes where it distinguishes the “existing projects” (i.e. already existing) and “prepared projects”. According to Directive 2011/92/EU of the European Parliament and of the Council of on assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU, the term “záměr” (in Czech) is the equivalent of the term “Project”.

2 New nuclear facility. On the EIA information system (https://portal.cenia.cz/eiasea/view/eia100_cr) this Project is listed under code MZP230.

3 Extension of the existing nuclear facility. On the EIA information system (https://portal.cenia.cz/eiasea/view/eia100_cr) this Project is listed under code MZP518.

construction site equipment and the relation to the necessary infrastructure systems, particularly the supply of water and drainage of wastewaters (these systems will be shared with the existing Temelín Nuclear Power Plant) and offsite power transmission and assurance of the offsite power reserve (in relation to the existing Kočín transformer station). These parameters virtually determine the location of the Project on the site.

The areas for the Project location do not apply to specially protected parts of nature, these are mostly environmentally poor intensively agriculturally cultivated areas without landscape vegetation, in an earlier period also used as a construction site equipment for the construction of Temelín NPP. This location is optimal from the environmental point of view.

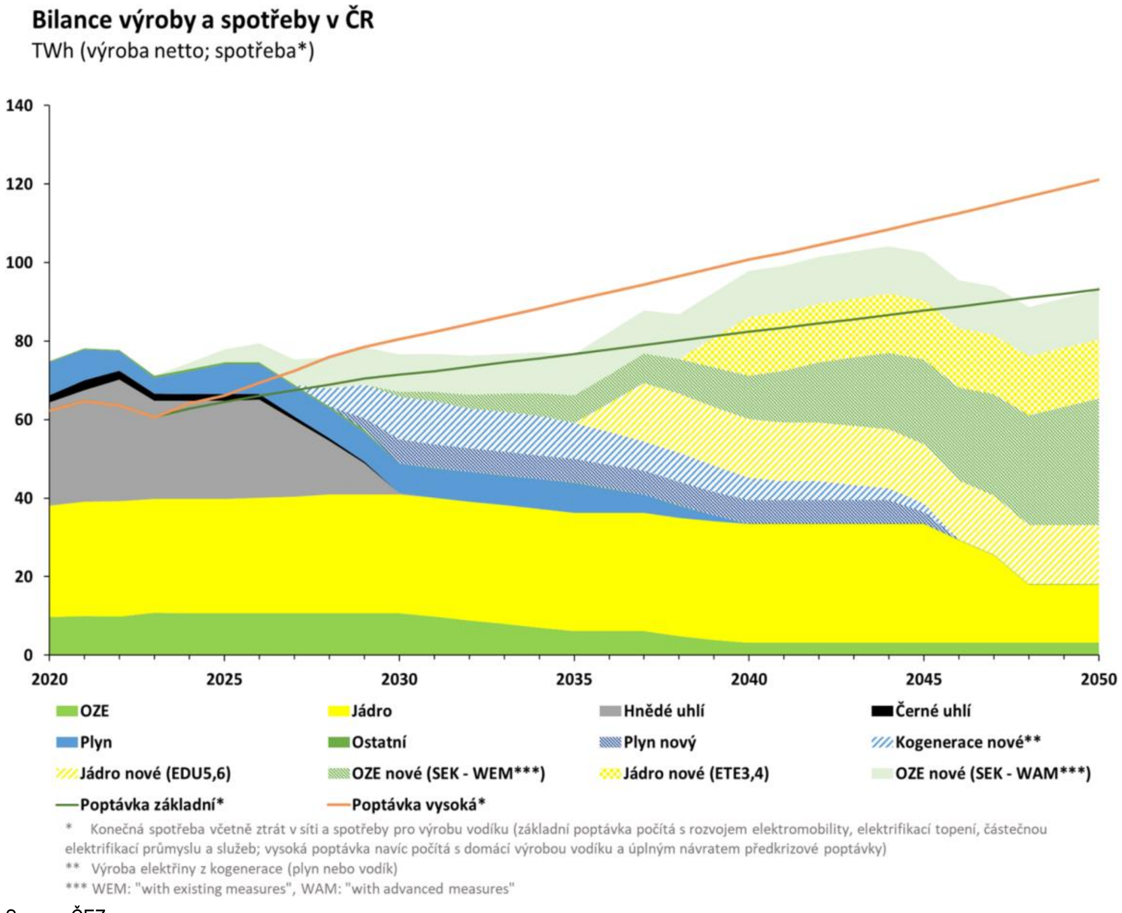
B.I.5.1.2. Data for Justification of the Project Need

The Project for the construction of the SMR Temelín NPP is based on the Policy Statement of the Government of the Czech Republic of January 2022, updated in March 2023, and on the Plan for Small and Medium Reactors in the Czech Republic - utilisation and economic development (MPO, May 2023), approved by Government Resolution No. 808 of 1 November 2023. The Project fully complies with the objectives of the prepared update of the State Energy Policy (ASEK), with the National Action Plan for the Development of Nuclear Power in the Czech Republic (NAP NP) and the existing update of the National Energy and Climate Plan of the Czech Republic (VPEK).

The State Energy Policy declares the social demand for assuring reliable generation and supply of electrical energy, and sets the main trends of the development of the energy infrastructure. Current trends in the energy sector aim to achieve low-carbon energy, security of energy supplies in terms of the supply of fuel, sustainability of development in terms of the environment, reduction of the energy demands of all consumer sectors and last but not least they aim to achieve national self-sufficiency in electricity generation.

The above-mentioned factors and growing consumption of electrical energy greatly influence the future development of the balance of electrical energy generation and consumption in the Czech Republic. The demand for electricity will grow significantly due to electromobility, the electrification of the heating industry and production of hydrogen. As part of the “Green Deal”, initiated by the European Commission and objectives of the EU “Fit for 55” legislative package, i.e. a set of measures for achieving a 55% emissions reduction, from 2030 with a view to 2050 the energy mix of the Czech Republic will change significantly, see the following figure.

Fig. B.4: Balance of Production and Consumption in the Czech Republic



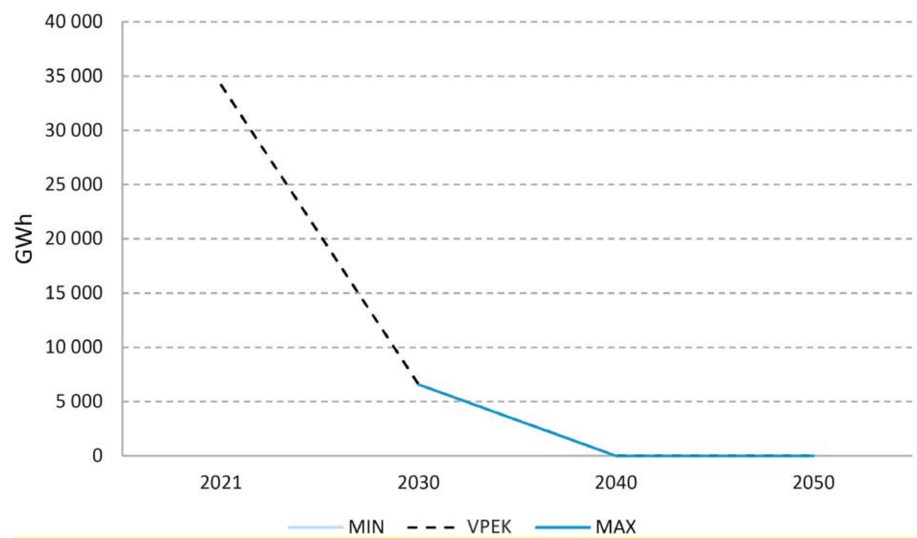
Source: ČEZ, a. s.

Bilance výroby a spotřeby v ČR	Balance of Production and Consumption in the Czech Republic
TWh (výroba netto; spotřeba*)	TWh (net production; consumption*)

OZE	OZE
Plyn	Gas
Jádro nové (EDU5,6)	New nuclear (Dukovany NPP 5,6)
Poptávka základní*	Basic demand*
Jádro	Nuclear
Ostatní	Other
OZE nové (SEK -WEM***)	New OZE (SEK -WEM***)
Poptávka vysoká*	High demand*
Hnědé uhlí	Brown coal
Plyn nový	New gas
Jádro nové (ETE3,4)	New nuclear (Temelín NPP 3,4)
Černé uhlí	Black coal
Kogenerace nové**	New cogeneration**
OZE nové (SEK - WAM***)	New OZE (SEK -WAM***)
* Konečná spotřeba včetně ztrát v síti a spotřeby pro výrobu vodíku (základní poptávka počítá s rozvojem elektromobility, elektrifikací topení, částečnou elektrifikací průmyslu a služeb; vysoká poptávka navíc počítá s domácí výrobou vodíku a úplným návratem předkrizové poptávky)	* Final consumption including loss in the grid and consumption for hydrogen production (the basic demand takes into account the development of electromobility, electrification of heating, partial electrification of industry and services; high demand also takes into account household hydrogen production and the full return to pre-crisis demand)
** Výroba elektřiny z kogenerace (plyn nebo vodík)	** Electricity generation from cogeneration (gas or hydrogen)
*** WEM: "with existing measures", WAM: "with advanced measures"	*** WEM: "with existing measures", WAM: "with advanced measures"

The Czech Republic, as an EU member state that has adopted the “Green Deal” and “Fit for 55” legislative package, must reflect and appropriately implement the set objectives. According to the update of the VPEK, the Czech Republic’s strategic objective is to reduce its share of fossil fuels (used without CO_2 capture technology) in the consumption of primary energy to 50% by 2030 and to 0% by 2050 and totally phase out the use of coal for the generation of electricity and heat by 2033. The expected fall in electricity generated from coal and coal derivatives according to the corridors defined in the ASEK is shown in the following figure.

Fig. B.5: Corridor of the Development of Gross Electricity Generation from Coal and Coal Derivatives (relative expression)



Source: MPO, ASEK 2023

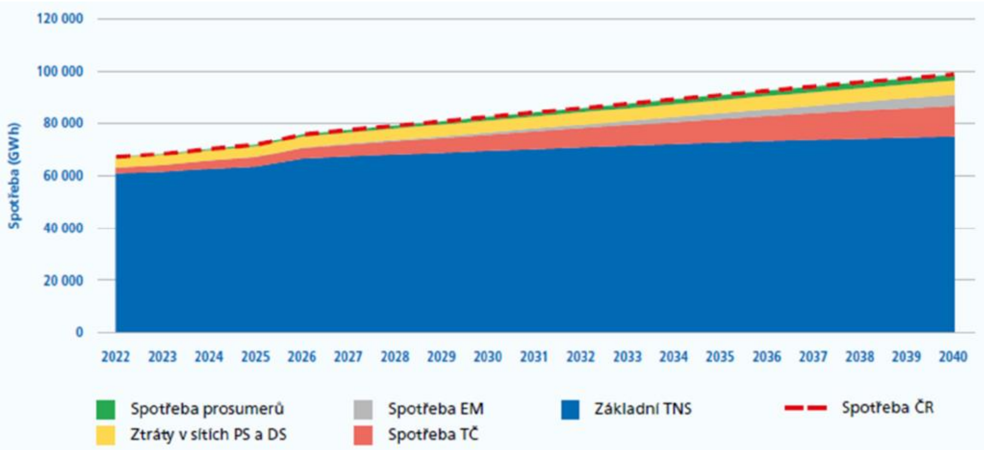
An important element of the decarbonisation strategy is the development of nuclear power while its share in energy consumption will increase. This will be achieved with the construction of big nuclear reactors and small modular reactors (SMRs). The effect of the set objectives will result in a shift from fossil sources and transition to OZE and nuclear sources while reflecting the requirements for the efficiency and protection of the environment.

So production from nuclear power plants is gradually replacing coal energy which is the existing pillar of electricity generation, however its phasing out is expected due to the above-mentioned climate objectives. The prepared construction of the new nuclear source at the Dukovany site (Dukovany NPP 5,6) will not in itself be sufficient to cover future demand even while taking into account the current increase of the installed power in OZE. According to the information in the Plan for Small and Medium Reactors in the Czech Republic - utilisation and economic benefit, it was assessed in the Assessment of the Resource Adequacy of the Electricity Network of the Czech Republic by 2040 (MPO, ČEPS, 2023) that the construction of renewable energy sources together with new big reactors will not cover the needs of self-sufficiency in the electrical energy of the Czech Republic and a further up to 3 GW_e of power will need to be installed by 2050. It is for this reason that it is being considered developing SMRs as an appropriate replacement for coal units while according to the update of the VKEP the objective is to commission the first SMR in the mid 2030s.

So in accordance with the above-mentioned strategic documents of the Czech Republic in the energy sector, the SMR Temelín NPP is considered a part of the broad diversified mix of electrical power sources, based on effective utilisation of all the available energy sources, maintenance of a sufficient reserve of the electricity network performance balance, and maintenance of available strategic reserves of the domestic energy forms. Nuclear sources are also pillars of the Czech Republic's energy security and are crucial for maintaining the stability of the electricity network and lower system costs in the future. Assurance of self-sufficiency in electricity generation will be in particular based on advanced conventional technologies with a high efficiency of energy conversion and an increasing share of renewable energy sources.

According to the prepared Update of the State Energy Policy it is expected that there will be a gradual increase in electricity generation from about 85.9 TWh/year to 109.1 to 114.7 TWh/year. This development is burdened by a great amount of uncertainty, particularly with regard to the development of electricity consumption, but also due to the possibility of its import/export. Development of electrical energy consumption in the Czech Republic virtually indicates an increase. The expected development for a progressive scenario considered in the Assessment of the Resource Adequacy of the Electricity Network of the Czech Republic by 2040 is clear from the following figure.

Fig. B.6: Development of Electricity Consumption in the Czech Republic - progressive scenario



Explanation of abbreviations: PS - National Grid, DS - distribution network, EM - electromobility, TČ - heat pump, TNS - domestic net consumption

Source: ČEPS, a.s., 2023

Spotřeba (GWh)	Consumption (GWh)
Spotřeba prosumerů	Prosumer consumption
Ztráty v sítích PS a DS	Losses in PS and DS
Spotřeba EM	EM consumption
Spotřeba TČ	Thermocouple consumption
Základní TNS	Basic TNS
Spotřeba ČR	Consumption in the Czech Republic

To cover a source loss on one hand and an increasing consumption on the other hand, a whole number of available measures are taken into account, involving the utilisation of the portfolio of available electrical energy sources, including utilisation of economic measures and development of renewable energy sources. In this context, the Project of the SMR Temelín NPP represents one of the parts of the multi-source energy mix in which it will represent an efficient, stable, above-standard reliable and environmentally-friendly (virtually carbon-free) power generating plant. However, it does not represent the direct exclusive alternative to other energy sources or other measures of the energy policy. These are and will be developed in respective connections.

The prepared Update of the State Energy Policy of the Czech Republic is considering strengthening the role of nuclear power in the energy mix and the construction of new nuclear sources depending on the prediction of the balance of energy generation and consumption while making maximum use of the existing Dukovany and Temelín nuclear sites which are prepared for the construction of further new nuclear units. In the approved WAM3 scenario the ASEK is considering the construction of three new big units and one SMR (and is also considering a max. 26.1 GW_e of installed power for photovoltaic plants in 2050, max. 5.5 GW_e for wind power plants in 2050 and an import balance of 10 TWh/year).

In the energy strategy of the Czech Republic the resulting direction is determined by the development of acceptable limits that are given by fulfilling the priorities formulated in the prepared ASEK. The fulfilment of the priorities depends on the actual development of society and the economy, the steps taken by the EU and the geopolitical development, and represents the direction of the required and currently expected situation in the energy sector while taking into account the respective restrictions and defined initial preconditions arising from related sectors. So as the basic indicator for fulfilling the strategic objectives the prepared ASAK defines the corridors for the composition of the diversified mix of primary energy sources and for the balanced and decarbonised mix of sources for the generation of electrical energy. The corridors for net electricity generation (in a ratio to the volume of total annual generation) in 2030, 2040 and 2050 are shown in the following table.

Table B.1: Corridors for Net Electricity Generation (in a ratio to the volume of total annul generation)

Type of energy	2030		2040		2050	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Coal and coal derivatives	10%		0%	0%	0%	0%
Natural gas	7%		1%	5%	0%	0%
Nuclear power	45%		47%	65%	36%	50%
Renewable energy sources	37%		33%	47%	43%	56%
Other	1%		1%	2%	7%	8%

Source: MPO, ASEK 2023

The National Action Plan of Nuclear Power Development in the Czech Republic deals with the implementation of nuclear power development. With regard to assuring energy security, and with regard to the overall social-societal benefit, this considers it desirable from the state's point of view to immediately begin the preparation of the construction of new nuclear sources at the Temelín and Dukovany site.

The location of the SMR Temelín NPP is based on taking into account the expected development of energy balances as well as safety requirements for the location and operation of nuclear power facilities, availability of the required spaces, and infrastructure, operation, staff and social relations.

According to the Spatial Development Policy of the Czech Republic as amended by update no. 7 updated (PÚR ČR 2024) the location of the SMR Temelín NPP corresponds to the delineation of the corridors and E4a areas Area for the extension including the corridor for offsite electrical and thermal power transmission including the necessary infrastructure for Temelín, Ledvice, Počerady, Prunéřov, Tušimice, Dětmarovice, Mělník, and Dukovany power plants, including the necessary water reservoir to ensure the long-term operation of Dukovany (if necessary) and corridors for the connection to the nearest substation.

The Project also included in the South Bohemia Landscape Territory Development Principles as amended by the 13th update (ZÚR JČK 2024), which modifies the delineation of the area of international and national importance so they allow the implementation of new nuclear sources not just in the form of the completion of the Temelín 3rd and 4th unit, but also in the form of an SMR, including the related civil and technological objects and construction site equipment areas and technical infrastructure for offsite power transmission to the Kočín substation. Thus, the ZÚR of the South Bohemian Region create the conditions for the location of the SMR Temelín NPP at the site of the existing nuclear source (Temelín NPP), and where its further development was expected so far in the form of the completion of the 3rd and 4th unit of the Temelín Nuclear Power Plant (Temelín NPP).

So a site that already has a nuclear source and most of the prepared infrastructure has been selected for the location of the SMR Temelín NPP Project. The site is monitored over the long term and according to analysis results is also appropriate for locating the SMR. The Kočín substation is situated near the site where it is possible to transmit the generated power. Thus, the location of the SMR Temelín NPP Project is in accordance with the objectives and land planning tasks and represents an effective and environmental and socially optimal utilisation of available sources.

Currently a Memorandum of Understanding is also concluded between ČEZ, a. s., the South Bohemian region and ÚJV Řež, a.s., in order to make more significant progress in the SMR with the aid of the synergy of all these entities. Further to this memorandum, a memorandum of association on founding a limited liability subsidiary “South Bohemian Nuclear Park, s.r.o.” was concluded which aims, among other things, to create a platform for consultation and problematic areas under consideration when preparing and implementing the SMR Temelín NPP pilot project.

B.I.5.2. Description of Considered Options

The Project is not considered in multiple options of location, capacity or technical solution. It is proposed in one implementation option involving the construction of a new nuclear source of the SMR in one unit at the Temelín NPP site. The selection of this option is based on taking the following potential possibilities of the option solution into account:

Options of location within the Czech Republic: The selection of the Temelín site is based on taking into account the current availability of the required areas and infrastructure and operation relations in the Czech Republic, including legislative requirements for the location of nuclear power facilities. Maintaining the continuity of electrical energy generation at the site and thereby assuring the use of the existing infrastructure and staff relations is also taken into account. In these terms, the location of the SMR at the Temelín site represents the best technical environmental and social solution.

Options of location within the Temelín site: The selection of the location at the Temelín site is based on planning data files (South Bohemia Landscape Territory Development Principles) taking spatial, urban, ecological, technical, and infrastructure possibilities of location of the new source at the site into account. From this standpoint, the location of the Project at the Temelín site is optimal.

Options of capacity: The selection of capacity (installed electrical power) of the new source is based on taking into account the power of commercially available SMRs and restrictions given by the site properties. From this standpoint, the Project capacity effectively uses the available resources.

Options of technical solution: The selection of the LWR-type, generation III+ reactor is based on taking into account the best commercially available solutions (PWR and BWR). LWR-type reactors represent the most frequently used type of nuclear source worldwide (exclusively used in the Czech Republic) with a number of safety advantages and long-term operational experience (approx. 200 reactor years of operation in the Czech Republic). From this standpoint, the Project represents the best available technical solution.

Reference options (other methods of electrical energy generation and/or electrical energy saving): The selection of electrical energy generation in the new nuclear source is based on demand for this type of source, given by respective strategic documents of the Czech Republic (National Energy Policy, National Action Plan for Nuclear Power Development) and taking into account the continuity of nuclear power at the site. From this standpoint, the Project represents part of the nuclear portion of the fuel mix. Other resources and tools of the energy policy (including savings) are not affected by this and are addressed in respective connections.

Options of follow-up systems (connection to the infrastructure): The selection of follow-up systems (infrastructure relations) of the new nuclear 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 virtually predetermined.

Zero option: The zero option represents the non-implementation of the Project of the small modular reactor at the Temelín site (SMR Temelín NPP)[1]. The selection of this option should result in the fact that the site would not be utilised and on the contrary, it would be necessary to ensure the required power at another site. From this standpoint, this zero option is therefore considered to be a reference option with the result that its environmental effects describe the existing condition of the environment in the affected territory, or its development trends.

As indicated by the data, the selected implementation option is the optimal option. The above-mentioned facts justify the single option solution.

[1] The zero option is exclusively related to the SMR Temelín NPP Project. Therefore, it assumes the continuation of the operation and preparation of other nuclear facilities at the Temelín NPP site or outside the Temelín NPP site (e.g at the Dukovany NPP site).

B.I.6. Description of the Technical and Technological Solution

6. The description of technical and technological solution of the Project, including possible demolition works necessary for the Project implementation; the comparison with best available techniques, associated emission levels, and other parameters must be included in case of projects within the scope of the Act on Integrated Prevention.

The technical and technological solution is described with the scope serving as the basis for the implementation of the investigation process. The technical and technological solution will be further defined and specified at further levels of assessment and preparation of the Project while in follow-up processes compliance will always be checked of the current solution of the Project with the solution of the Project which was the subject of the assessment of the effects on the environment in accordance with Section 9a of Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended. But it is the environmental parameters of a facility that are decisive and not a specific type of facility of specific manufacturer or their trademarks.

B.I.6.1. Subject of the Project

The subject of the Project involves the construction and operation of the New Nuclear Source of SMR at the Temelín site (SMR Temelín NPP), including one power unit consisting of one or two nuclear reactors, including all related civil objects and technological systems (technological equipment), used to generate and for offsite power transmission and assurance of the safe operation of the nuclear facility.

The Project will be implemented in a way so it does not restrict the operation of the existing nuclear facilities at the site (see Chapter B.I.6.4. Specific Data of Other Facilities at the Site) so that it does not influence their operation and the level of their nuclear safety, radiation protection, assurance and abnormal radiation occurrence management.

The Project includes these elements:

Power unit:	number of units:	one unit (consisting of one or two nuclear reactors)
	type:	light water reactor (LWR)
	generation:	III+ with a high degree of passive safety elements
	net electrical power:	up to 500 MW_e
	design lifetime:	60 - 80 years

A part of the power unit are all necessary civil objects and technological equipment of the primary circuit, secondary circuit (if used), tertiary (cooling) circuit, auxiliary objects and operations including all related and induced investments for the construction and operation of the Project.

Available SMR units will be used while none of the available designs is excluded in advance.

The reference list of designs is provided in Chapter B.I.6.3. Specific Data of the Project (page 39 of this Notification). The nuclear unit supplier will subsequently be selected, the Selection of the supplier is not part of the environmental impact assessment. Parameters used for the environmental impact assessment conservatively cover (or will cover) all the environmentally significant facility parameters of all the prospective designs.

The area of the location of power units and related objects and operations is delineated in the drawings in Annex 1.1 of this Notification.

Electrical connection:	electrical power transmission:	400 kV overhead or underground power lines
	offsite power reserve: 110 kV above ground and underground power lines	

Electrical connection includes all the elements required for the Project construction, operation and connection to the electricity network of the Czech Republic. The Project offsite power transmission is considered to the Kočín transformer station, an offsite power reserve will be assured from the Kočín transformer station.

The corridor for the location of electrical connection is delineated in the drawings in Annex 1.1 of this Notification.

Water system connection:	water supply:	underground pipe mains
	wastewater discharge:	underground pipe mains
	precipitation water discharge:	underground pipe mains, 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 wastewaters and discharge of precipitation water.

The raw water will be supplied through the existing raw water supply of Temelín NPP 1,2 from the Hněvkovice water reservoir on the Vltava River.

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

Cleaned precipitation and process wastewaters will be discharged by a connection to the existing Temelín NPP 1,2 infrastructure (including the discharge of wastewaters to the Kořensko waterworks) into the Vltava River.

Precipitation water will be discharged by a connection to the existing network of precipitation sewerage discharging precipitation water from the Temelín NPP 1,2 to the Strouha recipient stream and then to the Vltava River.

The Project also includes areas and construction equipment, i.e. the main construction site and construction site equipment including areas considered for the extension of the construction site hinterland and area of temporary construction site equipment, including all elements necessary for the Project supplier during building, construction works, if any, (outside the public infrastructure). The areas for the location of the construction site equipment are delineated in Annex 1.1 of this Notification.

B.I.6.2. General Data

This chapter describes generally accepted information and requirements related to nuclear power and nuclear power plants with the LWR (PWR or BWR) type reactor.

B.I.6.2.1. Basic Data of Nuclear Power Plants

B.I.6.2.1.1. Nuclear Power

Power is the ability to perform work. For performance of work, it is electrical power that is utilised on a significant scale. This essentially represents a decentralised power source (power is cogenerated with many sources, it is consumed at a point different from where it is generated, and it can be consumed in a relatively wide spectrum of power everywhere where the distribution network is available), it is ecologically clean at the final consumption point (its utilisation does not give rise to any pollutants), and it has universal use (it is convertible to other forms of power). The function of all spheres of the economy as well as the living conditions of the population depend on power availability, possible deficiencies or failures of power supply affect all of society and can have fatal consequences.

However, electrical power is not the primary power source and its usable form does not generate by itself. It must be generated, transported to the final consumption point and at the same time consumed as well. Electrical power essentially serves as a transmission medium ("transport belt") transporting power between a point of generation and a point of consumption.

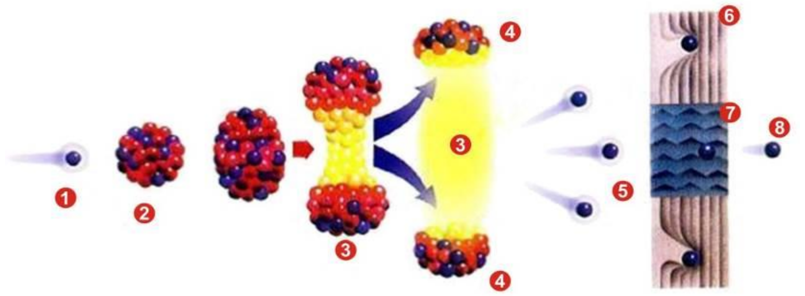
In the majority of cases, it is electric generators that are used for power generation by converting (excitation using the electromagnetic induction principle) mechanical power to electrical power[1]. The mechanical power source is usually a turbine driven by various media (pressure steam in thermal power plants, water in hydraulic power plants, wind in wind power plants). Pressure steam for the turbine is prepared by using thermal energy contained in primary sources of energy (coal, gas, nuclear fuel, etc.).

The electrical power generation principle in the nuclear power plant corresponds to the principle of any other thermal (steam) power plant. It can be described in a simplified fashion by the following string (italics highlight the components of the nuclear power plant):

- primary power source - fuel (coal, oil, gas, *nuclear fuel*, geothermal energy, etc.),
- utilisation of fuel for thermal energy generation (coal fired boiler, burners, *nuclear reactor* etc.),
- utilisation of thermal energy for steam generation (boiler, *steam generator* etc.),
- utilisation of steam for kinetic energy generation (*turbine*),
- utilisation of kinetic energy for electrical power generation (*generator*).

The basic element of the nuclear power plants is the *nuclear reactor* where energy contained in *nuclear fuel* matter is utilised, i.e., by means of nuclear reaction with heat generation. This heat is subsequently used for steam generation. Nuclear reactors, which are available worldwide at present, exclusively use nuclear fission reaction. The principle of fission reaction is shown in the following figure.

Fig. B.7: Schematic Representation of Fission Reaction



1	Slow neutron	**5**	Fast neutrons
2	^{235}U nucleus	**6**	Absorber
3	Fission with heat generation	**7**	Moderator
4	Fission products	**8**	Slow neutron

Fission nuclear reaction consists of fission of the atomic nucleus (usually uranium-235 nucleus) by a slow neutron. Fission usually divides the nucleus into two fragments. At the same time, a part of its binding energy is released in the form of heat (that is further used for steam generation) and two up to three other neutrons are released as well. These neutrons can fission other nuclei, therefore this reaction is called the

[1] Another possible method of electrical power generation is the utilisation of photoelectric effect in barrier-layer photocells.

chain reaction. During the utilisation of nuclear power, the process is controlled so that only one neutron released during fission slows down and induces a further fission nuclear -uranium 235 reaction. In this case, a steady fission reaction takes place because the number of fissions per time unit does not increase or decrease. The other neutrons released during fission are captured in materials of the reactor core. The intensity of the fission chain reaction follows changes in geometry and composition of the reactor core materials where the neutrons are captured, which is used during a change of the reactor power or during total decommissioning of the reactor.

The matter used for fission is called *nuclear fuel*, the matter slowing down fast neutrons from fission is called a *moderator,* the matter capturing neutrons is called an *absorber,* and the heat carrier taking heat out of the reactor is called the *coolant*. An array of fuel assemblies in the reactor vessel, where the fission chain reaction takes place, is called the *reactor core*.

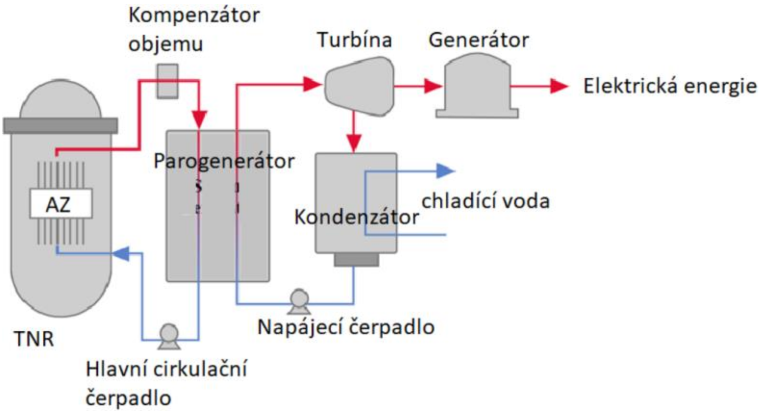
The type of nuclear reactors most used worldwide are light water reactors (LWR - Light Water Reactor). This is a heterogeneous thermal reactor with solid nuclear fuel working on thermal neutrons. Light water is used as the moderator of neutrons which also acts as a coolant. All reference types considered for the implementation of the SMR at the Temelín site are classified as LWR type reactors.

Light water reactors are further divided into:

- PWR - Pressurized Water Reactor and
- BWR - Boiling Water Reactor.

Pressurized Water Reactors (PWR): These are nuclear reactors cooled and moderated by light water (at high pressure), which circulates in the primary circuit from the reactor core to the steam generator where it transfers the thermal energy to the secondary circuit. Water in the secondary circuit converted by heat into steam serves to drive the turbine to generate electrical power.

Fig. B.8: Diagram of the Typical PWR



Source: Types of Nuclear Reactors (atomicarchive.com)

Kompenzátor objemu	Pressuriser
Turbína	Turbine
Generátor	Generator
Elektrická energie	Electrical power
AZ	AZ
Parogenerátor	Steam generator
Kondenzátor	Condenser
chladící voda	cooling water
TNR	RPV
Hlavní cirkulační čerpadlo	Main circulation pump
Napájecí čerpadlo	Feed water pump

Basic advantages of the PWR:

- very stable to changes in the temperature of the coolant,
- The turbine is separated from the primary circuit, is not contaminated and does not need shielding,
- the control clusters are slid in from above - passive (gravitational) shutdown of the reactor even without electrical power,
- the biggest number of reactors in operation (biggest operational experience),
- boric acid as part of the primary coolant, more even power distribution in the reactor core.

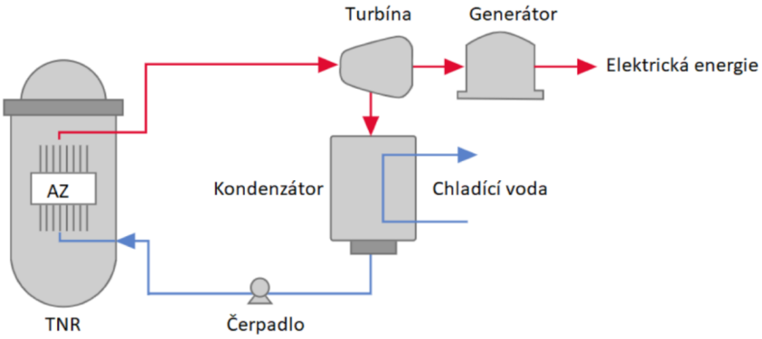
Further characteristics of the PWR:

- high coolant pressure, higher demands on materials and fuel,
- high density and reactor core power, necessary shielding of the reactor pressure vessel against embrittlement,
- usual use of boric acid in the primary coolant for controlling reactivity, increased corrosive properties of the environment, increased production of tritium, increased intensity on the chemical mode of the primary circuit and selection of materials,

- radiolysis of water and for potential emergency conditions with the loss of cooling and overheating of the fuel assemblies - steam reaction and fuel zirconium cladding produces hydrogen which then needs to be recombined.

Boiling Water Reactor (BWR): There are nuclear reactors also cooled and moderated by light water. The basic difference compared to the PWR is that the cooling water in the reactor core (at lower pressure than the PWR) heats and converts into steam (so the reactor also works as a steam generator). This produced steam then enters directly into the steam turbine where it generates electrical power through the connected generator.

Fig. B.9: Diagram of the Typical BWR



Source: Types of Nuclear Reactors (atomicarchive.com)

Turbína	Turbine
Generátor	Generator
Elektrická energie	Electrical power
AZ	AZ
Kondenzátor	Condenser
Chladicí voda	Cooling Water
TNR	RPV
Čerpadlo	Pump

Basic advantages of the BWR:

- works with lower pressure and temperature (reduced risk of an accident with the loss of coolant, lower demands on the materials and fuel used),
- a typical single circuit - fewer components (cheaper and simpler),
- there is no boric acid in the coolant during normal operation (simpler selection of primary circuit materials and control of the chemical mode, lower tritium production),
- higher utilisation of fuel and better spent fuel properties (reduced creation of radionuclides with long conversion half-life (with the exception of plutonium),
- lower density of the reactor core power (compared to the PWR) - longer lifetime of the reactor vessel,
- more robust aftercooling,
- great negative temperature coefficient of reactivity due to boiling in the reactor,
- the control clusters are usually slid in from below - during outage fuel can be replenished without disconnecting their controls.

Further characteristics of the BWR:

- Two-phase flow in the reactor - more complicated calculations when designing the reactor core and greater demands on the measuring apparatus,
- lower density of the reactor core power (compared to the PWR) - for the same power a bigger reactor vessel,
- the turbine and condensate and feed-water system are contaminated by radionuclides and there is the need of their continual shielding,
- control clusters from below - impossibility of using gravitation for emergency sliding in,
- the reactors are less stable in their performance (than the PWR) - increased operator demands,
- higher plutonium production in spent nuclear fuel (than in the PWR).

Nuclear power plants with an LWR type reactor (whether the PWR or BWR) use low enriched uranium as nuclear fuel in which the concentration of the uranium isotope U-235 is locally increased by enrichment. The basic element, in which heat is released in the reactor, is called the *fuel rod*. It consists of uranium dioxide (UO_2) pellets sealed in a zirconium tube. Fuel rods are arranged to create *fuel assemblies* which are inserted into the reactor core as a whole.

The PWR technology uses demineralised water as the coolant with the controlled chemical mode and the demineralised water also serves as a moderator and an absorber carrier (boric acid). When passing through the reactor, water heats up, enters several coolant loops, in which the coolant circulates by means of circulation pumps, passes through the primary side of steam generators where it releases a part of its thermal energy through a heat transfer surface to the secondary side, and returns to the reactor. This cooling circuit is called the *primary circuit*. The cooling water in this circuit, including the reactor, is maintained under high pressure (in order to remain in liquid form even at temperatures of about 320 to 330°C, hence the name the pressurised water reactor). Heat of the primary circuit is utilised in the steam generators (that function like heat exchangers) for heating of water in the *secondary circuit*. Water in this circuit on the secondary side of the steam generators converts into pressure steam. This is led to the *turbine* and rotates it when passing through and expanding at the same time. Having released the energy, the steam condenses in the condenser back into water, and this condensate is pumped back into the steam generator.

In BWR technology demineralised water with controlled chemical mode is also used as the coolant and moderator. The basic difference is that in BWR technology the reactor acts like and a steam generator, in this technology the properties of water are utilised at a lower pressure than for the PWR (about 7.5 MPa at a temperature o 285°C). When passing through the reactor core the water boils and its state is converted into steam. The steam leaving the reactor pressure vessel then flows through the loop/loops directly into the steam turbine. The condenser is located behind the steam turbine where the steam condenses into cooling water and then travels with the use of condensate and feeding pumps back into the reactor.

In the PWR and BWR the energy of the turbine's rotational movement is utilised as a drive for the *electric generator*, and the generated electrical power is transmitted to the electricity network.

A tertiary (cooling) circuit in which the cooling water circulates through the cooling tower or through a different ultimate heat collector (river, sea) is used for the PWR and BWR to ensure steam condensation in the condenser. In it the unused low potential heat is released into the atmosphere or into the surrounding water environment. A decrease (above all evaporation) of the tertiary water is refilled by treated raw water from a suitable source (in case of the SMR Temelín NPP this is the Vltava River).

Considering the safety requirements for nuclear power plants, the main equipment of the reactor is situated in the *protective envelope (containment)*, the principal task of which is to prevent radioactive substances from leaking into the environment. The function of an air-tight space inside the containment for protection against the leak of hazardous substances into the outer environment and mechanical protection of the reactor against the external effects caused by natural effects or human activity is combined. The containment acts like radiation shielding during routine operation and an accident. The structure of the containment contributes to the protection of the power plant's staff and the public from the effects of radiation from radioactive substances which occur inside the containment and its systems. The containment of PWR reactors usually consists of a single-layer or two-layer structure made of prestressed or reinforce concrete, or steel. Its geometry usually is a spherical or cylindrical vessel attached at the bottom to the base plate and topped with a spherical or ellipsoidal dome. The BWR containment is structurally different in its internal differentiation. It consists of a dry (Drywell) and wet (Wetwell) part. The reactor and systems for cooling the reactor are located in the dry part of the containment. The dry part is used to capture steam escaping during emergency conditions thereby pressurising the containment while the steam from the dry part is fed by a ventilation pipe into the wet part of the containment where it is fed below the surface of the present water so the steam condenses and the pressure in the containment is reduced. Both parts are stored in a secondary containment. Very high demands are placed on the quality of the containment and apart from protection against internal risks the containment also ensures protection against external risks (e.g. extreme meteorological conditions or the consequences of human activity - pressure wave, plane crash etc.).

B.I.6.2.1.2. Statistical Data of Nuclear Power Plants

At present (according to data of the World Nuclear Association, July 2024), there are 439 functional nuclear power reactors in total in 32 countries of the world (of which 380 LWR type) with total net electrical power of more than 395 GW_e. In 2023, nuclear power plants generated more than 2602 TWh of electrical power, which represents approximately 9% of electrical power generation worldwide.

A total of 64 further units are under construction. Of this number 56 reactors are PWR type, 2 are BWR type, 4 are TFBR type and 2 are PHWR type.

The commissioning of new nuclear units is currently accompanied by the gradual decommissioning of older nuclear power plants. In the last 20 years (2004 to 2023) 107 reactors were decommissioned and 100 new ones began operating. However, the power of reactors commissioned during this period was on average greater than those which were decommissioned so the total installed capacity in nuclear power plants has approximately increased by 19 GW_e.

The reference scenario in the issue of The Nuclear Fuel Report (World Nuclear Association, 2023) estimates 66 reactors decommissioned by 2040 and 308 new reactors which will be commissioned, while the data includes 31 Japanese reactors commissioned by 2040.

B.I.6.2.1.3. Development Generations of Nuclear Reactor Technology

Electrical power generation from energy being released from fission of uranium (and other suitable isotopes) has almost an 80-year history from the startup of the first demonstration sources. The technology of nuclear reactors in commercial nuclear power plants is usually classified in categories called generations depending on their stage of technical development.

The basic general characteristic of individual generations is the following:

Generation I: Generation I includes the reactors designed in the period from 1950 to 1960. This generation includes for example the first Czechoslovak nuclear power plant A1 in Jaslovské Bohunice in Slovakia. The last reactor of this generation so far in operation was the 1st unit of the Wylfa Nuclear Power Plant in the Great Britain (with scheduled termination in 2015).

Generation II: Designing and construction of the nuclear power plants with the generation II reactors began in the 1970s. At present, the power plants with the generation II reactors hold the most significant share in electrical power generation in the nuclear power plants. Pressurised water reactors (PWR) form more than half of these power plants. This generation also includes the VVER reactors (Russian designation for PWR reactors) built and operated in the former Czechoslovakia (and its successors Czech Republic and Slovakia). As compared with the generation I reactors, the level of the power plants with the generation II reactors is considerably higher, above all as far as the safety systems are concerned.

Generation III: The generation III includes the reactors designed in the 1990s. These designs, which are based on proven experience gained during construction and operation of the generation II reactors, use the best available technology. Improvements are focused on more effective utilisation of nuclear fuel, reaching a higher thermal efficiency and utilisation of standardised designs focused on reduction of demands for the construction period as well as reduction of demands for attendance and maintenance during operation. The safety characteristics of generation III reactors include for example the more extensive utilisation of passive elements in the safety system design, a robust containment with increased resistance to external risks and utilisation of specific systems intended in the major accident management design.

Generation III+: In terms of development, the generation III+ reactors immediately follow on from the generation III reactors. So the designs of this generation offer improvement of economic indicators (a simplified standardised design which should result in the future reduced period of licensing and reduced costs of construction and operation for further replication of already built nuclear units of this type), and further significant benefits for safety (implementation of the latest safety requirements and operational knowledge) and also lower production of radioactive waste. This generation also included reactors built and commissioned in recent years, for example EPR (Finland, China), AP1000 (China, USA), Hualong One (China), APR1400 (United Arab Emirates, South Korea), VVER 1200/392M and 1200/491 (Russia, Belarus), PHWR-700 (India). This generation also included selected types of SMR designs considered for the SMR Temelín NPP.

Generation IV: Generation IV designs have been under development so far in several various conceptual trends. These are mostly reactors working with fast neutrons and a closed fuel cycle enabling more effective utilisation of nuclear fuel together with reduction in the amount of radioactive waste. However, this generation also includes some technologies working with thermal neutrons and the open fuel cycle. In China a HTR-PM type of demonstration reactor has been operating since 2021. This is a small modular reactor with power of 210 MW_e, as the first generation IV reactor. It began working commercially in 2023.

B.I.6.2.1.4. Safety and Economic Characteristics of Generation III/III+ LWR Reactors

The generation III or III+ designs use the best available technologies based on proven generation II types. The main differences as compared with the generation II are the following:

- standardised design reducing a required licensing period of individual power plants, necessary investment costs and construction period,
- a simplified but at the same time more robust design enabling easier attendance and higher operating reserves,
- higher availability (90% and more), higher net efficiency (up to 37%), and extended lifetime (at least 60 years),
- lower risk of an accident with severe damage to the reactor core (significantly below 10^{-5}/year),
- a higher resistance to external influences,
- the power plant equipped with specific systems for prevention and mitigation of major accident consequences,
- making higher fuel burnup possible (higher utilisation up to 70 GWd/tU) and reduction in amount of radioactive waste produced,
- extension of the period between shutdowns for fuel shuffling and refuelling by using burnable absorbers (up to 48 months),
- improved operation economics.

At the same time, they make use of the general advantages of the PWR reactors:

- stability due to a negative power feedback (acting against a quick increase of reactivity),
- passive system of emergency shutdown of the reactor (the control clusters are held in place in the upper position by electromagnets and if necessary are slid into the reactor's core by their own weight resulting in the safe shutdown of nuclear fission),
- separation of the primary and secondary circuits (the secondary circuit is separated from the primary circuit so that water in the secondary circuit virtually contains no radioactive substances, which restricts the possibility of radionuclides escaping into the environment),

or BWR reactors:

- improvement of the control clusters controls,
- Improvement of the containment, increase of resistance to external influences,
- Improvement of the emergency core cooling system, increase of the number of divisions and capacity,
- improvement of protection against overpressure of the RPV due to the increased number of valves of the automatic reactor pressure reduction system.

B.I.6.2.2. Basic Requirements for Nuclear Power Plants

B.I.6.2.2.1. General Requirements

The SMR Temelín NPP design will meet the requirements of binding legislative regulations applicable in the Czech Republic, correspond to the current level of science and technology, and will use, where applicable, the best available technology (BAT).

The SMR Temelín NPP Project is subject, like any other construction, to permit processes in compliance with applicable legislation.

The conditions for the utilisation of nuclear power for peaceful purposes are regulated by Act No. 263/2016 Coll., the Atomic Act, as amended (hereinafter referred to as the "Atomic Act"). This fundamental legislative regulation of the Czech Republic which regulates the conditions of the peaceful utilisation of nuclear power, integrates the respective regulations of the European Atomic Energy Community and the European Union as well as building directly upon the applicable regulations of Euratom and the European Union. The Atomic Act defines the conditions and obligations under which legal entities and natural persons can use nuclear power and introduced the obligation of exercising supervision of nuclear safety. This supervision is exercised by the State Office for Nuclear Safety (SÚJB).

The requirements of the Atomic Act are further elaborated in its implementing legal regulations which are the decrees of the State Office for Nuclear Safety (SÚJB). The requirements of the following decrees, always as amended, apply to nuclear facilities with a nuclear reactor:

- Decree No. 358/2016 Coll., on requirements for quality assurance and technical safety and assessment and verification of conformity of selected equipment,
- Decree No. 359/2016 Coll., on details to ensure abnormal radiation occurrence management
- Decree No. 360/2016 Coll., on radiation situation monitoring,
- Decree No. 361/2016 Coll., on securing a nuclear facility and nuclear material,
- Decree No. 374/2016 Coll., on records and inspection of nuclear materials and reporting of information about them,
- Decree No. 375/2016 Coll., on selected items in the nuclear sphere,
- Decree No. 376/2016 Coll., on dual-use items in the nuclear sphere,
- Decree No. 377/2016 Coll., on the requirements for the safe management of radioactive waste and on the decommissioning of nuclear installations or category III or IV workplaces,
- Decree No. 378/2016 Coll., on the location of a nuclear facility,
- Decree No. 379/2016 Coll., on the type approval of certain products in the field of peaceful utilisation of nuclear power and ionising radiation and transport of radioactive or fissile material,
- Decree No. 408/2016 Coll., on requirements for the management system
- Decree No. 409/2016 Coll., on especially important activities in terms of nuclear safety and radiation protection, special expertise and preparation of a person providing radiation protection of the registrant,
- Decree No. 422/2016 Coll., on radiation protection and securing of a radionuclide source,
- Decree No. 21/2017 Coll., on ensuring the nuclear safety of a nuclear facility,
- Decree No. 162/2017 Coll., on safety assessment requirements according to the Atomic Act,
- Decree No. 329/2017 Coll., on requirements for the design of a nuclear facility,
- Decree No. 266/2019 Coll., on the policy of the management of radioactive waste and spent nuclear fuel.

The second level of regulations includes generally accepted international documents that define the basic requirements for the utilisation of nuclear power. These are safety principles, standards, regulations, guides and recommendations issued by the International Atomic Energy Agency (IAEA), Western European Nuclear Regulators Association (WENRA), European Atomic Energy Community (Euratom) and any other organisations. The requirements of the Atomic Act and SÚJB decrees have been harmonised with the requirements of this level of regulations.

Apart from SÚJB decrees also issues safety guidelines (a series of documents marked BN), which contains recommendations on how to correctly meet the requirements of the decrees. When these safety guides are compiled the respective guides issued by WENRA or IAEA (Safety Guides), as well as proven experience from the approach of renowned countries that use nuclear power on a long-term basis, are used.

The selected supplier of technology will provide its standard design, so only modifications and changes will be made in the design in case of more stringent requirements, as required by Czech legislation, or modifications and changes necessary for incorporating the design into the Temelín site. A licensing basis will be prepared as part of the SMR Temelín NPP design, defining all used regulations and standards, and their area of usage.

The principles of the peaceful utilisation of nuclear power and ionising radiation are set out in Section 5 of the Atomic Act, which prescribes that everyone who uses nuclear power will, among other things:

- prevent abnormal radiation occurrences and possibly limit their consequences,
- ensure the protection of a natural person and the environment against ionizing radiation,
- proceed so that the risk of danger to a natural person and the environment is as low as can be reasonably achievable considering the current level of science and technology and all economic and societal aspects,
- preferentially ensure nuclear safety, the safety of nuclear items and radiation protection,

- exercise only the activity whose benefit for society and individuals outweighs the risk that arises during this activity or its consequences,
- assess the level of nuclear safety, radiation protection, technical safety, abnormal radiation occurrence and safety management, and adopt measures to meet legal requirements, when new significant information has been received about the risks and consequences of these activities,
- assess the compliance with the peaceful nuclear power and ionizing radiation utilisation principles in an ongoing and complex manner, reflecting the existing level of science and technology, and ensure the enforcement of the assessment results in practice.
- exercise assurance of nuclear facilities and materials,
- when ensuring nuclear safety, radiation protection, technical safety, radiation situation monitoring, abnormal radiation occurrence management, and security of a nuclear facility and materials, use an approach graded according to potential radiation exposure and its potential consequences (graded approach).

The basic data on the requirements of nuclear safety, radiation protection, security of a nuclear facility and materials and abnormal radiation occurrence management are stated in the following text.

B.I.6.2.2.2. Requirements for Nuclear Safety

According to the Act No. 263/2016, the Atomic Act, as amended, nuclear safety is understood to mean *"the state and capability of nuclear installations and natural persons operating the installation to prevent uncontrolled self-sustaining fission chain reaction or release of radioactive substances or ionising radiation into the environment and to mitigate the consequences of accidents"*.

The conditions for the peaceful utilisation of nuclear power in the Czech Republic are determined in the above-mentioned Atomic Act that defines the conditions and obligations under which legal entities and natural persons can use nuclear power, and introduces the obligation to supervise nuclear safety which is exercised by the State Office for Nuclear Safety (SÚJB).

The future operator has to obtain licences for the location, construction, commissioning and operation of a nuclear power plant, i.e. also the SMR Temelín NPP, as well as for its decommissioning. The requirements for the contents of the documentation for licensed activity related to the utilisation of nuclear power are defined in Annex No. 1 of the Atomic Act and the implementing SÚJB decrees. In each stage of the assessment, before a respective licence is issued according to the Atomic Act ("Licensing"), the operator has to submit documentation comprising the safety assessment, with confirmation of the required safety level drawn up in detail corresponding to a level of the nuclear power plant design preparation state.

In the first step of the licensing process, SÚJB issues the licence for location of nuclear facilities, based on the assessment of the so-called assigned safety report and further documentation stated in Annex No. 1 (1) a) of the Atomic Act. The assigned safety report contains information on the suitability of the site. In the next step of the licensing process, SÚJB issues the licence for the construction of nuclear facilities, based on the assessment of the so-called assigned safety report and further documentation specified in Annex No. 1 (1) b) of the Atomic Act. The preliminary safety report is drawn up by a licence applicant only after the nuclear facility contractor is selected. The report contains a description of the given design and supports compliance of safety objectives on the basis of the design documentation.

In the last significant step before commissioning, SÚJB reviews the so-called operation safety report and other licensing activity documentation according to Annex No. 1 of the Atomic Act and based on it, SÚJB issues the licences for individual stages of the commissioning of the nuclear facility. The operation safety report contains the safety analysis of the actual already built facility being prepared for future operation, i.e., on the basis of input data from the implementing design and other documentation according to the Atomic Act and implementing decrees.

Similar licensing steps are carried out before and during the nuclear facility operation termination stage when SÚJB issues licences for individual stages of nuclear facility decommissioning.

Nuclear safety will be ensured throughout the life cycle of the nuclear facility at all states of operation and in case of emergency conditions (basic design accidents and extended design conditions), abnormal natural occurrences and events caused by human activity (including a plane crash). The requirement for ensuring nuclear safety (preventing the uncontrolled development of fission chain reaction, leakage of radioactive substances or ionising radiation into the environment and limitation of the consequences of accidents) apply to the entire nuclear facility including the spent fuel pool.

Requirements based on stress tests performed in response to the accident at the Fukushima Nuclear Power Plant will be enforced as indispensable requirements for ensuring nuclear safety at the SMR Temelín NPP. Currently these requirements are incorporated into the legislation of the Czech Republic which in this respect is harmonised with the safety standard of WENRA and IAEA, namely including greater resistance to external influences (e.g. earthquake, wind), greater autonomy, redundancy and reliability of safety systems for dealing with basic design accidents, use of diverse and alternative means for managing multiple failures and severe accidents and also the possibility of using mobile means for meeting safety functions in extreme situations.

The important principle that will be implemented for the SMR Temelín NPP is the defence in depth principle. Nuclear safety, radiation protection, radiation situation monitoring, abnormal radiation occurrence management and security of the nuclear facility will be ensured by defence in depth. Defence in depth represents the basic principle and philosophy of safety implemented at the present time for nuclear facilities and includes all activities and actions connected with location, design, construction, commissioning, operation and decommissioning. Defence in depth has two principal assignments:

- prevention of accidents,
- mitigation of consequences of accidents.

Requirements for defence in depth must be ensured in all technical activity related to the utilisation of nuclear power in the SMR Temelín NPP:

- creation of a series of back-up physical security barriers which are placed between radioactive substances and the vicinity of the nuclear facility,
- systems, structures, components and processes to enforce security functions for the protection of integrity and functionality of physical safety barriers at individual levels of defence in depth,
- prevention of the occurrence of an abnormal radiation occurrence using physical safety barriers.

Implementation of defence in depth in the SMR Temelín NPP design is to ensure that no individual technical, human or organisational failure should result in significant harmful effects and that a combination of failure with potentially significant effects should be highly improbable.

Defence in depth is divided into five levels. The characteristics of these levels of defence in depth according to WENRA are listed in the following table.

Table B.2: Characteristics of Defence Levels according to WENRA

Level of defence in depth	Objective	Measures required for management	Radiation consequences	Associated conditions of the power plant
Level 1	Prevention of failure and abnormal operation	Conservative design, high quality of construction and operation and maintenance of basic operating parameters within specified limits	Without radiation effects in the vicinity of the power plant	Normal operation
Level 2	Management of abnormal operation and failures	Control- and limitation systems and supervision programs		Abnormal operation
Level 3a	Management of accidents to restrict radiation leaks and prevent occurrence of major accidents	Protection system of reactor, safety systems, accident management	Without radiation effects or with only negligible radiation consequences in the vicinity of the power plant	Design basis accidents (DBA)
Level 3b		Additional safety measures, accident management		Multiple failure under design extension conditions (DEC)
Level 4	Management of major accidents with the aim to reduce leaks into the vicinity	Supplementary safety measures for mitigation of reactor core melting consequences, major accident management	Radiation consequences in the vicinity of the power plant can lead to taking preventive measures limited by range and time	Major accident under design extension conditions (DEC)
Level 5	Mitigation of radiation consequences caused by significant leakage of radioactive substances	Emergency response organisation, emergency levels	Radiation indications in the vicinity of the power plant requiring preventive measures	-

Source: WENRA Report: Safety of New NPP Designs, RHWG, March 2013

In accordance with the defence in depth concept physical barrier intended to prevent the leakage of radioactive substances into the external environment will be created in the SMR Temelín NPP (i.e. a nuclear power plant with an LWR reactor). These are (apart from the structure of the nuclear fuel material with high chemical stability and retention capacity to prevent leakage of fission products) the following barriers:

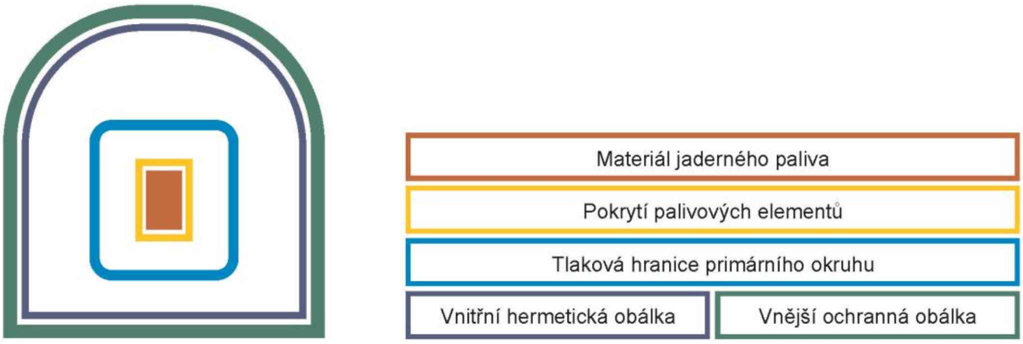
First barrier: Fuel element cladding.

Second barrier: Primary circuit pressure boundary (or the entire cooling circuit for BWR).

Third barrier: Containment, formed by an air-tight containment.

The schematic representation of physical barriers in the PWR-reactor power plant design is shown in the following figure.

Fig. B.10: Schematic Diagram of the Physical Barriers



Materiál jaderného paliva	Nuclear fuel material
Pokrytí palivových elementů	Fuel element cladding
Tlaková hranice primárního okruhu	Primary circuit pressure boundary
Vnitřní hermetická obálka	Inside air-tight envelope
Vnější ochranná obálka	Outside containment

The purpose of these physical barriers is to prevent radioactive material from penetrating from the point of occurrence into the external environment. Each physical barrier is conservatively designed (with considerable design reserves against damage) and its condition is continuously monitored in operation.

Requirements for ensuring nuclear safety resulting from relevant regulations will not only be applied to currently applicable regulations in the period of preparation, designing, and construction of the power plant, but will also reflect and incorporate any new requirements for nuclear safety, as well as for radiation protection, security of the nuclear facility and nuclear materials, and management of an abnormal radiation occurrence in any phase of its life cycle. Within periodic safety reports, the safety objectives and requirements will continuously be reflected, resulting from current requirements of Czech legislation and international regulations (in particular, EU, WENRA and IAEA recommendations), as well as requirements of technical standards in compliance with the development of the best available technology, including experience from abnormal operation events, if any, or emergency conditions in nuclear facilities in the Czech Republic and all over the world. Legislation safety related requirements will then be developed in detail in the form of an assigned, preliminary, and operational safety report within relevant licensing processes (location license, construction license, concerning, commissioning and operation) as described above.

B.I.6.2.2.3. Requirements for Radiation Protection

According to the Atomic Act, radiation protection is understood to mean *"a system of technical and organisational measures to reduce exposure of natural persons and protect the environment from the effects of ionising radiation"*. The population and environment is protected against the effect of ionising radiation by ionising radiation shielding and prevention of the occurrence of radioactive substances found at the SMR Temelín NPP.

The requirements for radiation protection arise from the Atomic Act which stipulates that whoever performs activity as part of the scheduled exposure situation will limit radiation exposure of a natural person so the total exposure caused by a combination of exposure from these activities is justified, optimised and does not exceed the total exposure limits:

- Justified activity as part of exposure situation is such that its benefit to society and the individual outweighs the risk that occurs during this activity or its consequence (principle of justification according to ICRP and IAEA).
- The optimisation of radiation protection means an iterative process to achieve and maintain a level of radiation protection ensuring that exposure of people and the environment is as low as reasonably achievable, taking all economic and societal aspects into account (principle of optimisation according to ICRP and IAEA).
- The limit of exposure is the quantitative indicator for the restriction of the total exposure of a person from activities in scheduled exposure situations. Anyone who carries out activities leading to exposure is obliged to reduce radiation so that exposure of any exposed person does not exceed the specified limits. The total dose for any individual from controlled sources in scheduled exposure situations (apart from medical exposure of patients) should not exceed the respective limits (principle of dose limits according to ICRP and IAEA).

The enforcement of the above-mentioned principles of radiation protection results in the limitation of the radiation exposure of staff, and the minimisation of activity and amount of released radioactive substances results in the limitation of radiation exposure of the population and the environment from the operation of nuclear facilities. Thus, the SMR Temelín NPP design will ensure that all exposure is maintained to the minimum reasonably achievable limit. At the same time, it will reflect the respective limits of exposure set out by Act No. 263/2016 Coll., the Atomic Act, as amended, SÚJB Decree No. 422/2016 Coll., on radiation protection and securing of a radionuclide source, as amended, and respective supervisory bodies.

Fulfilment of the following basic criteria of acceptability in terms of radiation protection is required for the SMR Temelín NPP:

Criterion K1: Authorised limits for the discharge of radionuclides from the nuclear facility into the environment set by the respective SÚJB licence may not be exceeded in the normal operation of the nuclear facility. For the representative person [1] the dose optimisation limit related to exposure from discharge pipes from into the atmosphere and water from all nuclear facilities located at one site may not be exceeded. The criterion of acceptability set by SÚJB will not be exceeded for abnormal operation of the nuclear facility.

Criterion K2 Any accident, which will not result in the core melting or damage of irradiated nuclear fuel in the storage pools, will not result in a radionuclide release that would require sheltering, iodine prophylaxis and evacuation of population anywhere in the vicinity of the nuclear facility.

Criterion K3: Such design measures must be taken for postulated accidents of a nuclear facility with the nuclear reactor core melting or severe damage of irradiated nuclear fuel in the storage pools ensuring that it will not be necessary to evacuate the population in the immediate vicinity of the nuclear facility and to introduce long-term restrictions on food consumption. Core-melting accidents or severe damage to irradiated nuclear fuel in the storage pools, which could lead to early or large releases, should be virtually excluded. An early leak means a leak not allowing preventive measures for sheltering and iodine prophylaxis to be taken for the postulated accidents, a large leak means a leak that would require measures taken excluded by this criterion.

The process taken to optimise radiation protection will be used in the phase of the SMR Temelín NPP design and construction. Further optimisation of the protection will be provided at the level of the SMR Temelín NPP commissioning and operation. The application of optimisation of radiation protection will follow the requirements set out by the above-mentioned Atomic Act and the Decree on radiation protection and securing of a radionuclide source.

The exposure limit for individuals from the population is set out by Decree of the State Office for Nuclear Safety No. 422/2016 Coll., on radiation protection and securing of a radionuclide source, as amended, which sets the value of 1 mSv/year as a general effective dose limit in any calendar year, which defines as the sum total of effective doses from external exposure and committed effective doses from internal exposure from exposure of all licensed or registered activities (so this limit does not include doses resulting from natural exposure or medical exposure of the person as a patient).

[1] according to the Atomic Act the representative person is an individual of the population representing the model group of natural persons most highly exposed to a given source and pathway.

According to the Atomic Act, every entity performing radiation activity will ensure that as a result of this activity, even in case of accumulation of radioactive substances being released from the workplace, a dose optimisation limit is used for a representative person within optimisation of radiation protection with a value of (the population) 0.25 mSv per year, and in case of a power nuclear facility, together with 0.2 mSv/year for discharges into the atmosphere, and 0.05 mSv/year for discharges into surface water. This dose optimisation limit value, including division into exposure from discharges into the atmosphere and into surface water, is also considered for the limit dose for the design of nuclear facility. If there are multiple nuclear facilities on the site, having an effect of doses on the population, this value applies to total exposure from all nuclear facilities on the site or in the region.

Based on a radiation protection optimisation study, the State Office for Nuclear Safety (SÚJB) sets the authorised limit for exposure from the respective nuclear facility (SMR Temelín NPP). The authorised limit is a quantitative indicator, resulting from the optimisation of radiation protection for an individual radiation activity, or individual source of ionising radiation, and as a rule, it is lower than the dose optimisation limit. SÚJB will set the authorised limit in the licence for the activities within the exposure situations (commissioning, operation, closure and decommissioning of nuclear facilities). Not exceeding the authorized limits which the operator continuously assesses, is proof that the exposure limits are not being exceeded.

B.I.6.2.2.4. Requirements for Security of Nuclear Equipment and Materials

Requirements for the security of nuclear facilities and materials are set out in Act No. 263/2016 Coll., the Atomic Act, as amended, and implementing Decree No. 361/2016 Coll., on securing a nuclear facility and nuclear material, as amended. The international recommendations of WENRA and IAEA will also be reflected in the preparation of the new nuclear source, in particular recommendations from the document IAEA INFCIRC/225/rev5.

The physical protection of a nuclear facility means a system of technical and organisational measures preventing unauthorised activities with a nuclear facility or nuclear material. The physical protection of a nuclear facility and nuclear material is a specific activity regulated by the respective legislation whose selected areas are subject to secrecy and a controlled approach to classified information. This fact is reflected in legislation regulating the securing of the physical protection of the new nuclear source and Act No. 412/2005 Coll., on the Protection of Classified Information and Security Eligibility, as amended, and its implementing decrees. The list of classified facts regarding the physical security, directly associated with its assurance, is set out in Annex No. 16 (List of Classified Facts in the area of the State Office for Nuclear Safety scope), Government Regulation No. 522/2005 Coll., as amended.

For these reasons, this Notification of the Project (which is a public document), or also subsequently compiled environmental impact documentation may not include any specific measures for the security of a nuclear facility and materials, relevant for the SMR Temelín NPP, apart from the specification of general requirements resulting from legal regulations of the Czech Republic and WENRA and IAEA recommendations.

For the purposes of securing a nuclear facility nuclear material according to Annex No. 361/2016 Coll., on securing a nuclear facility and nuclear material, as amended, will be classified under category I, II or III. Based on the categorisation of nuclear material and on the analysis of possible consequences for nuclear safety in case of unauthorised activities, areas in the nuclear facility will be delineated and physically demarcated to which access and entry will be restricted, which are:

- a guarded area,
- a protected area,
- an internal area (where category I nuclear material is used or stored) and
- a vitally important area (where intentional damage to systems and equipment important in terms of nuclear safety located in this area may result directly or indirectly to a radiation accident).

The basic purpose of securing a nuclear facility and nuclear material will be:

- allow access to the guarded area, protected area, internal area and vitally important area only to persons that have met the requirements imposed on them (integrity, psychological profile, safety capability) and who have been granted an access or entry permit to the area,
- ensure that authorised persons accessing the guarded area, protected area, internal area and vitally important area do not abuse this access for an unauthorised activity,
- a combination of an electric alarm system and mechanical protective devices, timely detection of violators and by slowing their progress making it possible for the fast-deployment unit to catch the violator before he/she starts their unauthorised activity.

Technical measures will be represented by the technical system of physical protection which includes detectors, access control devices, camera and communication systems. The physical barriers consist of the appropriate mechanical means of prevention. The organisational measures include above all the rule for access of persons and entry of means of transport. They also contain a ban on bringing weapons which is made impossible by a technical system of physical protection. Access to individual areas delineated in the SMR Temelín NPP site will be made possible only to persons who meet the conditions for access to a specific area.

Requirements for securing cyber security are set out by Act No. 181/2014 Coll., on Cyber Security, as amended, and in Decree No. 82/2018 Coll., on Cyber Security, as amended. The international recommendations of WENRA and IAEA will be reflected in the preparation of the SMR Temelín NPP, particularly IAEA Computer Security at Nuclear Facilities (NSS No. 17, Vienna 2011).

According to IAEA NSS No. 17 the aim of cyber security in a nuclear facility is to protect the confidentiality, integrity and availability of attributes of electronic data, used computer systems and processes. The security objective will be met if data for securing nuclear safety and security of the nuclear facility will be identified and protected.

To optimise the SMR Temelín NPP cyber security system settings a security policy will be compiled according to Annex No.5 to Decree No. 82/2018 Coll., and the cyber security management system settings will meet the respective provisions of this decree.

The technical design of all IT means used in the SMR Temelín NPP will be classified and managed according to the requirements of Decree No. 82/2018 ("Technical Measures") and assets will be assessed (according to the definitions of Decree No. 82/2018), in the scope of Annex 1 to Decree No. 82/2018 Coll., All IT systems used in the SMR Temelín NPP design will be assessed. Individual effect matrices according to Annex I of Decree No. 82/2018 Coll., will be modified (specified) according to the decree recommendations for use in the nuclear industry specifically for use in IT systems of the SMR Temelín NPP. The aim of the specification of individual matrices for asset assessment is to modify the terminology which must meet the terms established in the nuclear industry and to set up the specific requirements for the protection of the respective assets.

B.I.6.2.2.5. Requirements for Abnormal Radiation Occurrence Management

Abnormal radiation occurrence management according to the Atomic Act means a system of processes and measures to ensure the analysis and assessment of an abnormal radiation occurrence, which is an analysis of considered abnormal radiation occurrence assessment of their effects, preparedness for response to an abnormal radiation occurrence, responses to an abnormal radiation occurrence and remedy of the state after a radiation accident. The term abnormal radiation occurrence is understood to mean an event which leads or could lead to exposure limits being exceeded and which requires measures that would prevent them being exceeded or the situation deteriorating from the point of view of securing radiation protection. Details to ensure management of an abnormal radiation occurrence are provided by Decree No. 359/2016 Coll., on details to ensure abnormal radiation occurrence management, as amended, which in particular regulates:

- rules for classifying a nuclear facility, workplace with a source of ionising radiation or activities as part of exposure situations under the category of threat,
- detailed rules for performing an analysis and assessment of an abnormal radiation occurrence,
- Processes and measures for securing preparedness for response to the abnormal radiation occurrence,
- method and frequency of verifying the internal emergency plan, national radiation emergency plan, deployment instructions and emergency rules and functionality of technical means,
- scope and method of remedying the state after a radiation accident.

circumstances in which exposure of natural persons or the environment to ionising radiation or their contamination with a radioactive substance may occur are known as an exposure situation.

An exposure situation is:

- a scheduled exposure situation which is connected with the intentional use of the source of ionising radiation,
- an accidental exposure situation which may occur during a scheduled exposure situation or be induced by an accidental act and requires the adoption of immediate measures to avert or limit the consequences, or
- an existing exposure situation, which already exists at a time when it is decided how to regulate it including a long-lasting consequence of the accidental exposure situation or terminated activity as part of the scheduled exposure situation.

When deciding about introducing preventive measures in an accidental exposure situation, the facts will be taken into account affecting the feasibility of the preventive measures, size of exposure of natural persons which would be averted by introducing a preventive measure and also the consequences of the introduced preventive measures according to the criteria that are set out in SÚJB Decree No. 422/2016 Coll., on radiation protection and securing of a radionuclide source.

Following that, it is the obligation of the licence holder to also ensure the so-called preparedness to respond which is understood as a set of organisational, technical, material and staff measures prepared according to the probable course of an abnormal radiation occurrence to avert or mitigate its effects and developed in the form of deployment instructions, internal emergency plan, emergency rules, a plan to perform rescue and disposal work in the vicinity of the source of the threat and national radiation emergency plan.

The requirements for the above-mentioned measures, their preparation and approval, including organisational assurance, processes and technical requirements are provided in particular in Act No. 263/2016 Coll., the Atomic Act, as amended, and in related implementing decrees, particularly Decree No. 359/2016 Coll., on details to ensure abnormal radiation occurrence management, Decree No. 329/2017 Coll., on requirements for the design of a nuclear facility, Decree No. 360/2016 Coll., on radiation situation monitoring, Decree No. 422/2016 Coll., on radiation protection and securing of a radionuclide source, and then in Act No. 239/2000 Coll., on the Integrated Rescue System or Act No. 240/2000 Coll., on Crisis Management, always as amended.

B.I.6.3. Specific Data of the Project

This chapter describes specific data and requirements related to the new nuclear source of SMR at the Temelín site.

B.I.6.3.1. Basic Safety Data

The SMR Temelín NPP design will be designed so that fulfilment of the basic safety objectives will be secured in accordance with the requirements of SÚJB and the recommendations of WENRA AND IAEA for new power plants.

The basic safety objective is to protect persons, society and the environment against adverse effects of ionising radiation.

To meet this objective, the basic safety requirements should be continuously met:
- Prevent uncontrolled exposure of persons and leakage of radioactive substances into the environment.
- Minimise a level of the probability of occurrence of events that could lead to loss of control over the reactor core, the fission chain reaction, the radioactive source or any other radiation source.
- In case of occurrence of such events, to manage them so that their consequences are minimised.

Observance of the basic safety objective will be considered at all phases of the life cycle of the SMR Temelín NPP Project i.e. In its planning, location, design, production, construction, commissioning and decommissioning , including the transport of radioactive substances and disposal of radioactive waste.

The most important principles that will be applied in the SMR Temelín NPP design include:
- defence in depth,
- Safety of the design including the SKK security classification
- assessment of the safety and maintaining the integrity of the design during its lifetime.

B.I.6.3.2. Technical and Technological Solution

B.I.6.3.2.1. General Data

Small modular reactors (SMRs) are new designs of generation III+, or IV nuclear reactors whose power ranges from units of MW_e to the lower hundreds of units MW_e. SMRs use a broad spectrum of various reactor technology and a modular approach for designing key components and systems which can be produced and assembled into respective modules on site at production plants and subsequently transported and installed in the respective generating unit at the construction site.

In comparison with the existing reactors the designed structures of SMRs are generally simpler and the SMR safety concept often relies more on passive systems and the inherent safety characteristics of the reactor such as low power and operating pressure. This means that in such cases no human interference or external energy supply or the action of other forces is required to shutdown the reactor, because the passive systems rely on physical phenomena such as natural circulation, convection and gravitation. These increased safety reserves in some cases eliminate or significantly reduce the potential of the dangerous leak of radioactivity into the environment in case of an accident.

SMRs also have lower demands on the amount of fuel given that refuelling of the small modular reactor unit is scheduled once in 1 to 4 years whereas the interval in current nuclear reactors is 1 to 2 years.

The basic technical data of the SMR Temelín NPP are summarised in the following points:
- the power units will be equipped with general III+ light water reactors (LWR) with a high degree of passive safety elements,
- net electrical power up to 500 $MW_{e,}$
- lifetime 60 years at least ,
- the design will comply with the legislative regulations of the Czech Republic while using the experience and recommendations of international institutions,
- the power plant will operate in the basic part of the daily-load curve and be able to provide the operator of the national grid with supporting services corresponding to primary, secondary and tertiary regulations,
- the average availability of the power unit will be greater than 90%.

The power plant supplier will be selected in the next stages of the design preparation; the 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 effects 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 following design solutions are presented as references for the SMR Temelín NPP Project:
- power plant supplier,

- BWRX-300,
- NUWARD,
- WESTINGHOUSE SMR (AP 300).

The basic data of the reference designs, based on data presented by their suppliers, are provided in the following text:

B.I.6.3.2.2. UK SMR (Rolls-Royce) Design

Preliminary Information

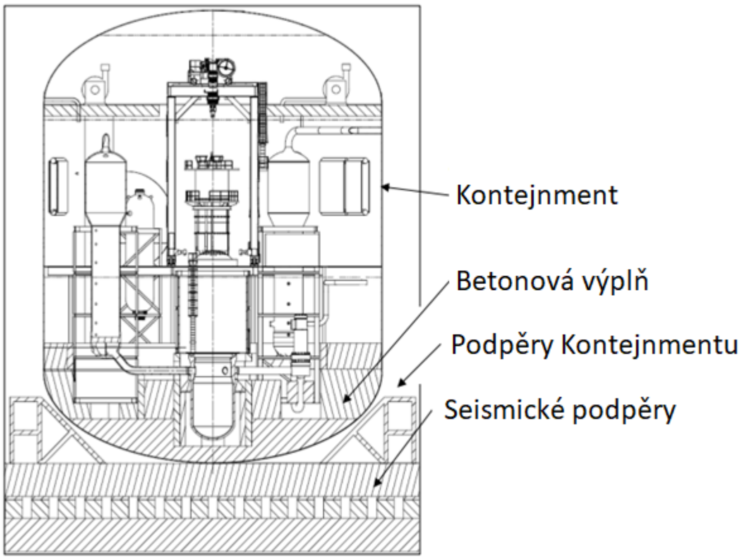
Rolls-Royce has a generation III+ SMR design based on PWR technology using a modular layout and passive systems. The design is primarily used to generate electrical power. This is a nuclear reactor cooled and moderated by pressurised light water, a double circuit triple loop layout. The scheduled electrical power is 498 MW_e. The design lifetime is 60 years with a usability coefficient of up to 92.5% at a scheduled reactor run length of 18-24 months.

No soluble absorber in the form of boric acid is used in order to limit the occurrence of tritium, but only control clusters and a burnable absorber. The primary circuit (I.O.) is enclosed in an inner steel containment which in turn is sealed with safety systems inside an outer envelope that protects the device from external hazards.

Table B.3: Basic Parameters of the UK SMR (Rolls-Royce) Design

Reactor type	PWR
Power [MW_e/MW_t]	498/1358
Usability coefficient [%]	92.5
SMR lifetime [year]	60
Fuel	UO_2 in 17x17 array
Reactor run length [month]	18 - 24
Number of loops	3
Design basis earthquake [g]	0.3
Passive safety systems	Yes
Load capacity	50-100%, 3-5% /min

Fig. B.11: Cross section of the RR SMR Containment



Kontejnment	Containment
Betonová výplň	Concrete filling
Podpěry Kontejnmentu	Containment supports
Seismické podpěry	Seismic supports

Nuclear Part

Fuel

The fuel is in the form of <5 % enriched UO_2 pellets, with zirconium cladding in a square 17x17 array. The fuel pellets are arranged in 264 fuel rods in an array of a 2.8 m long fuel assembly. The reactor core (AZ) contains 121 fuel assemblies. The scheduled fuel producer is WEC UK. The fuel will be based on the experience of already used fuel in PWR reactors. After refuelling the used nuclear fuel is stored for 6 years in a spent fuel pool placed inside an air-tight containment.

Main Components

The power of the reactor is controlled by the sliding in and out of 89 control clusters (cluster rods), that can be controlled together or in groups. The clusters are used not just to control the power, but also for emergency shutdown of the reactor and thanks to their high number they ensure safe shutdown even if the thickest cluster does not slide in.

The cooling of the reactor core (AZ) is based on a loop layout, but unlike the traditional PWR coolant the reactor core (AZ) does not contain boron. The boron-free mode significantly reduces the requirements of the device for the adjustment of the coolant, the reactor's chemical control and the potential occurrence of radioactive waste. Water is used as the reactor core (AZ) coolant which is fed using the main circulation pumps between the reactor core (AZ) and the steam generator (SG). The pressure of the primary circuit is maintained using one of the pressurisers connected to the hot legs of one of the loops

Vertical U-tube steam generators are used to transfer the heat from the primary circuit to secondary circuit (II.O). Each of the 3 steam generators has a power capacity of 453 MW_t and generates saturated steam that drives the turbine. In addition, the structure contains an integral preheater ensuring higher thermal efficiency compared to the conventional layout. The steam generators are placed asymmetrically around the reactor pressure vessel to ensure convenient access to the integral pressure vessel head.

The main circulation pump is a single-stage centrifugal pump is designed as a sealless pump, so there is no need for any auxiliary systems thus eliminating any problems and increasing operational reliability. Each pump is equipped with a flywheel which prolongs the pump run-down time in case of loss of electricity and ensures the sufficient coolant flow through the reactor core before the emergency reactor shutdown system flow rate of the coolant is triggered. The pumps are equipped with a frequency converter for the regulation of the revolutions during heatup.

A pressuriser is connected to one hot loop to pressurise the coolant volume changes of the primary circuit during changes in power. This is a vertical cylindrical vessel with a system of electrical heaters and a spray system to maintain the balance between the coolant steam and water component. The pressuriser is equipped with a system of safety valves which open in case of the overpressurisation of the primary circuit and reduce the by releasing the coolant into the containment area.

Non-nuclear Part

The design uses one turbine generator (TG). Steam for the turbine is fed through a pipeline from 3 vertical U-tube steam generators (SG). In tube SGs the coolant is fed from the primary circuit which heats feed water of the secondary circuit to the saturation limit and generates steam which passes through a pair of regulatory valves on the high pressure (VT) part of the TG that also meets the fast closing function. The TG contains a double flow high pressure part and a low pressure part. To reduce the erosive stress of the low pressure (NP) part the steam emerging from the high pressure (VP) part is fed to the steam separator reheater (SPP) where it is reheated and the steam is discharged. At the outlet from the NP part the steam transfers the condensation heat in the main condensers to the circulation cooling water system which using the cooling circuit circulation pumps transfers it to an ultimate heat sink.

The condensate is fed by condensate pumps through 4 low-pressure heaters to a feed-water tank, which creates an adequate supply of degassed condensate that is fed by feed-water pumps under pressure through 2 high-pressure heaters back to the SG. The steam for the heaters is taken from unregulated TG bleeds. 3 condensate pumps operate in a 2+1 mode and each provides sufficient water for 50% nominal output. 4 condensate pumps operate in a 3+1 mode and each provides sufficient water for 33% of nominal output. Two auxiliary feed-water pumps serve as a backup for non-performing states.

The design efficiency of the RC cycle is 34.6% with electrical power on the generator terminals of 498 MW_e. After deduction of the plant's home consumption 470 MW_e will be supplied to the network. There will be a two position generator with a rotor revolution speed of 3000 min^{-1}.

Three phases with a voltage of 11 kV will be fed from the generator to off-site high voltage service transformers that convert the voltage to 400 kV and feed power further to the external network. The plant's home consumption loads (about 30 MW) are fed from the generator by on-site service transformers of internal load. These can be fed from an external network in case the generator is disconnected. The contracting authority's requirement is a possible standby feed line which, however, is not required in terms of nuclear safety. If there is loss of offsite power (LOOP), 2 diesel generator stations (DGS) and a battery system will provide an emergency power (LOOP)source.

Containment and Safety Systems

Defence in depth using a fuel matrix and cladding, pressure interface of the primary circuit (I.O.) and 2 protective envelopes are used to prevent a leak of radioactive substances into the environment. The pressurised water reactor vessel and primary circuit is located inside a metal containment. This together with the system of storage, inspection and fuel refuelling, the main control room, inspection and control safety systems, wiring and instrumentation are installed in the outer protective envelope. Emergency shutdown systems and their diverse design, systems for passive residual heat removal and emergency core cooling are also installed here.

The reactor is shutdown by control rods which in case of the loss of power supply will by gravity feed slide into the reactor core (AZ) and stop a fission chain reaction. This function has 2 redundant systems for preventing a false action due to a simple fault. The diverse reactor shutdown occurs by injecting a liquid absorber of potassium tetraborate. The emergency boron injection system has dual redundancy.

In case of a design accident when it is not possible to remove residual heat from the reactor core (AZ) in the normal way through the steam generators, the main condenser and circulation cooling water system, the redundant core (AZ) cooling and passive residual heat removal systems are used.

The emergency core (AZ) cooling is a passive system which ensures protection against a loss of coolant accident (LOCA). In case of need the primary circuit is immediately depressurised into the area of the inner containment by a safety valve system on the head of the pressuriser. After depressurising, 3 hydro accumulators with coolant are introduced, which are connected to the circulation loops and a water pool, which will cover the reactor area and the vaults around the pressure vessel. This subsequently results in natural circulation which removes the heat through 3 local passive condensers to an ultimate heat sink.

If the secondary circuit cannot be used, but the primary circuit is not damaged, the passive residual heat removal system can be utilised which uses natural circulation that removes the heat from the reactor core (AZ) to the SG and then to the passive condensers located in the water reservoirs. The layout allows the removal of residual heat without the need of intervention by operating staff for up to 72 hours.

B.I.6.3.2.3. BWRX-300 (GE-Hitachi) Design

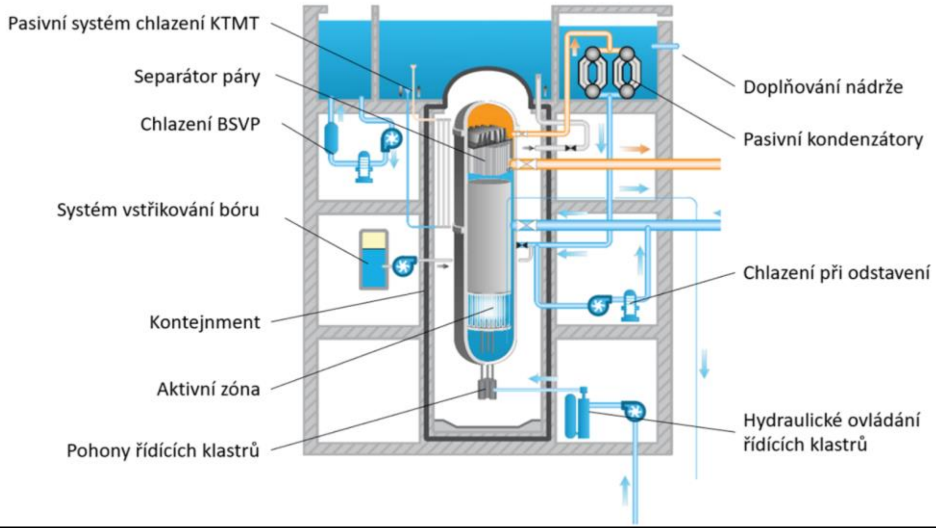
Preliminary Information

GE Hitachi has a generation III+ SMR design based on BWR technology using a modular layout and passive systems. The design is primarily used for generating electrical power and builds on the previous licence of the new series of ESBWR boiling water reactors. This is a nuclear reactor cooled and moderated by pressurised light water, single circuit with an integral layout. The scheduled electrical power is 300 MW_e. The design lifetime is 60 years with a usability coefficient of up to 95% at a scheduled reactor run length of 12 - 24 months. Unlike standard BWR reactors it does not use circulation pumps for the flow of core cooling water, but natural circulation is used instead. As a result, it is not possible to control the power by flow as in conventional BWRs.

Table B.4: Basic Parameters of the BWRX-300 (GE-Hitachi) Design

Reactor type	BWR
Power [MW_e/MW_t]	300/870
Usability coefficient [%]	95
SMR lifetime [year]	60
Fuel	UO_2 in 10x10 array
Reactor run length [month]	12 - 24
Number of loops	3
Design basis earthquake [g]	0.3
Passive safety systems	Yes
Load capacity	50-100%, 0.5% /min

Fig. B.12: Cross section of the BWRX-300 Containment



Pasivní systém chlazení KTMT	Passive containment (KTMT) cooling system
Separátor páry	Steam separator
Chlazení BSVP	Spent fuel storage pool (BSVP) cooling
Systém vstřikování bóru	Boron injection system
Kontejnment	Containment
Aktivní zóna	Reactor core
Pohony řídících klastrů	Control cluster drives
Doplňování nádrže	Tank refilling
Pasivní kondenzátory	Passive condensers
Chlazení při odstavení	Shutdown cooling
Hydraulické ovládání řídících klastrů	Hydraulic control cluster controls

Nuclear Part

Fuel

The fuel is based on the design of the standard GE fuel design used in operated BWRs. This is low enriched UO_2 with enrichment of about 4% in a square 10x10 array. The fuel assemblies contain 78 fuel rods with full-length zirconium cladding, 14 rods of shortened length and two central flow channels for better flow of the coolant through the assembly. The reactor core contains 240 fuel assemblies.

Main Components

Unlike PWR type reactors, the control clusters in BWR reactors are slid in from below due to the vaporisation of the primary water and instrumentation for separation in the top part of the pressure vessel. The drives of the control clusters are driven by an electric motor for normal power regulation. In case of the need for emergency reactor shutdown, the clusters are injected into the reactor core (AZ) using a hydro-pneumatic mechanism. If the highly unlikely failure of the emergency reactor shutdown system using the clusters, it is possible to shutdown the reactor by a diverse boron injection system.

The coolant in the reactor core (AZ) is not mixed and circulated by pumps as is the case in conventional BWR type reactors, but natural circulation is used. This is enhanced thanks to the extension of the pressure vessel between the reactor core (AZ) and separation system on top of the pressure vessel. The separation and drying system separate the water drops from the steamline mixture before the inlet to the high pressure part of the turbine.

At the outlet of steam from the reactor pressure vessel the steam passes through the fast-acting valves, which immediately isolates the reactor pressure vessel and prevents coolant loss in case of breach of the pipelines.

During the operation the reactor fuel and coolant ratio is sub-moderated and negative feedback coefficients are ensured from the coolant and fuel. However, in shutdown states the density of the coolant increases and this condition ceases to apply. In forced circulation thanks to the work of the pumps the primary circuit can be heated before reaching minimum stabilised critical state (MSKS) which in natural circulation is not possible without further auxiliary systems.

Steam from the reactor is fed through the separator to the turbine. In an active media there is greater emphasis on measuring activity and leakage to non-nuclear parts. Power is controlled from the reactor to the turbine when the movement of the control clusters changes the reactor power which causes a change in pressure and subsequently the regulatory valves on the turbine regulate the flow of the steam and restore the pressure initial pressure in the reactor.

Non-nuclear Part

For the BWR type the steam for the TG is generated directly in the reactor and there is no SG installed here which would separate the active and non-active medium. For this reason, greater emphasis is placed on tightness and radiation safety in the turbine building. As part of the radioactive components in the steam the turbine part also has shielding and there could be contamination of the pipework, valves and other parts of the activated products. To create the required dryness of the steam entering the turbine, a humidity separator is installed in the top part of the reactor vessel. Steam on high pressure part expands then the humidity is separated from it, reheated and enters the 2 low pressure parts. After expanding in the low pressure parts the steam transfers condensation heat in the main condensers to the circulation cooling water system which removes the heat to the ultimate heat sink.

The condensate is fed through 3 low-pressure heaters by condensate pumps for suction of feed-water pumps and then fed under pressure through 3 high-pressure heaters back to the reactor. The steam for the heaters is removed from unregulated TG bleeds and each heater is not only used for heating, but also for sufficient degasification of the coolant. 2 condensate pumps operate in a 1+1 mode and each pump provides sufficient water for 100% nominal output. 2 feed-water pumps operate in a 1+1 mode and each provides sufficient coolant for 100% of nominal output.

The calculated RC cycle efficiency is 34.5% with electrical power on the generator terminals of 300 MW_e and after deduction of the plant's home consumption 270 - 290 Mwe_e is supplied to the network. The generator is two pole, 3-phase and operates with nominal revolutions of 3000 min^{-1}.

The output voltage from the generator is 3-phase with 21 kV voltage, converted to 400 kV in offsite high voltage service transformers and further fed to the external network. The power plant's home consumption ranges from 10 to 30 MW_e. This is nominally provided either from the generator or the external network. A back-up source of normal supply is possible in the design at the contracting authority's request. If there is loss of offsite power (LOOP) 2 redundant diesel generator stations (DGS) are used as an emergency source which autonomously supply power for the system for up to 7 days and a diverse battery source for feeding selected and monitoring equipment.

Containment and Safety Systems

Defence in depth using a fuel matrix and cladding, pressure interface of the circuit and containment is used to prevent a leak of radioactive substances into the environment. The containment is equipped with fast-acting valves in case of the need to isolate and prevent the spread of radioactive substances. The containment also provides protection of the reactor pressure vessel against external hazards.

The reactor is shutdown by control rods which in case of need are hydraulically injected from below the reactor core (AZ) and stops a fission chain reaction. The diverse reactor shutdown takes place using the boric acid injection system which is located in the nuclear part outside the containment.

For a loss of coolant accident (LOCA) the BWRX-300 use redundant fast-acting valves which immediately isolate the reactor vessel and prevent the leakage of coolant from the reactor core (AZ). These valves are designed directly on the reactor vessel as compared to older generations which had valves mounted on the pipelines. This solution is to minimise a loss of coolant accident (LOCA) given that the probability of a leak on the reactor pressure vessel is lower than on the pipelines.

Residual heat after an emergency shutdown is removed by passive cooling loops which remove the heat from the reactor into passive condensers. These are found in the pool and remove heat by evaporation into the atmosphere. The system has a 3x100% redundancy and is put into operation by the opening of one fast-acting valve.

B.I.6.3.2.4. NUWARD (EDF) Design

Preliminary Information

EDF has a generation III+ SMR design based on PWR technology using a modular layout and passive systems. The design primarily serves to generate electrical power. The concept includes 2 modules in one unit, which are cooled and moderated by light water. It has an integral layout and each module has its own turbine. The power is scheduled for 2x170 MW_e. The design lifetime is 60 years with a usability coefficient of 90% at a scheduled reactor run length of 24 months.

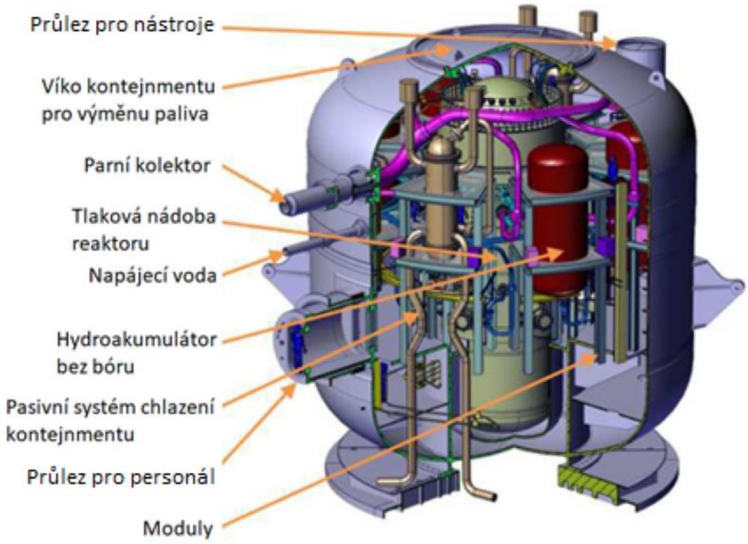
No soluble absorber in the form of boric acid is used in order to limit the occurrence of tritium, but only control clusters and a burnable absorber. The primary circuit (I.O.) is enclosed in an inner steel containment which in turn is sealed with safety systems in an outer envelope that protects the device from external hazards.

Table B.5: Basic Parameters of the NUWARD Design

Reactor type	PWR
Power [MW_e/MW_t]	2x170/2x540
Usability coefficient [%]	90
SMR lifetime [year]	60

Fuel	UO_2 in 17x17 array
Reactor run length [month]	24
Number of loops	Integral
Design basis earthquake [g]	0.3
Passive safety systems	Yes
Load capacity	50-100%, 0.5% /min

Fig. B.13: Cross section of the Inner NUWARD Containment



Průlez pro nástroje	Hatch for instruments
Víko kontejnmentu pro výměnu paliva	Head of the containment for refuelling
Parní kolektor	Steam collector
Tlaková nádoba reaktoru	Reactor pressure vessel
Napájecí voda	Feed water
Hydroakumulátor bez bóru	Boron-free hydro accumulator
Pasivní systém chlazení kontejnmentu	Passive containment cooling system
Průlez pro personál	Hatch for staff
Moduly	Modules

Nuclear Part

Fuel

The fuel is in the form of pellets with zirconium cladding in a square and low enrichment of UO_2 up to 5% in a square 17x17 array, according to a proven design used in operated PWRs. The pellets are placed in fuel rods in an array of fuel assemblies. 76 fuel assemblies are used in the reactor core (AZ) and apart from the fuel they also consist of flow channels for better flow of the coolant. The fuel supplier is Framatome.

Main Components

The power of the reactor is controlled by the sliding in and out of control clusters (cluster rods), that can be controlled together or in groups. The clusters serve not just to control the power, but also for reactor emergency shutdown. Thanks to the integral solution, it is not possible for control rods to inject out given that their drives are found directly inside the reactor pressure vessel (RPV).

The reactor core (AZ) is cooled by force circulation which removes the heated coolant into the steam generator (SG) where the evaporation heat is transferred to the secondary circuit's feed water. As well as the reactor core (AZ), there are 8 SGs (2 safety and 6 operational), 6 main circulation pumps and pressurisers used to control pressure in the primary circuit. The reactor pressure vessel is installed in the steel inner containment which is part of the passive cooling system and is installed in a water reservoir.

The integral layout of all the main primary circuit components in the reactor pressure vessel not only lower the amount of welded conduits and therefore any leaks or faults in stressed joints, but also increase quality control during the generation process.

Each module uses 6 compact SGs to generate saturated steam which are found directly in the reactor removing the need of primary loops. According to EDF the SGs have high thermal efficiency and a high thermal power to volume ratio, which facilitates compact construction. Apart from normal core cooling, a passive safety cooling system is used for faults operated by 2 independent 2 integrated SGs.

Non-nuclear Part

The design used one TG for each reactor. The steam for the turbine is fed by a conduit from 6 integral compact panel SGs where there is water from the primary circuit which heats the feed water of the secondary circuit to the saturation limit and generates steam, which then enters the turbine building which will contain 2 separate turbogenerators. The calculated RC cycle efficiency is 32% with electrical power on the generator terminals of 170 MW_e.

The offsite power transmission design is flexible and can be changed according to the network requirements. In the current design solution 3 phases are fed from a generator with a voltage of 21 kV to transformers that convert the voltage to 230 kV. Power is fed from the transformers to the external network and to the power plant's home consumption (approx. 30 MW_e). The power plant's home consumption is supplied either from the generator or from the external network and also has back-up offsite power transmission from 2 modules through longitudinal couplings which can be pinned together if required. If there is a LOOP, a DGS and battery system is used as a safety backup which autonomously supplies power for safety and monitoring systems for up to 72 hours.

Containment and Safety Systems

Defence in depth by a fuel matrix and cladding, a pressure interface of the primary circuit and an inner and outer protective envelope (containment) are used to prevent a leak of radioactive substances into the environment. A big supply of water, thanks to tanks which are installed in the inner containment modules and a spent fuel storage pool located between both modules contribute to increased safety. The reactor pressure vessel and safety systems are located in the inner metal containment. The layout allows the removal of residual heat without the need of intervention by operating staff for up to 72 hours.

The reactor is shutdown by control rods which, in case of the losses of power supply of the drives will by gravity feed slide into the reactor core (AZ) and stop a fission chain reaction. The diverse reactor shutdown takes place using a high-pressure injection of boric acid.

Apart from the active cooling system, the design contains a passive safety cooling system consisting of 2 independent routes where each contains 1 safety integral steam generator and 1 condenser in an inner containment that removes heat to an outer pool used as the ultimate heat sink. Each route is equipped with one valve which puts the system into operation.

To mitigate a LOCA type of event, the maximum diameter of the conduits connected to the reactor pressure vessel is 30 mm. The emergency core cooling is a passive system providing protection against a LOCA incident and extended emergency conditions during which access is applied to the core molten material cooling in the reactor pressure vessel. To reduce the pressure in the primary circuit, a system of safety valves is used to depressurise the primary circuit. If there is a loss of coolant and drop of pressure, a system of hydro accumulators with a supply of coolant is triggered to cover the reactor core (AZ) with coolant. The passive system is used for heat removal by covering the inner area of the steel containment and reactor pressure vessel. Then the natural circulation is activated and the heat by condensation on the walls of the inner containment is removed to an adjacent water reservoir.

B.I.6.3.2.5. WESTINGHOUSE SMR (AP300) Design

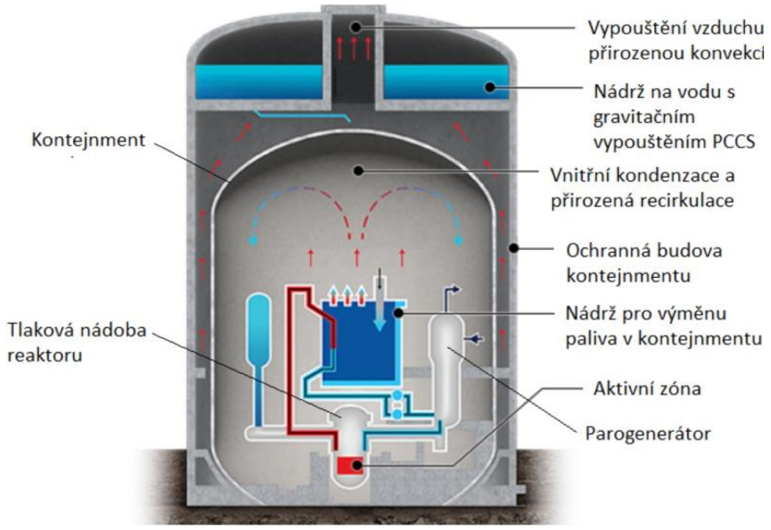
Preliminary Information

Westinghouse has a III+ SMR generation design, a small AP300 modular reactor based on a design already operated in AP1000 nuclear power plants and combines, for example, a design of passive safety systems or some primary circuit components. (Main circulation pump, pressuriser,...). The design primarily serves to generate electrical power. This is a nuclear reactor cooled and moderated by pressurised light water, a double circuit with a single loop. The scheduled electrical power is 330 MW_e. The design lifetime is 80 years with a usability coefficient of 90% at a scheduled reactor run length of up to 48 months.

Table B.6: Basic Parameters of the WESTINGHOUSE SMR (AP300) Design

Reactor type	PWR
Power [MW_e/MW_t]	330/990
Usability coefficient [%]	92.5
SMR lifetime [year]	80
Fuel	UO_2 in 17x17 array
Reactor run length [month]	up to 48
Number of loops	1
Design basis earthquake [g]	0.3
Passive safety systems	Yes
Load capacity	20-100%, 5% /min

Fig. B.14: Cross section of the AP300 Containment



Kontejnment	Containment
Tlaková nádoba reaktoru	Reactor pressure vessel
Vypouštění vzduchu přirozenou konvekci	Natural convection air discharge
Nádrž na vodu s gravitačním vypouštěním PCCS	Water reservoir with gravity discharge or passive core cooling system (PCCS)
Vnitřní kondenzace a přirozená recirkulace	Internal condensation and natural recirculation
Ochranná budova kontejnmentu	Reactor containment building
Nádrž pro výměnu paliva v kontejnmentu	Containment refuelling storage tank
Aktivní zóna	Reactor core
Parogenerátor	Steam generator

Nuclear Part

Fuel

The fuel is in the form of pellets with zirconium cladding with low enriched UO_2 up to 5% with the considered option of increasing enrichment up to 7% in a square 17x17 array based on the AP1000 fuel design. A greater supply of reactivity is required for a longer run length which needs to be pressurised at the start of the run time.. A combination of boric acid, burnable absorber and so-called “grey” control rods are used for the AP300 which are used to correct the axial neutron flux. The fuel pellets are arranged in 264 fuel rods which make up a fuel assembly. The reactor core (AZ) in 121 fuel assemblies. The scheduled fuel producer is WEC. The fuel will be based on the experience of already used fuel in PWR reactors. After refuelling, the used nuclear fuel is stored in a spent fuel pool, which is part of the fuel refuelling pool and is located inside the airtight containment.

Main Components

The power of the reactor is controlled by the sliding in and out of 105 control clusters (cluster rods), that can be controlled together or in groups. The design has 53 drives where 52 will always drive 2 clusters simultaneously. The clusters serve not just to control the power, but also for emergency shutdown of the reactor and thanks to their high number they ensure safe shutdown even if the thickest cluster does not slide in.

The core cooling is based on a loop layout. The design contains only one loop which contains 2 cold legs and one hot one. Each has one main circulation pump which provides forced circulation between the reactor core (AZ) and steam generator (SG). The heated coolant is fed by the hot leg into a vertical U-tube steam generator, which transfers the evaporation heat to the feed water of the secondary circuit. The pressure of the primary circuit is maintained by a pressuriser connected to the hot loop leg.

The steam generator design is based on the steam generators operated on the AP1000 with the necessary modification for the new design. The water of the primary circuit enters the tube plate of the U-tube steam generator and transfers the evaporation heat to the feed water of the secondary circuit, which is evaporated. The steam line mixture enters the centrifugal humidity separator where most of the water phase is removed and flows back into the steam generator and the team part of enters the secondary separator where the remaining humidity is removed and the saturated steam continues to the high pressure part of the turbine.

The 2 main circulation pump are sealless electric pumps. Each pump is equipped with a flywheel which prolongs the pump run-down time in case of loss of electricity and ensures the sufficient cooling water flow through the reactor core before the emergency reactor shutdown system flow is triggered. The pumps are integrally connected to the bottom of the steam generator with motors underneath.

A pressuriser is connected to a hot loop to pressurise the coolant volume changes of the primary circuit during changes in power. This is a vertical cylindrical vessel with a system of electrical heaters and a spray system to maintain the balance between the coolant steam and water component in the pressuriser. The large dimensions of the pressuriser help to smoothly compensate for the pressure changes in the primary circuit and lower the demand on immediate staff response in case of sudden pressure changes.

Non-nuclear Part

The design uses one steam generator from which steam is fed to one TG. In tube plates the coolant is fed from the primary circuit which heats feed water of the secondary circuit to the saturation limit and generates steam which passes through a pair of regulatory valves on the high pressure (VT) part of the TG that also meets the fast closing function. The TG contains a double flow high pressure part and a low pressure part. To reduce the erosive stress of the low pressure (NT) part the steam emerging from the high pressure part is fed to the steam separator reheater (SPP) where it is reheated and the steam is removed. At the outlet from the NT part the steam transfers condensation heat in the main condenser to the circulation cooling water system which removes the heat to the ultimate heat sink.

Using condensation pumps, the condensate is fed through 4 low-pressure heaters to the feed-water tank. After degasification, the condensate is fed using the feed-water pumps through a high-pressure heater to the steam generator.

The RC cycle efficiency is 33% with electrical power on the generator terminals of 330 MW_e and after deduction of the plant's home consumption 300 MW_e will be supplied to the network. The preliminary design is a four-pole generator with a rotor revolution speed of 1500 min^{-1}.

3 phases are fed with a voltage of 26 kV to transformers that convert the voltage to 400 kV. Power is fed from the transformers to the external network and to the power plant's home consumption (approx. 30 MW_e). The power plant's home consumption is provided either from the generator or the external network. In case of maintenance or faults of the main normal feed line, a back-up reserve line is ensured from the external network, which, however, is not necessary in terms of nuclear safety. If a LOOP event occurs, the design has as backup 2 redundant DGS, which autonomously supply power for the systems for up to 7 days and a diverse battery source for supplying selected and monitoring devices.

Containment and Safety Systems

Defence in depth using a fuel matrix and cladding, pressure interface of the primary circuit (I.O.) and containment which contains the primary circuit with the reactor pressure vessel, are used to prevent a leak of radioactive substances into the environment. The containment is based on an open steel inner containment structure and an outer protective envelope which is used on already operated AP1000 type power plants. Its task is to prevent the spread of radioactive substances into the environment and to protect the primary circuit from external influences.

The reactor is shutdown by control rods which, in case of the losses of power supply of the drives will by gravity feed slide into the reactor core (AZ) and stop a fission chain reaction. The diverse reactor shutdown takes place using the high pressure boric acid injection system which is located outside the containment.

In case of a design accident when it is not possible to remove decay heat from the reactor core (AZ) in the normal way through the steam generators, the main condenser and circulation cooling water system, the passive decay heat removal system is used. The passive exchanger is located in the refuelling pool and removes the decay heat from the reactor core (AZ) to the pool coolant, which using ventilation routes removes the steam to the containment area from where the heat is then removed through the containment wall to the ultimate heat sink.

In case of a LOCA event the cooling of the reactor core (AZ) is based on the principle of emptying the refuelling tank into the reactor area and the adjacent vaults, and triggering the natural recirculation inside the containment. The steam that appears by the core cooling expands and condenses on the containment walls. The containment cooling is ensure by sprinkling water from supply tanks and by outer air circulation which is passively absorbed, heated and then removed by using a vent in the upper part of the containment. The layout allows the removal of residual heat without the need of intervention by operating staff for up to 72 hours. The emerging hydrogen is removed by hydrogen recombiners inside the containment.

B.I.6.3.3. Operational Solution

B.I.6.3.3.1. Nuclear Fuel and Spent Nuclear Fuel Management

The basic commodity for operation of the new nuclear source (NJZ) is nuclear fuel. This will be purchased on the world market that has sufficient uranium raw material available for production of nuclear fuel for the assumed lifetime of the SMR.

Fresh nuclear fuel will be transported to the nuclear power plant by means of road or railway transport in casks. It will be stored in an amount taking into account the need of the nearest regular shutdowns of the nuclear units for refuelling depending on the selected fuel cycle, with a necessary reserve. The fresh fuel store will be placed in fresh fuel storage which will include facilities for an initial fuel check, for it safe storage as well as for the necessary handling of fuel upon its receipt and upon its transport for refuelling to the reactor.

Considering that changes in fuel properties in terms of fission reaction use effectiveness occur during use of fuel in the reactor, it is necessary to replace fuel assemblies with new/fresh assemblies after several years of use. Used fuel assemblies in the reactor are usually replaced in cycles during an operational shutdown (reference SMR designs state possible refuelling every 12 - 48 months). The fuel in the reactor is not replaced all at once, but usually during the shutdown only part of the fuel is replaced and part of the fuel assemblies change their location in the reactor core. Thus, all the fuel assemblies are gradually fully replaced over several years.

Nuclear fuel is considered to be spent in case that its reloading to the reactor core from the spent nuclear fuel storage pool is no longer assumed. After having been removed from the reactor, spent nuclear fuel will be moved to the spent nuclear fuel storage pool. This can be situated either next to the reactor in the reactor containment hall or in the auxiliary fuel storage building. Fuel will be stored in the pool in a compact grid that contains integrated material for absorption of neutrons, and under a sufficient layer of water which may contain boric acid. This ensures a sufficient degree of subcriticality and heat removal resulting from decay of radionuclides present in spent nuclear fuel.

SMR technology makes it possible to store spent nuclear fuel for 4 to 10 years. After this time, the spent fuel will be placed in new spent nuclear fuel storage, which will be built at the SMR site or at the existing Temelín NPP 1,2 site, or at another selected site. This storage is not the subject of the Project (according to Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended, as amended, it is a separate project subject to assessment), and it will be built when required while taking into account the current state of knowledge and technical level of the storage at the time of its preparation.

B.I.6.3.3.2. Radioactive Waste Management

The principles for radioactive waste (RAO) will be the same for the SMR Temelín NPP as for the existing nuclear source. According to the Atomic Act, radioactive waste are defined as “materials, objects or facilities containing or contaminated by radionuclides, for which no further use is foreseen” and includes gaseous, liquid and solid RAO. The requirements for safe RAO management contains Decree No. 377/2016 Coll., on the requirements for the safe management of radioactive waste and on the decommissioning of nuclear installations or category III or IV workplaces,, as amended.

Gaseous RAO will be formed at the SMR Temelín NPP above all through the radiolysis of the primary circuit coolant in the reactor or formed as gaseous fission products. They will have dust and humidity and radioactive aerosols removed and retain in the retention line system where their activity will decreased with natural decay. Then in a controlled manner they will be discharged into the atmosphere as effluents based on the authorised limits.

Liquid RAO will form above all when cleaning the primary circuit coolant during which its mechanical impurities will be removed and it will be deionised. Another source of liquid radioactive waste can be decontamination activities, contaminated clothing laundries, showering facilities etc. Liquid waste will subsequently be thickened, which makes it possible to reuse recleaned inactive parts of the coolant and part of the chemicals in the primary circuit. Saturated ionex resins used to clean the technological circuits, concentrates resulting from the thickening of liquid radioactive waste and radioactive sludge will, before further management (e.g. compaction), be stored in appropriate property tanks. Liquid effluent will be discharged into a watercourse in a controlled manner based on authorised limits.

Solid radioactive waste will represent spent radioactive filters of all kinds, activated or contaminated parts of technology replaced during maintenance works and contaminated materials coming from the controlled zone. Solid waste will be collected at collection points, sorted in terms of activity and a method of their later management (for example combustible, compressible, incombustible, incompressible). Before further management, solid radioactive waste will be stored in casks and/or shielded storage chambers.

After having been finally treated, radioactive waste will be stored in radioactive waste storage. The preparation, construction and operation of radioactive waste storage is in the competence of SÚRAO.

B.I.6.3.3.3. Conventional Waste Management

Conventional waste formed during the operation of the SMR Temelín NPP will be transferred to authorised entities which will recycle or dispose of the waste under contract. Waste will be managed in the same way at Temelín NPP 1,2 according to Act No. 541/2020 Coll., on Waste, as amended.

B.I.6.3.3.4. Water Management Connections and Systems

The SMR Temelín NPP will be equipped with water supply systems and treatment systems and waste and precipitation water treatment and drainage systems.

Water Supply Systems

The water supply systems include a potable water system, raw water system and fire-fighting 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 will be supplied from the water connection of the existing Temelín NPP 1,2 units. In the operation phase and construction phase of the SMR Temelín NPP the existing permit and restriction of potable water offtake is adequate.

It is assumed that raw water for the SMR Temelín NPP will be supplied from the existing system of raw water offtake and feed system for the supply of the Temelín NPP 1,2 units currently in operation from the Hněvkovice water reservoir on the Vltava River. Raw water will be used to replenish losses in the SMR Temelín NPP cooling circuits, for the production of demineralised water for the operation of the SMR Temelín NPP and for the need of the fire-fighting water system. For the possible concurrent operation of Temelín NPP 1,2, the NJZ Temelín NPP design and SMR Temelín NPP design, it will be necessary to ensure the capacity of the existing raw water supply system and increase the permitted limit for raw water offtake.

The fire-fighting water system at the SMR Temelín NPP site will be independent of the system of the current Temelín NPP 1,2 and any system intended for the NJZ Temelín NPP. A constant fire-fighting water supply will be ensured at the SMR Temelín NPP site in the form of separate fire-fighting water tanks or in the form of a reserve in raw/cooling water tanks.

Waste and Precipitation Water Treatment and Drainage Systems

These include the systems for collection, treatment and drainage of industrial and sewage waters (wastewaters) and furthermore drainage of precipitation water.

A number of wastewaters of an industrial nature will be produced during the operation of the SMR Temelín NPP. These will in particular include the following industrial wastewaters:

- wastewaters from the radiation controlled zone,
- blowdown from cooling systems,
- aggressive wastewaters from water treatment systems,
- oily wastewaters.

A system of collection, treatment and drainage of industrial wastewaters, so-called industrial sewerage system, will be implemented for the need of the SMR Temelín NPP at its site. The system will be divided into subsystems according to the nature of the wastewaters. After the necessary treatment (cleaning, neutralisation, deoiling etc.), the wastewaters will be introduced into the primary circuit floor drainage tank at the SMR site and then transferred to the existing system of wastewater drainage from the Temelín NPP 1,2 site and drained through the Kořensko damping and metering object into the Vltava River. The kinetic energy in the wastewater mains is used by the Pelton Turbine. To increase production of wastewaters from Temelín NPP 1,2, the NJZ Temelín NPP and SMR Temelín NPP design, it will be necessary to ensure the capacity of the existing wastewater supply system and increase the permitted limits for wastewater discharge.

Apart from the industrial sewerage system, a sewerage system will also be built at the SMR Temelín NPP site. Treated sewage will be drained together with industrial wastewaters.

A new network of precipitation water sewerage will be built for precipitation water intended to collect, drain and treat precipitation water from the roofs of objects, roads and paved areas at the SMR Temelín NPP site. Precipitation water will be drained into a new precipitation water reservoir with regulated drainage connected to an existing ultimate sewage collector, which together with precipitation water from the Temelín NPP 1,2 and the NJZ Temelín NPP site will be drained through the existing Byšov septic tank and retention tank to the Strouha recipient stream and then to the Vltava River.

B.I.6.3.3.5. Relation to External Electrical Power Systems

The offsite power transmission of the SMR Temelín NPP is being considered to the Kočín transformer station. Offsite transmission is being considered by no more than two above ground 400 kV power lines through a corridor east of the existing corridor delineated by the Temelín NPP 1,2 power lines (3,4). Simultaneously 110 kV power lines will be extended from the Kočín transformer station underground or above ground to back up the power supply of the SMR Temelín NPP home consumption.

B.I.6.3.3.6. Traffic Connection

A SMR Temelín NPP traffic connection to the road network is expected and a connection to the railway network is also being considered. There will be a road transport link by a connection to road II/138 along the southern edge of the area for the Project location. There may be a railway transport link by the extension of the existing railway spur, which services the existing Temelín NPP 1,2. An arrival railway spur track runs from the Temelín railway station, which is situated on railway line No. 192 Čičenice - Týn nad Vltavou.

B.I.6.3.3.7. Staff Security

A maximum of 300 workers is expected for the operation and maintenance of the SMR Temelín NPP during routine operation.

B.I.6.3.4. Data of Construction

There will be civil building and construction work in areas delineated in Chapter B.I.3. Project location (page 12 of this Notification).

The main construction site will be located in the SMR area, which also represents the definition of the Project site and its permanent location. Areas F1 (in immediate vicinity to the main SMR construction site) and areas F1 and F2 (north of the Temelín NPP 1,2 site, which in an earlier period were used as a construction site equipment for its construction) are delineated for the purposes of the temporary construction site equipment. Areas G and H are further considered for the temporary extension of the construction site equipment. In the EL area (offsite power transmission corridor) construction site electrical equipment will be temporarily located (bases of masts, or work zones of underground power lines).

Arrival at the main construction site will be from road II/138, the construction site equipment areas will be serviced by the existing road network. The existing Temelín NPP 1,2 railway spur will be used as railway transport. The existing infrastructure, already prepared for the transport of oversized and heavy components for the NJZ Temelín NPP design, will be used for the transport of oversized and heavy components.

The actual organisation of construction will include the following steps:

- preparatory work,
- main civil building work,
- shared civil building assembly work,
- assembly work,
- putting into operation.

Preparatory works on the construction site above all involve the preparation and implementation of definition and security of the construction site, the material and energy supply systems, and furthermore of technological, staff and transport relations. The construction site will be equipped with necessary building and erection machinery and equipment, it is assumed that heavy mechanisation and tower cranes will be used. The actual construction will begin with overburdens, groundworks and excavation works related to the adjustment of the foundation joint and drainage of the construction site. These activities will be followed by the foundation, i.e. reinforcement and concreting of the base plate of the power unit/units and other objects and then the construction of the plant's own object.

In addition to the building activity and after its completion, there will be the gradual assembly of mechanical systems, pipework, followed by the assembly of an electrical device and control and management systems. The assembly work will end with flushing, post-assembly cleaning operations and individual device tests and gradual tests of individual subsystems and verification of their preparedness for commissioning the power unit/units.

The construction site equipment areas will be recultivated after the completion of construction.

Given the intensity of construction traffic, the SMR Temelín NPP construction works will be coordinated with further civil building activity at the site (particularly the NJZ Temelín NPP).

The expected period of construction is approx. 5 years. The total number of jobs during construction will be approx. 1500.

B.I.6.3.5. Data of Closure and Decommissioning

Closure and decommissioning of the SMR Temelín NPP will be in accordance with applicable legislation. According to Act No. 263/2016 Coll., the Atomic Act, as amended, decommissioning means "the administrative and technical activities aimed at complete decommissioning or decommissioning of a nuclear installation, a category III workplace or a category IV workplace with restrictions on its use for other activities related to the use of nuclear power or activities in exposure situations". Complete decommissioning means "putting a nuclear installation, a category III workplace or a category IV workplace into a state that allows its use for another purpose or use of the area where it was located without restrictions".

The SMR Temelín NPP will be decommissioned based on approved documentation, submitted to SÚJB together with an application for the relevant licence for individual stages of decommissioning. The submitted documentation for licensed activity which is decommissioning is prescribed by Annex No. 1 of the Atomic Act. The content of the documents of the Safe Operation Termination Concept and the Decommissioning Plan is specified in SÚJB Decree No. 377/2016 Coll., on the requirements for the safe management of radioactive waste and on the decommissioning of nuclear installations or category III or IV workplaces, as amended. These draft documents will be based on the current knowledge of technologies and processes appropriate for decommissioning, IAEA recommendations and applicable Czech legislation. In future there will certainly be a development of knowledge, technical equipment and possibilities of assessing experience gained from decommissioning generation I and II nuclear units. This information will be applied to specifying and updating the Safe Operation Termination Concept and the Decommissioning Plan during the entire process of the preparation, implementation, commissioning of the new nuclear source.

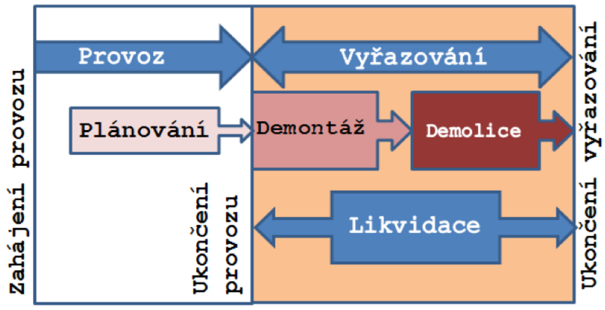
The main activities performed in the decommissioning phase include the shutdown of the reactor and inspection of the state of all installations, removal of spent nuclear fuel (SVJ) from the reactor core to the SVJ storage pool and after the fall in decay power of the individual fuel assemblies the continuous removal of SVJ to the spent nuclear fuel storage, drainage and drying of unoperated systems, sampling to determine the inventory of the radioactivity of out-of-operation, drained and dried systems, removal of operating fluids from systems, decontamination to reduce the dose rates, processing and treatment of waste from decontamination, disposal of hazardous materials and waste, processing and treatment of redundant ionex resins and other operational waste, monitoring ionising radiation, providing physical site security, ensuring management of an abnormal radiation occurrence, separation of installations still in operation and acquisition of basic equipment and materials for the needs of decommissioning activity, dismantling and demolition of redundant installations.

The start of decommissioning is characterised by the state when all nuclear fuel from the decommissioned nuclear installation is removed to a different nuclear facility. The aim of decommissioning will be to enable the use of the SMR Temelín NPP or its part for further activities related to the utilisation of nuclear power or for different purposes. In terms of the existing legislation, two methods of decommissioning are under consideration:

- immediate decommissioning when decommissioning is performed smoothly in a continuous sequence from the moment of its initiation to its completion,

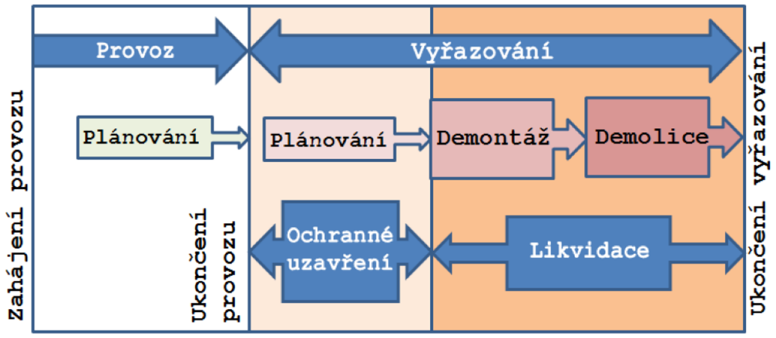
- gradual decommissioning when decommissioning activities are divided into several sequential materially and temporally limited stages, between which there may be a time lag (Section 43 i) of the Atomic Act) to reduce the activity of the isotopes with a relatively short half time of decay.

Fig. B.15: Immediate Decommissioning



Zahájení provozu	Start of operation
Provoz	Operation
Plánování	Scheduling
Ukončení provozu	End of operation
Vyřazování	Decommissioning
Demontáž	Dismantling:
Demolice	Demolition
Likvidace	Elimination
Ukončení vyřazování	End of decommissioning

Fig. B.16: Gradual Decommissioning



Zahájení provozu	Start of operation
Provoz	Operation
Plánování	Scheduling
Ukončení provozu	End of operation
Vyřazování	Decommissioning
Plánování	Scheduling
Demontáž	Dismantling:
Demolice	Demolition
Ochranné uzavření	Protective closure
Likvidace	Elimination
Ukončení vyřazování	End of decommissioning

One of the objectives of the decommissioning activities is to remove contamination from technological systems which accumulate as a result of operation on their inner surfaces and on the building parts. Using the technology of sorting, processing and treatment of radioactive waste, it is necessary to ensure the fixing of radionuclides into a form acceptable for storage and transport to the storage site. During the entire process emphasis will be placed on maximum sorting of potentially inactive waste so the amount of waste for storage in radioactive waste storage is minimised.

Decommissioning of the SMR Temelín NPP will be subject to a separate environmental impact assessment process in accordance with the respective legislation at the time of its preparation (at present the respective law would be Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended). A licence from SÚJB according to Section 9 (7) of the Atomic Act will be necessary to completely decommission the SMR Temelín NPP.

B.I.6.4. Specific Data of Other Facilities at the Site

This chapter describes specific data and requirements related to the other nuclear facilities at the Temelín NPP site.

B.I.6.4.1. Summary of Other Nuclear Facilities at the Site

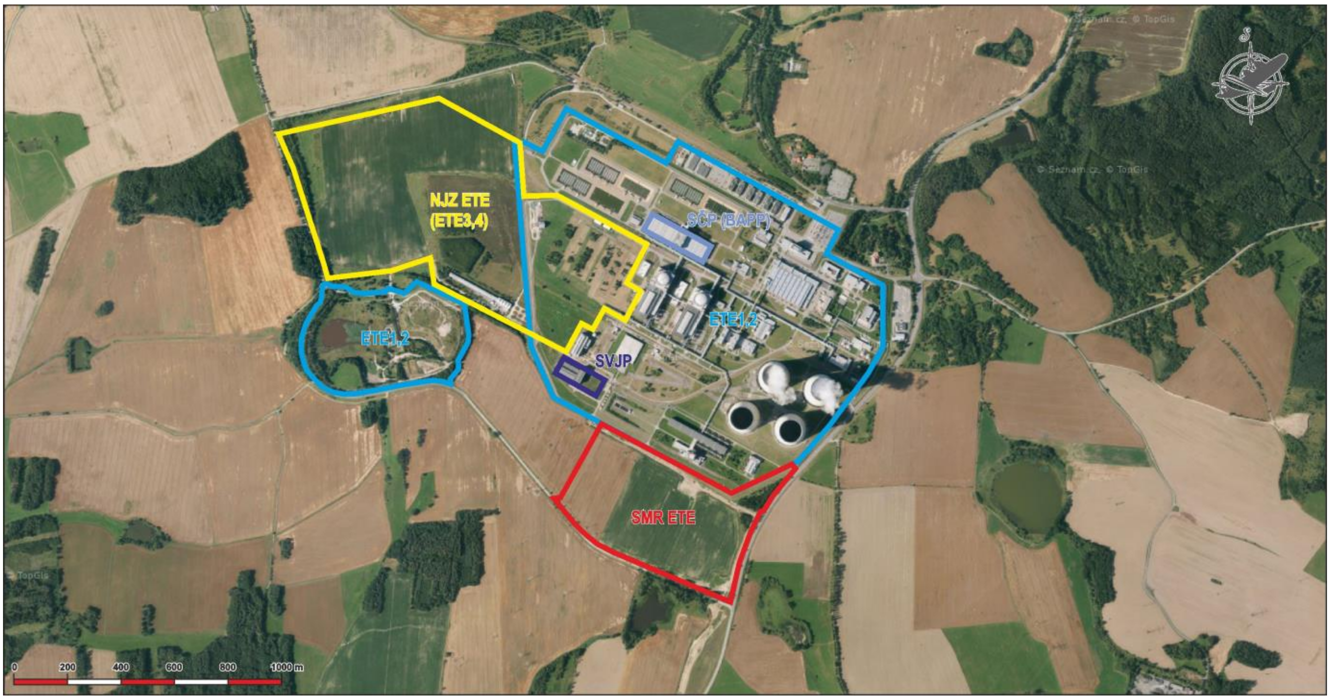
The following nuclear facilities are situated at the Temelín NPP¨site:

- The Temelín Nuclear Power Plant (unit 1 and 2 of the Temelín Nuclear Power Plant), (Temelín NPP 1,2),
- Temelín fresh nuclear fuel storage (SČP),
- Temelín spent nuclear fuel storage (SVJP).

There is also long-term preparation for a new nuclear source (NJZ or Temelín NPP 3,4), currently there is also preparation for the extension of storage capacity of the above-mentioned spent nuclear fuel storage (SVJP).

The location of these facilities is shown in following figure.

Fig. B.17: Overview of the Location of Other Facilities at the Site



More detailed information on the mentioned nuclear facilities is stated in the following text.

Temelín Nuclear Power Plant (Temelín NPP 1,2)

The Temelín Nuclear Power Plant consist of two power units (HVB1, HVB2), and each has thermal power of 3120 MW_t and net electrical power of 1083 MW_e. Construction of the power plant began in 1987 using the original plan of constructing four units. After 1989 the originally planned requirement for 4000 MW_e of installed power was reassessed and in 1993 the Czech government finally approved the completion of the power plant while only two of the originally scheduled four units were completed. The first unit generated electricity in 2000 and the power plant was put into operation from 2002 to 2003.

The power plant comprises two mono-nuclear units with pressurised water power reactors VVER-1000 of serial design type V 320 operated in the basic load mode and in frequency control mode. A technological diagram of each unit is two-circuit. The primary circuit compromises one reactor with a nominal thermal power of 3120 MW, and four cooling loops including with main circulation piping, main circulation pumps and the primary side of horizontal steam generators.

According to the preconditions of the State Energy Policy (2015), the shutdown of HVB1 is expected no earlier than in 2060 and the shutdown of HVB2 is expected in 2062.

New Nuclear Source at the Temelín Site (NJZ, Temelín NPP 3,4)

The new nuclear source construction is prepared as a two-unit source with generation III+ light water reactors with a total net installed electrical power of up to 2x1700 MW_e.

Fresh Nuclear Fuel Storage (SČP)

The fresh fuel storage is located in a separate room inside the auxiliary building (BAPP), which is common for both Temelín NPP 1,2 units under operation. The fresh fuel storage facility ensures the receipt of fresh nuclear fuel for the power plant, is inspection, storage and preparation for refuelling. The storage part is equipped with containers (for transport to the main production unit (HVB) part of the transport cask), intended for storing fuel assemblies at the storage and for transport to HVB for refuelling in the reactor. The operating capacity of the fresh fuel storage is 13 containers of 18 fuel assemblies, i.e. 234 fuel assemblies.

Spent Nuclear Fuel Storage (SVJP)

The spent nuclear fuel storage is designed as a separate civil object. The concept of the implemented SVJP at the Temelín NNP site is cased on the principle of dry storage. The SVJP object comprises a rectangular hall divided into two basic parts, i.e. the receipt and the storage part. The storage capacity is 152 casks containing spent nuclear fuel storage, which represents 1370 t U.

Currently the SVJP storage capacity is being expanded to a total of 304 casks, i.e. 2740 t U.

B.I.6.4.2. Schedule of Operation and Decommissioning of Nuclear Installations at the Site

Temelín Nuclear Power Plant (Temelín NPP 1,2)

Estimated operation termination date of HVB1:	2060
Estimated operation termination date of HVB2:	2062
Estimated commissioning termination date of HVB1, HVB2 and BAPP:	2104

New Nuclear Source at the Temelín Site (NJZ, Temelín NPP 3,4)

Estimated implementation commencement date of NJZ (Temelín NPP 3,4):	2032
Estimated trial operation commencement date of Temelín NPP 3:	2039
Estimated trial operation commencement date of Temelíin NPP 4:	2040
Estimated operation termination date of Temelín NPP 3:	2099
Estimated operation termination date of Temelín NPP 4:	2100

Fresh Nuclear Fuel Storage (SČP)

Estimated operation termination date of the SČP in the auxiliary building (BAPP):	2062
Estimated decommissioning termination date of SČP in the auxiliary building (BAPP):	2104

Spent Nuclear Fuel Storage (SVJP)

Estimated implementation commencement date of extension of the storage capacity of SVJP:	2029
Estimated operation commencement date of extension of the storage capacity of SVJP:	2034
Estimated operation termination date of SVJP[1]:	2120

B.I.7. Estimated Commencement and Completion Date

7. Estimated Project Commencement and Completion Date

Estimated implementation commencement date:	2029
Estimated operation commencement date:	2034

B.I.8. List of Affected Local Government Units

8. List of Affected Local Government Units

B.I.8.1. Determination of Affected Local Government Units

Those local government units (regions and municipalities) are considered to be involved in the area of which the Project is physically located, i.e., in the area of which any of the areas for Project location are situated, i.e. an area for location of the SMR (main construction site), area for offsite power transmission and area for (construction site equipment) - including their immediate vicinity.

Furthermore, those local government units are considered to be involved that could be affected by a declared zone of emergency planning. Currently this is not determined for the Project (will be determined by SÚJB in proceedings according to Decree No. 359/2016 Coll., on details to ensure abnormal radiation occurrence management, as amended). The area for the location of the SMR is in the existing Temelín NPP internal

[1] When storing spent nuclear fuel in casks for an estimated period of 60 years and transfer of the last casks to the extended spent nuclear fuel storage after 2060, the operation of the spent nuclear fuel storage will be terminated after 2120. According to the "Concept of Radioactive Waste and Spent Nuclear Fuel Management in the Czech Republic", approved by Czech Republic Government Resolution No. 597/2019, spent nuclear fuel will be put into long-term storage and subsequently stored in a deep repository whose commissioning is scheduled for 2065. One of the conditions of the so-called European taxonomy of sustainable sources which includes nuclear energy, applies to the building of a deep repository by 2050. However, the potentially earlier start of operation of the deep repository does not have any effect on the SVJP operation schedule.

emergency planning area, which has a radius of 5 km. In conservative terms and in accordance with existing international practice,[1] all local government units are considered affected that are situated at least partially in the existing Temelín NPP internal emergency planning area.

Determining the affected local-government units does not affect the right to participate in the environmental impact assessment process of any entity, including a foreign one.

B.I.8.2. List of Affected Local Government Units

Considering the above-mentioned facts, the following list of affected local government units has been drawn up:

Region:	South Bohemia	South Bohemian Region U Zimního stadionu 1952/2 370 01 České Budějovice tel.: +420 386 720 111 IDDS: kdib3rr
Municipalities:	Temelín	Municipality of Temelín Temelín no. 104 373 01 Temelín tel.: +420 385 734 311 IDDS: tsmb3jy
	Dříteň	Municipality of Dříteň Dříteň no. 1 373 51 Dříteň tel.: +420 387 991 121 IDDS: rqibekv
	Olešník	Municipality of Olešník Olešník no. 15 373 50 Olešník tel.: +420 387 985 605 IDDS: r9ramzj
	Hluboká nad Vltavou	Town of Hluboká nad Vltavou Masarykova 36 373 41 Hluboká nad Vltavou tel.: +420 387 001 322 IDDS: cdxbedz
	Týn nad Vltavou	Town of Týn nad Vltavou náměstí Míru 2 375 01 Týn nad Vltavou tel.: +420 385 772 200 IDDS: tn8b4c3
	Všemyslice	Municipality of Všemyslice Neznašov 9 373 02 Všemyslice tel.: +420 385 721 737 IDDS: zahb64r

1 According to IAEA Safety Guide No. GS-G-2.1 Arrangements for Preparedness for a Nuclear or Radiological Emergency, for reactors with power of 100 -1000 MW a radius of 0.5 to 3 km is recommended for an internal emergency planning area. This is less than the extent of the existing Temelín NPP internal emergency planning area.

B.I.9. List of Follow-Up Decisions and Administrative Authorities

9. List of Follow-up Decisions according to Section 9a 3) and Administrative Authorities that will Issue these Decisions

The Project is subject to these follow-up proceedings according to Section 3 g) of Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended:

- permit proceedings according to the Building Act.

The competent administrative authority is as follows:

Dopravní a energetický stavební úřad (Transport and Energy Authority)

Nábřeží Ludvíka Svobody 1222/12
110 00 Praha 1

tel.: +420 210 082 300
IDDS: 7mnrnuu

B.II.

DATA OF INPUTS

II. Data of inputs
utilising natural resources, particularly land, water (offtake and consumption), raw material and energy resources, and biodiversity

B.II.1. Land

Land requisition:

SMR location area, main construction site: up to 28.7 ha

The indicated value of the main construction site area (in Annex 1.1 of this Project marked as the SMR area). The SMR Project itself will be located in this area including related structures and operational areas. For conservative reasons, the complete permanent land requisition of this area is being considered.

The existing Temelín NPP 1,2 site has an area of approx. 123.3 ha (the boundary of the permanent requisition delineated by fencing of the guarded area of the existing power plant, without the storage management area at the Temelínec site), according to the EIA documentation the total requisition of Temelín NPP 1,2+NJZ Temelín NPP will not exceed approx. 187.2 ha. Thus, the total permanent requisition in the concurrent effects of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 215.9 ha.

electric connection: up to 1 ha

The indicated value represents a conservative estimate of requisition for built-up areas of above ground parts of power lines (foundations of the line masts of offsite power transmission to the Kočín transformer station, or induced relays of existing power lines), which in total represents a permanent requisition in the order of thousands of units of m^2 at the most. The total corridor area for offsite power transmission (marked as EL area in Annex 1.1 of this Notification) has a total area of approx. 55.8 ha, however it does not represent an area of requisition).

construction site equipment: up to 84.1 ha

The indicated value represents the total area for the location of construction site equipment (marked in Annex 1.1 of this Notification as areas E1, F1, F2, G, H), of this area E1 18.4 ha, area F1 18.4 ha, area F2 12.6 ha, area G 9.0 ha and area H 25.7 ha. For conservative reasons, the complete permanent land requisition of these areas is being considered, after completion of construction the areas will be recultivated and vacated.

B.II.2. Water

Water offtake:

raw water: up to 15,100,000 m^3/year

The indicated value represents the envelope value for the offtake of raw water for the operation of the SMR Temelín NPP. The raw water source will be the Vltava River. The offtake of raw water will be at the existing offtake point, i.e. at the pump station located on the left bank of the reservoir of the Hněvkovice waterworks and existing force mains to the existing Temelín NPP water tank and from here to the SMR water treatment systems.

The existing permitted offtake of surface water for Temelín NPP 1,2 is 47,000,000 m^3/year. The offtake of surface water for the concurrent operation of Temelín NPP 1,2+NJZ Temelín NPP according to the EIA documentation is estimated at up to 109,000,000 m^3/year, considering the currently applicable (compared to EIA documentation an increase of 5,000,000 m^3/year) permitted offtake of surface water for Temelín NPP 1,2 i.e. 114,000,000 m^3/year, thus the total offtake of raw water in concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 129,100,000 m^3/year.

Need of raw water for construction purposes will be in the order of several hundreds of thousands of m^3/year at the most and will be realised from the existing raw water source. During termination of operation (decommissioning), raw water offtake will be gradually decreased.

potable water: up to 31,000 m^3/year

The indicated value represents the envelope value for the offtake of potable water for the operation of the SMR Temelín NPP. The source of potable water will be the existing source/system of supply of the Temelín NPP site from the Zdoba water tank. Potable water will be used for drinking and hygienic purposes, partly also for service purposes.

The existing permitted contractual offtake of potable water for Temelín NPP 1,2 is 280,000 m^3/year, of this amount approx. 140,000 m^3/year is used. According to EIA documentation, offtake of potable water for the NJZ Temelín NPP is estimated at up to 33,000 m^3/year, thus the total offtake of potable water in concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 204,000 m^3/year.

The offtake of potable water for the purposes of construction of SMR Temelín NPP will be up to approx. 88,000 m^3/year. In the period of concurrent construction of the SMR Temelín NPP and NJZ Temelín NPP, the requirements for an increase in contractual offtake for the Temelín NPP site will rise above the existing permitted amount. With the termination of operation (decommissioning) there will be a gradual decrease in potable water in connection with the decrease in the number of workers.

B.II.3. Other Natural Resources

Natural resources:	without significant demands Operation, construction or termination of operation of the Project do not cause demands on the consumption of other natural resources.

B.II.4. Energy Resources

Energy resources: nuclear fuel: 12.5 t UO_2/year (except first fuel charge)

The indicated value represents the envelope value of nuclear fuel consumption for the of the SMR Temelín NPP. Nuclear fuel will be purchased on the market. The fuel will be on the basis of UO_2 with maximum enrichment of up to 5% U-235 (with considered possibility of increased enrichment of up to 7%), arranged in fuel assemblies. The length of the fuel cycles is considered for 12 to 48 months. The use of MOX fuel is not assumed but not absolutely excluded either.

Current consumption of spent nuclear fuel for Temelín NPP 1,2 is up to 46 t UO_2/year. According to EIA documentation, consumption for the NJZ Temelín NPP is considered up to 78.5 t UO_2/year, thus the total consumption of nuclear fuel in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 137,0 t UO_2/year.

Demand for nuclear fuel consumption does not arise during periods of construction (until commissioning) nor after termination of operation.

electrical power: up to 50 MW_e

The indicated value represents the envelope value of the power input of the home consumption of the SMR Temelín NPP. Consumption is secured by own activity of the units and backup power supply.

The power input of Temelín NPP 1,2 home consumption is approx. 140 MW_e. According to EIA documentation, consumption for the NJZ Temelín NPP design is considered at approx. 220 MW_e, thus the total consumption of nuclear energy input station service load in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 410 MW.

Power consumption during periods of construction and termination is not specified; however there will be the usual demand.

natural gas: consumption not specified (insignificant)

Considering the need for steam to start up and operate the SMR (start-up, shutdown), one of the considered options of constructions of the new gas auxiliary boiler plant with considered maximum steam production of 24 t/h at a pressure of 1.0-1.6 MPa. In case of the implementation of this method of production of auxiliary steam, the use of the existing gas mains to the Temelín NPP site can be considered and connect a new route supplying natural has to the SMR Temelín NPP. Considering the occasional (infrequent) use of insignificant consumption.

The consumption of natural gas in periods of construction and termination of operation is not demanded.

Operating masses: unspecified consumption (normal)

Operating masses are understood to be chemicals, lubricants, driving fuels, fuels and technical gases. Their consumption is not specified in more detail, however there will be usual demands in the amount of the order of hundreds of t/year.

The consumption of chemicals comprises chemicals for control of reactivity, treatment of chemical modes of the technological circuits, treatment of raw water etc. The consumption of oil substances comprises diesel fuel for the backup diesel generator station, turbine oil, transformer oil and other types of oils, depending on the installed technology (motor, transmission, light heating oil etc). The consumption of technical gases for operation may, depending on the SMR technology, comprise nitrogen, hydrogen and CO_2, for maintenance of oxygen, acetylene, argon or other technical gases.

The total consumption of operating masses in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP may be of the thousands of t/year for chemicals and higher hundreds of t/year for oil products.

The consumption of building materials during construction of the SMR Temelín NPP may be of approx. 200,000 m^3 of concrete, approx. 44,000 t of concrete steel and approx. 13,000 t of steel structures. Commodities and finished products of supplier companies will be used for building. There are no significant additional demands for operational, building or structural materials during the period of operation termination.

B.II.5. Biodiversity

Biodiversity: without demands

The location, operation and termination of operation of the Project does not place demands on (infrastructure) inputs of biodiversity.

A description of the state of the affected territory in terms of biodiversity is provided in Chapter C.II.7. Biodiversity (page 93 of this Notification), effects on biodiversity are assessed in Chapter D.I.7. Effects on Biological Diversity (page 126 of this Notification).

B.II.6. Demands for Transport and Other Infrastructure

Transport Infrastructure: road transport: up to 315 vehicles/day (of which approx. 65 heavy-duty vehicles)

The indicated value represents the average daily intensity of destination traffic (number of arrivals) for the SMR Temelín NPP. The source traffic intensity (number of departures) will be identical. This intensity includes transport of permanent operation and maintenance workers (passenger vehicles, buses) and operation demands (mostly trucks). Traffic will run along road II/105, which passes alongside the Temelín site, with the use of the section of road II/138, from which traffic will enter the Temelín SMR site. In dividing the direction of traffic on road

II/105 there will be slightly heavier traffic from the south (Hluboká nad Vltavou, České Budějovice) compared to the direction from the north (Týn nad Vltavou), distribution of traffic intensity will be at a ratio of approx 3:2.

The intensity of the existing target transport service of the Temelín site reaches approx. 630 vehicles/day (of this approx. 130 heavy-duty vehicles - lorries and buses). According to EIA documentation, for the NJZ Temelín NPP design the same intensity is assumed of up 630 vehicles/day (of this 130 heavy-duty vehicles). Thus, the average daily intensity of destination traffic (number of arrivals) in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 1575 vehicles/day (of this approx 325 heavy-duty vehicles). The source traffic intensity (number of departures) will be identical. In dividing the direction of traffic on road II/105 there will be slightly heavier traffic from the south (Hluboká nad Vltavou, České Budějovice) compared to the direction from the north (Týn nad Vltavou), distribution of traffic intensity will be at a ratio of approx 3:2.

During construction of the SMR Temelín NPP, the estimated average intensity of destination construction traffic during construction of the SMR will be approx. 440 vehicles/day (of this approx. 240 heavy-duty - lorries and buses). The source traffic intensity (number of departures) will be identical. Considering the expected schedule of construction of the SMR Temelín NPP (which precedes the construction of the NJZ Temelín NPP, see Chapter B.I.6.4.2. The schedule of operation and decommissioning of other installations at the site, page 58 of this Notification) there will be no concurrent operation of the main construction activities of the SMR Temelín NPP and NJZ Temelín NPP. Thus, the total intensity of destination construction traffic assessed in the NJZ Temelín NPP EIA will not be exceeded. This is approx. 890 vehicles/day (of this 490 heavy-duty), the intensity of source construction traffic will be the same. In dividing the direction of traffic on road II/105 there will be slightly heavier traffic from the north (Týn nad Vltavou and the D3) compared to the direction from the south (Hluboká nad Vltavou, České Budějovice), distribution of traffic intensity will be at a ratio of approx 3:2.

The maximum destination traffic load at the Temelín NPP site can then be considered the site of operation of Temelín NPP 1,2 and SMR Temelín NPP and the main phase of construction of the NJZ Temelín NPP, a total intensity of destination traffic of the Temelín site in this period will be approx. 1835 vehicles/day (of this 685 heavy-duty, including buses). The source traffic intensity (number of departures) will be identical.

The intensity during the period of termination of the operation of the SMR Temelín NPP will not exceed the intensity during the period of operation.

railway transport: insignificant

The period of operation does not place significant demands for use of railway transport. The existing railway transport intensity induced by activities at the Temelín NPP site is insignificant and does not exceed train units per month, therefore this state will be maintained for the period of concurrent operations.

The intensity of destination railway transport during the period of construction can be expected at the level of train units per day. Thus, the termination of operation does not place any additional demands for railway transport as compared with the period of operation or construction.

special transport: insignificant

The transport of oversized or heavy components during the period of construction will not be significant in terms of intensity (transport units during the period of construction). The existing infrastructure will be used, in terms of spatial and specific demands this traffic may require local modification of the existing infrastructure (already prepared for the transport of oversized and heavy components for the NJZ Temelín NPP design), or temporary restrictions of their use.

Other Infrastructure: without demands

The Project does not place demands for the other infrastructure. There is a link available to the necessary infrastructure network in the area of the Project.

B.III.

DATA OF OUTPUTS

III Data of Outputs
amount and type of possible expected residue and emissions, amount of wastewaters and their contamination, categorisation and amount of waste, risks of an accident considering the proposed application of substances and technology

B.III.1. Atmosphere

Outputs into the atmosphere: emissions into the atmosphere: without significant outputs

The SMR is not a combustion source, therefore it will not be a significant source of emissions into atmosphere. Backup technological facilities (diesel-generator stations, auxiliary boiler plant), however which will not be in continuous operation, will be sources of pollutants from the operation of technological facilities. There will be emission of pollutants (TZL, SO_2, NO_x a CO) during their regular tests. Considering the period of operation, the amount of pollutants will be insignificant. Car traffic will be another emission source. The amount of emitted pollutants from these sources (public roads, purpose-built roads, car park) will be insignificant considering the traffic intensity (in the order of approx hundreds of vehicles/day), at the same time this will depend on the development of specific emission factors of the vehicle fleet in future years.

Similar preconditions also apply to the currently operated technological sources and car traffic related to the operation of the existing Temelín NPP 1,2 units and the scheduled NJZ Temelín NPP. Not even the concurrent effect for the period of the concurrent operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will reach significant values of the emission of pollutants into the atmosphere.

Emissions from the construction activity itself and due to car traffic can be expected in the period of the construction of the SMR Temelín NPP. The most significant effect can be expected in the course of works on open terrain (earthwork or excavation) when increased emissions of solid pollutants can be expected. Emissions and the nature of other pollutants are connected with the use of machinery and related to consumption of driving fuels. These emissions will be limited to the time of the period of construction and they will change during the period of construction depending on the schedule of individual construction activities. During the period of termination of operation, sources related to operation will cease being effective and emissions produced by dismantling or demolition works will not exceed the amount of emissions during the period of construction.

waste heat: up to 900 MW_t
evaporation: up to 1,200 m^3/h (0.333 m^3/s)

The indicated values represent the envelope value for the considered SMR technology. The low-potential waste heat will be released into the atmosphere by wet forced draft cooling towers (use of a natural draft tower is not excluded).

The removed waste heat from the Temelín NPP 1,2 units currently in operation may reach the value of up to 4,400 MW_t and total evaporation from 4 cooling towers in total of up to 5,947 m^3/h (1.652 m^3/s). The EIA documentation does not provide the values of waste heat and evaporation for the NJZ Temelín NPP design. It is true that the estimated power of the NJZ Temelín NPP will be approx. 70% more than for Temelín NJZ 1,2, therefore a 70% greater amount of removed heat and evaporation may be expected, i.e. 7,480 MW_t and 10,109 m^3/h (2.808 m^3/s). Thus, the total value for the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed the amount of removed heat of 12,780 MW_t and evaporation of 17,256 m^3/h (4.793 m^3/s).

No significant waste heat will be produced during the periods of construction and termination of operation.

B.III.2. Wastewaters

Wastewaters:

process wastewater: up to 3,564,000 m^3/year

The indicated value represents the estimated amount of process wastewaters for the SMR Temelín NPP. The process wastewater will comprise mostly of the blowdown of the circulation (tertiary) circuit or blowdown of service water, and wastewaters from water treatment and from control tanks. In qualitative terms, the composition of the process wastewater will approximately correspond to the composition of process wastewater from the existing Temelín NPP 1,2 and will be due above all to the amount of contamination pumped with the raw water and its thickening effect of the evaporation. The introduction of contamination to wastewater due to the operation of the SMR Temelín NPP (water treatment, treatment of chemical modes etc.) will be minimal.

The release of wastewater from Temelín NPP 1,2 is currently limited by the value of 10,800,000 m^3/year. The estimated amount of process wastewater for the NJZ Temelín NPP design is 15,123,000 m^3/year, thus the total discharge of process wastewater in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 29,487,000 m^3/year.

Process wastewater will be discharged by the existing wastewater mains of Temelín NPP 1,2 to the recipient river (the Vltava River in the Kořensko cross section).

The amount of process wastewater from the construction is not specified. Water taken off for needs of construction becomes part of the building structures, evaporates, or is reused for building purposes. Potentially contaminated waters (tests of technological facilities, flushings, etc.) will be collected in drainless pits and depending on the physical-chemical analyses, they will be either discharged to the recipient river or transported for disposal. The discharge of process wastewater will be gradually decreased during the period of termination of operation.

sewage water: up to 31,000 m^3/year

The indicated value represents the amount of sewage water of the SMR Temelín NPP (300 workers). In qualitative terms, the composition of sewage water will correspond to the composition of sewage water from the existing Temelín NPP 1,2.

The existing discharge of cleaned sewage water from the Temelín NPP is approx. 100,000 m^3/year. According to EIA documentation, approx. 33,000 m^3/year of wastewaters is expected to be discharged for the NJZ Temelín NPP design,thus the total discharge of sewage water in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 164,000 m^3/year.

The cleaned sewage water will be discharged together with the process wastewaters by the existing wastewater mains of Temelín NPP 1,2 to the recipient river (the Vltava River in the Kořensko cross section).

The amount of sewage water in the course of construction will be in the order of several hundreds of thousands of m^3/year, the Vltava River will receive the cleaned sewage water from the construction. The discharge of sewage water will be gradually decreased during the period of termination of operation.

precipitation water: approx. 85,000 m^3/year

The indicated value represents a conservative estimate of the discharge of sewage water from the SMR Temelín NPP site based on its extent. In qualitative terms, there will be no change in the quality of precipitation water.

The existing discharge of precipitation water from Temelín NPP 1,2 is approx. 266,000 m^3/year. According to EIA documentation, the NJZ Temelín NPP represents the amount of precipitation water of approx. 155,000 m^3/year, thus the total amount of discharged precipitation water in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 506,000 m^3/year.

Due to the geological conditions, the flow rates of the discharged precipitation water will not be appropriate for clogging limited by retention tanks and septic tanks, the recipient stream of the precipitation water will be the same with the existing state of the Strouha stream and then the Vltava River.

The amount and the recipient stream of precipitation water from the SMR Temelín NPP site during the course of construction will be roughly correspond to the phase of operation. The amount of precipitation water from the construction site equipment and the precipitation water recipient stream will still need to be specified. The amount of precipitation water being drained will decrease during the period of termination depending on the progress of releasing of the territory.

B.III.3. Waste

Inactive waste:	municipal and other waste:	up to 660 t/year
	hazardous waste:	up to 75 t/year
	sludge from the treatment of raw water:	up to 750 t/year

The indicated values represent the expected amount of inactive waste related to the operation of the SMR Temelín NPP. The amount and structure of the occurring inactive waste produced will quantitatively as well as qualitatively correspond to the structure of waste from the existing Temelín NPP 1,2 units in operation. They include the usual types of waste produced by cleaning, maintenance, repairs, operation and replacement of inactive installations, construction waste produced by repairs and others. Waste will be managed in the similar way as waste in connection with the operation of Temelín NPP 1,2, in accordance with the Waste Act and managing documents of ČEZ, a. s. (collection, safeguard and transfer for further management by professional authorised companies). The sludge from the cleaning raw of water stored in the existing Temelínec sedimentation basin.

At present, an average of approx. 1,200 tons of inactive waste per year is produced at the Temelín NPP 1,2 site (of which approx. 130 tons of hazardous waste) and 3,000 tons of sludge from raw water treatment, however production is highly variable depending on current activities and the quality of the pumped raw water. According to EIA documentation, for the NJZ Temelín NPP design average production of 752 tons of inactive waste per year is expected (of this 112 tons of hazardous waste, the amount of sludge from the treatment of raw water will be proportional to the amount of raw water, thus the total production of inactive waste in concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 2,370 t/year of municipal and other waste, 317 t/year of the hazardous waste and 8,850 t/year of sludge from the treatment of raw water.

During construction, waste will mostly be of the nature of construction waste and municipal waste. A final part of construction will in particular be of great importance because of the disposal of construction site equipment objects. The amount of waste produced during the period of construction will be up to approx. 100,000 tons per construction period (of which approx. 1,000 tons of hazardous waste), the waste will be mostly of the nature of construction waste and municipal waste. The waste will be reused and recycled as a priority, or transferred for further management by professionally authorised companies. At the termination of operation, waste will initially be of the same nature as during normal operation, construction waste and dismantling works will be added later. The amount of waste at the termination of operation is not more closely specified, it will be managed in accordance with the Waste Act.

B.III.4. Other

Noise:	stationary sources:	forced draft cooling tower:	$L_{A,W}$ = 125 dB
		natural draft cooling tower:	$L_{A,W}$ = 120 dB
		turbine hall:	$L_{A,W}$ = 100 dB
		transformer:	$L_{A,W}$ = 115 dB
		Other individual buildings:	$L_{A,W}$ = up to 80 dB

The indicated value represents the expected noise output of the dominant sources of the SMR Temelín NPP without noise preventive measures. The operation of these sources is continuous, i.e. the same for daytime as well as night time. All sources are addressed by noise preventive measures so the hygiene limits in the closest or potentially the most affected protected outdoor area (Kočín) are in compliance with Government Regulation No. 272/2011 Coll., on health protection against adverse effects of noise and vibrations, as amended.

The noise measurement of Temelín NPP 1,2 and Kočín transformer station (see Chapter C.II.3. Noise and Other Physical and Biological Characteristics, page 78 of this Notification) show that the hygiene limits reliably comply in the nearest or potentially the most affected outdoor area (Kočín). What this means is that all sources will be addressed by noise preventive measures for the NJZ Temelín NPP, just as the SMR Temelín NPP, so hygiene limits are observed.

machines used during construction:	compaction machines:	L_{WA} = 107 dB
	bulldozers, loaders:	L_{WA} = 107 dB
	lorries:	L_{WA} = 90 dB
	autocranes:	L_{WA} = 105 dB
	automatic mixers:	L_{WA} = 105 dB
	mechanical hammers:	L_{WA} = 105 dB
	loaders:	L_{WA} = 107 dB

A local increase of noise levels can be expected in the course of constructional works during implementation of the SMR Temelín NPP Project (due to operation of the mechanisms and tools used) without a significant effect on the protected outdoor area. Noise sources during decommissioning will not exceed the noise output of the characteristics of facilities used in the period of the construction of SMR Temelín NPP.

traffic on public roads:	road (or railway)

During the operation of SMR Temelín NPP will be the noise source associated with the traffic on public roads and railway lines. Increased traffic intensity associated with the operation of SMR Temelín NPP will affect the noise load in adjacent municipalities. Considering the small increase of traffic associated with the operation of SMR Temelín NPP, the share of noise will be minimal. The aim is to comply with noise hygiene limits in the vicinity of roads and during the concurrent operation of Temelín NPP 1,2, NJZ Temelín NPP and SMR Temelín NPP and any implementation of noise prevention and compensatory measures. Railway traffic noise can be considered negligible considering its low frequency.

An increase of noise levels in the vicinity of transport routes can be expected in the course of execution of constructional works during implementation of the Project. Sources of traffic noise during the termination of the operation will not exceed the period of operation or construction.

Vibrations: insignificant

The SMR Temelín NPP Project will not be a source of significant vibrations spreading to the vicinity. In particular, it is the turbine hall (turbine) that is a vibration source, and transmission of vibrations from the turbine to the turbine stool subbase is minimised by its suitable mounting so that way limited to the nearest vicinity. Effects of vehicle movements driving on the public roads can be additional potential sources of vibrations. However, these are usual traffic sources that are suppressed in the substratum already in the immediate vicinity of roads. Similar conclusions also apply to the existing facilities at the Temelín NPP 1,2 and NJZ Temelín NPP site.

In terms of vibrations during the preparation and construction of SMR Temelín NPP, only normal construction machines and means of transport are considered whose effect will be restricted to their immediate vicinity. No blasting operations using explosives are assumed during construction. Only sources mentioned above for the period of operation or construction, i.e., without significant effect on the vicinity, are under consideration for the period of termination of operation.

Ionising radiation: radioactive effluents discharged into the atmosphere:

noble gases:	up to 2.98E+13 Bq/year
tritium:	up to 1.00E+12 Bq/year
C-14:	up to 3.60E+11 Bq/year
iodines:	up to 9.23E+10 Bq/year
aerosols:	up to 2.99E+09 Bq/year
Ar-41:	up to 1.61E+12 Bq/year

The indicated values represent envelope annual activity of effluents discharged into the atmosphere from SME Temelín NPP during operational states (normal and abnormal) operation for individual groups of radionuclides. The values are based on provided authorised estimates of suppliers of SMR technology. There is a possible realistic expectation, based on operational experience, that actual effluents will be significantly lower than the values anticipated by the design.

Nuclear fuel itself, in which the fission chain reaction takes place and also produces active isotopes of gases, is the primary source of radioactive gases. These in the limited amount penetrate microleaks in the fuel cladding and enter the primary circuit coolant that is in permanent contact with the cladding. By means of the primary circuit coolant, radioactive gases reach other power plant systems related to the primary circuit. This is also in accordance with isotope composition of effluents, in which noble gases and radiologically significant iodines prevail in fission products and as far as activation products are concerned, it is radioisotopes of carbon and argon that above all are of radiological significance. Effluents will be discharged into the atmosphere in a controlled manner after high-efficiency filtration and radiological checks have been performed.

Real effluents discharged into the atmosphere from the existing Temelín NPP 1,2 units have had the following values in previous years:

noble gases:	up to 1.21E+13 Bq/year
tritium:	up to 3.70E+12 Bq/year
C-14:	up to 1.25E+12 Bq/year
iodines:	up to 2.47E+08 Bq/year
aerosols:	up to 3.62E+08 Bq/year
Ar-41:	up to 1.81E+12 Bq/year

The indicated values represent the envelope selection (maximum) of measured values of individual radionuclide effluent activities in the period from 2004 to 2023 from the Temelín NPP 1,2 units. The other nuclear facilities at the site do not emit gaseous effluents. Effluents are discharged into atmosphere in a controlled manner after high-efficiency filtration and radiological checks have been performed through the ventilation stacks.

According to EIA documentation, the expected envelope effluents discharged into the atmosphere from the NJZ Temelín NPP design are the following:

noble gases:	3.55E+15 Bq/year
tritium:	2.59E+13 Bq/year
C-14:	5.40E+11 Bq/year
iodines:	3.85E+10 Bq/year
aerosols:	3.48E+09 Bq/year
Ar-41:	2.52E+12 Bq/year

Radioactive effluents from SMR Temelín NPP will not be produced into the atmosphere in the period of construction. Effluents will be gradually significantly reduced (by several orders) in the period of termination of operation and decommissioning as compared with the period of operation. Isotope composition of gaseous effluents in the period of termination of operation and decommissioning will be different from that in the stage of operation (a considerably lower share of noble gases and iodines).

liquid radioactive effluents:

tritium:	up to 8.8E+12 Bq/year
Corrosion, activation and fission products:	up to 5.06E+09 Bq/year

The indicated values represent envelope annual activity of liquid effluents discharged from SMR Temelín NPP during operational states (normal and abnormal operation) for individual groups of radionuclides. The values are based on provided authorised estimates of suppliers of SMR Temelín NPP technology. There is a possible expectation, based on operational experience, that actual effluents will be significantly lower than the values anticipated by the design.

Tritium, which appears in the primary circuit and cannot be effectively captured by cleaning systems dominates the isotopic composition of liquid effluents. After undergoing a controlled radiology check, effluents will be discharged into the recipient river (the Vltava River) through the new resulting wastewater collector (together with process and sewage waters).

Real effluents discharged into watercourses from the existing Temelín NPP 1,2 units have had the following values in previous years:

tritium:	up to 6.38E+13 Bq/year
corrosion, activation and fission products:	up to 6.42E+08 Bq/year

The indicated values represent the envelope selection (maximum) of measured values of liquid effluent activities in the period from 2006 to 2023 from the Temelín NPP 1,2 units. The other nuclear facilities at the site do not emit liquid effluents.

The estimated effluents discharged into watercourses from the NJZ Temelín NPP design are as follows:

tritium:	1.2E+14 Bq/year
corrosion, activation and fission products:	1.9E+10 Bq/year

Liquid radioactive effluents will not be produced from SMR Temelín NPP in the period of construction. Effluents will be gradually significantly reduced from the operation (by up to several orders) in the period of termination of operation and decommissioning of SMR Temelín NPP as compared with the period of operation.

ionising radiation field: insignificant

The ionising radiation field is understood to be electromagnetic (gamma) radiation or the neutron flux directly from the technological facilities (without the contribution of effluents). This is insignificant already in the near vicinity of objects of the existing Temelín NPP 1,2 nuclear installations and in the case of the SMR Temelín NPP and NJZ Temelín NPP designs.

It cannot be excluded that radiation sources (sealed radiators), which are part of defectoscopy devices (e.g. for weld checking), will be used in the course of construction, without a significant effect on the vicinity. There will be no additional sources of ionising radiation in the period of termination of operation or decommissioning.

radioactive waste: up to 184 m^3/year

The indicated value represents the envelope value of the amount of radioactive waste produced during the operation of SMR Temelín NPP before its processing (including minimising the volume) and treatment. The source of waste above all includes the liquid RAO treatment systems (concentrates, spent resins and sludges), filters of active HVAC systems, used measuring probes and irradiation specimen assemblies, furthermore contaminated unusable components, protective devices or clothing, sorted materials from the controlled zone etc. The amount of processed and treated radioactive waste will only be specified on the basis of applied processing technology. This technology will be selected depending on the acceptability of RAO at operated repositories in the Czech Republic, requirements of the concept of radioactive waste and spent nuclear fuel management in the Czech Republic and the best available technologies.

The production of treated radioactive waste from the existing Temelín NPP 1,2 units and from the scheduled NJZ Temelín units will range from 50 to 70 m^3/1,000MW per year. This waste will be stored in accordance with the Radioactive Waste and Spent Nuclear Fuel Management Concept at the Dukovany Radioactive Waste Repository.

Radioactive waste will not be produced in the period of NJZ construction. Radioactive waste will be produced during the period of termination of operation and decommissioning, in particular sorted contaminated materials (contaminated technological systems or building constructions) from dismantling and demolition, and materials used for decontamination. The amount and type of radioactive waste produced during the operation of SMR Temelín NPP and its decommissioning will be specified after the selection of SMR technology.

spent nuclear fuel: up to 12.5 t UO_2/year

The amount of produced spent nuclear fuel corresponds to the amount of fresh fuel in a charge. The indicated value represents the envelope value of spent nuclear fuel for SMR Temelín NPP.

Production of spent nuclear fuel for the existing Temelín NPP 1,2 units is up to 46 t UO_2/year. Production for NJZ Temelín NPP is considered up to 78.5 t UO_2/year,$_2$/year, the total production of spent nuclear fuel in concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 137.0 t UO_2/year.

Spent nuclear fuel will not be produced in the period of construction. Spent nuclear fuel will not continue being produced after termination of operation and the removal of the fuel from the reactor and pools.

Non-ionising radiation: insignificant

The Project will not be a significant source of non-ionising radiation. Electric and magnetic fields in the vicinity of individual facilities (power lines, transformers, generators, and others) will meet the requirements of Government Decree No. 291/2015 Coll., on health protection against non-ionising radiation, as amended. There will be compliance with the limits for employees on the power plant site and there will be compliance with limits for natural persons in the municipal environment in publicly accessible outdoor area (this only concerns power lines).

Similar data also apply to the existing facilities at the Temelín NPP 1,2 and NJZ Temelín NPP site.

Similarly, ionising radiation will not be significant during construction and decommissioning.

Odour: without outputs

The Project is not a source of smell.

Light pollution: without outputs

The Project is not a source of light pollution. The lighting of the Project will be addressed in accordance with MŽP methodological guideline ref. no. MZP/2023/710/2146 and standard ČSN 36 0459 Restriction of the adverse effects of outdoor lighting to exclude light pollution in the vicinity.

Other physical and biological factors: without outputs

The Project is not a source of other significant outputs.

B.III.5. Supplementary Data

The construction or the operation of the Project will not produce any other significant outputs into the environment.

B.III.6. Accident Risks

B.III.6.1. Radiation Risks

B.III.6.1.1. Safety Characteristics of SMR

During operation of the nuclear power unit, same as during operation of any other industrial installation and human activity (and seemingly paradoxically during inactivity as well), it is generally impossible to absolutely exclude the probability of occurrence of abnormal states or emergency conditions.

A specific feature of nuclear facilities is that they contain radioactive substances that would potentially escape into the environment in case of emergency conditions. Nevertheless and considering this risk, generation of electrical power in nuclear power plants is no more dangerous than generation from other sources in terms of danger to health and life of the population. This can be demonstrated on the power plants in operation on the basis of international organisations' statistics concerning the rate of risk to life for individual types of sources (for example the report of OECD/NEA 2010 Comparing Nuclear Accident Risks with Those from Other Energy Sources).

The safety concept of the considered SMR technologies is based on a combination of proven and advanced technologies of large units, but at the same time and to a great extent it uses passive solutions and passive safety systems, which help ensure the autonomy of the units and management of emergency conditions even without the intervention of an operator or the need for a power supply.

B.III.6.1.2. Potential Risks having an Effect on Nuclear Safety and Radiation Protection

An abnormal operation state or emergency conditions at a nuclear facility can occur due to failure of one or more components as a result of an internal or an external cause. An internal cause can result from failure of systems, structure or a component or the components due to design or a structural defect, failure in quality assurance during production, erection, operation, maintenance, inspections and tests, failure of a component as a result of faulty intervention by a worker or failure as a result of another internal or external cause.

Typical internal causes include:

- failure of the auxiliary system, e.g. cooling, lubrication, power supply or
- internal projectiles, which could occur for example from the rupture of rotating mechanical parts,
- internal flooding,
- internal fires and explosions,
- falls and shocks of heavy loads,
- failure of pressurised parts, supports and other structural parts,
- electromagnetic interference between power plant equipment,
- leaks of water, gas, steam or hazardous substances,
- emergence of environmental parameter conditions for which equipment is not dimensioned,
- human factor failure etc.

External causes may either be of natural origin or originate from human activity. External events of natural origin include for example:

- climate and meteorological phenomena (storm, lightning, high or low temperatures, rain and snow fall, ice, extreme drought etc.),
- floods,
- seismic event,
- other geodynamic phenomena (volcanism, slope movement, subsidence and land surface deformation etc.),
- Biological phenomena or
- natural fires.

External events originating from human activity include for example:

- bursting of dams on watercourses in the vicinity of the nuclear facility,
- explosions and fires originating from human activity,
- strong vibrations,
- electromagnetic interference,
- eddy currents,
- effect of pipelines and power lines,
- leak of toxic, explosive or otherwise hazardous substances in the vicinity of the nuclear facility such as during transport along a road or when storing such substances within the site,

- crash of a plane and other objects into the nuclear facility as a result of an accident,
- accident in another nuclear facility on the site with leak of radioactive or other hazardous substances.

Acts of sabotage and terrorism on the nuclear facility (including intentional plane crash) are specific types of event with external cause.

All these operational states and emergency conditions will, as part of a nuclear facility licensing process proceeding according to the Atomic Act, be assessed and it will be proven that their occurrence is virtually excluded, or the acceptability of their consequences will be proved, while the assessment of the acceptability of the consequences of radiation is of greater importance. Proving the acceptability must be above all based on a deterministic principle when the consequence of an event is quantified and its acceptability for safety of the nuclear facility and negligible consequences for the vicinity are proved. In case of extremely improbable events (frequency of occurrence is to a high extent of reliability under 10^{-7}/year), it is acceptable to assess and rate them on a probability 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 SÚJB and is subject to special treatment (i.e. secrecy).

The reliability of systems, structure and components with an effect on the nuclear safety of the nuclear facility will be assured by a system ensuring their environmental qualifications, resistance of systems to faults and way of ensuring their maintenance and testing. Fault resistance is ensured through redundancy, diversity and physical separation. Redundancy is ensured by multiple backup of safety systems fulfilling the same function, physical separation of individual redundant systems and their functional independence. Diversity is ensured in such a way that the basic safety function - control of reactivity, heat removal from the reactor core and from spent fuel located outside the reactor, retention of radioactive substances, radiation shielding, management of scheduled effluents of radioactive substances and restriction of radioactive leaks in emergency states is ensured independently by two or more functionally different systems, of which each can separately ensure fulfilment of the safety function on a different principle.

B.III.6.1.3. Characteristics of Operational States and Emergency Conditions

The acceptability of the consequences of operational states and emergency conditions is assessed depending on the frequency with which the given state may occur, while the limits of the consequences of individual states must not be exceeded as set out by national legislative regulations and international requirements. It is generally true that for more probable types of operational states and emergency conditions, the criteria of the maximum permissible consequences are stricter than for less probable operational states and emergency conditions.

Operational states and emergency conditions of SMR Temelín NPP are divided into:

- Normal operation.
- Abnormal operation.
- Emergency conditions:
  - design basis accidents (DBA),
  - design extension conditions (DEC):
    - multiple equipment faults without significant nuclear fuel degradation,
    - severe accidents with significant damage to nuclear fuel.
- Virtually excluded conditions.

These states are characterised as follows:

Normal operation	is the state of a nuclear facility in which there is compliance with the limits and conditions of the safe operation of the nuclear facility. This is in particular steady state operation of power and outage, scheduled shutdown/start-up of a unit, increase and decrease of its power (including its control).
Abnormal operation	is the state of a nuclear facility deviating from a normal operation, which does not result in severe damage to systems, structures or components with an effect on nuclear safety and after which the nuclear facility is able to operate normally. Abnormal operation includes simple faults and failure the occurrence of which can be expected while the unit is in operation during the unit's period of operation. Typical cases of this category includes loss of external electrical power supply, faults in the reactivity control system, short-term opening of safety valves of steam generators, rupture of small-sized pipelines (auxiliary pipelines, measurement and sampling pipelines) etc. Abnormal operation events may not lead to loss of function of any barriers, to the loss of function of safety systems and their effect on the vicinity must be minimal, i.e. The radiation design criterion of acceptability for abnormal operation must be met, see criterion K1 (see Chapter B.I.6.2.2.3. Requirements for Radiation Protection, page 36 of this Notification).
Design basis accidents (DBA)	are emergency conditions, in which the proper function of safety systems ensures that the adequate reference levels or exposure limits are not exceeded. In terms of the frequency of occurrence, the design basis accidents in accordance with SÚJB No. 329/2017 Coll., can be divided into these groups:

- medium frequency events, which is the occurrence of the same type of event in a period of more than 10 years of the operation of the nuclear facility,
- low frequency events, which is the occurrence of the same type of event in a period of more than the lifetime of the nuclear facility.

Initiating event falling into this category of accidents include the rupture of technological pipelines - main pipelines for the supply of water, steam, primary circuit, rupture of tube/tubes in the steam generator, mechanical fault in the reactor trip system etc. For design basis accidents, the basic criterion K2 is applied (see Chapter B.I.6.2.2.3. Requirements for Radiation Protection, page 36 of this Notification) which requires that any accident, which will not result in the core melting or damage of irradiated nuclear fuel in the storage pools, will not result in a leak of radionuclides that would require to apply preventive measures of concealment, iodine prophylaxis and evacuation of the population anywhere in the SMR Temelín NPP vicinity. Concealment, iodine prophylaxis and evacuation of the population are considered urgent preventive measures according to SÚJB Decree No. 422/2016 Coll.,

Design extension conditions (DEC) are emergency conditions induced by a more severe scenario than a design basis accident, which are taken into account when designing a nuclear facility. Thus, these are accidents that are not taken into account within design basis accidents but 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 accidents and multiple faults for which a very low frequency is expected, the occurrence of an event is longer than one hundred times the lifetime of a nuclear facility. Design extension conditions are divided into:

- multiple faults during which significant damage of the fuel system does not occur (DEC-A),
- severe accidents during which significant damage of the fuel system occurs (DEC-B).

While the reactors currently in operation were not originally designed for these conditions and their resistance was increased by modernisations carried out later, the Project of the considered small modular reactors are capable of coping with or minimising consequences of design extension conditions, including major accidents already included in the design. The most important properties include extended resistance to 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 faults 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 rupture of the primary circuit with partial failure of the emergency cooling system, a rupture of a tube/tubes of the steam generators accompanied by failure of the secondary circuit integrity, a loss of spent nuclear fuel storage pool cooling, multiple failures in the systems of cooling water, service water, removal of heat to the vicinity or the ultimate heat sink, multiple events with a common cause of an internal or an external origin.

For design extension conditions during which there is no nuclear reactor core melt-down or severe damage to irradiated nuclear fuel in the storage pools, criterion K2 applies in the same way (see Chapter B.I.6.2.2.3. Requirements for Radiation Protection, page 36 of this Notification) which requires that any accident falling into this category will not result in a leak of radionuclides requiring urgent preventive measures, i.e. concealment, iodine prophylaxis and evacuation of population anywhere in the vicinity of SMR Temelín NPP.

For major accidents connected with a nuclear reactor core melt-down or severe damage to irradiated nuclear fuel in the storage pools, criterion K3 applies in the same way (see Chapter B.I.6.2.2.3. Requirements for Radiation Protection, page 36 of this Notification), which requires that there is no urgent evacuation of the population in the immediate vicinity of SMR Temelín NPP and no long-term restriction to food consumption needs to be introduced. Accidents, which could lead to early or large leaks, must be virtually excluded. Thus, in major accidents the functionality of the containment must be ensured and the possibility virtually excluded of large or early leaks of radionuclides from the containment.

Virtually excluded facts are conditions, states or events, the occurrence of which is considered physically impossible or very unlikely with a high degree of credibility. They include sequences of major accidents with the core melting or severe damage of stored spent nuclear fuel outside the containment that could lead to early or large leaks of radioactive substances into the vicinity. Summary frequency/probability of a large or an early leak of radioactive substances into the vicinity of the power plant must be with a reserve and reliably less than $1x10^{-6}$/year. To have the possibility of mitigating accident consequences exceeding the design extension conditions (DEC), the SMR Temelín NPP design will contain all the technical facilities and organisational means that are necessary for the operator to perform all its obligations set out by the Atomic Act for in case of the occurrence of a radiation accident. The introduction of respective preventive measures will be based on criteria based on the legislation of the Czech Republic, EU, and IAEA and ICRP recommendations.

B.III.6.1.4. Approach to the Assessment of Radiological Effects of Radiation Accidents in the EIA Process

Proving the acceptability of the consequences of possible abnormal states and emergency conditions of SMR Temelín NPP will be subject to further proceedings for the specific SMR Temelín NPP design led in accordance with the Atomic Act. The environmental impact assessment (EIA) process will demonstrate the effect on the vicinity and population for representative (envelope) cases of a design basis accident and a major fuel melting accident.

In case of design basis accidents , a potential source of a leak of radionuclides into the vicinity of the power plant is their content in the primary circuit coolant and pertinently also their content in free volumes under cladding of fuel rods in case that damage of cladding occurs to a part of the fuel rods. Analysis of a representative design basis accident in the EIA process must follow the generally accepted envelope approach, i.e., during which a representative source term (that characterises the size of a leak of radionuclides into the vicinity in order to assess radiological consequences) and other parameters (e.g. meteorological conditions) are determined so that radiological consequences corresponding to this source term will be worse with a sufficient reserve than those (while taking the rate of uncertainties into account) from results of subsequent safety analyses (e.g. in the Preliminary Safety Report) within the licensing process.

In case of major accidents (with the assumption of fuel melting), a potential source of a leak of radionuclides to the vicinity is their content in fuel. Fuel melting is accompanied by a release of radionuclides from fuel into the containment followed by a release from the containment into the vicinity through microleaks of the containment. In accordance with SÚJB and WENRA requirements, the safety systems and diverse/alternative means for the new reactors (including SMRs that also fall into this category) must ensure the full functionality of the containment and restrict the consequences of a major accident in accordance with the criterion K3 (see Chapter B.I.6.2.2.3. Requirements for Radiation Protection, page 36 of this Notification).

Assessment of radiological consequences of a representative design basis accident and a major accident for the EIA process will be performed using a computer program approved by the supervising authority (SÚJB) intended for assessment of radiological consequences.

B.III.6.1.5. Risk of an Act of Terrorism

The risk of an act of terrorism against the new nuclear power source (NPP Temelín) will 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 existing practice in accordance with requirements of international and national legislative regulations.

The obligations of the Czech Republic in the sphere of the physical protection of nuclear materials result from accession to the Convention on the Physical Protection of Nuclear Material that was signed by the Czech Republic in March 2005 and came into effect in July 2007. Requirements for the physical protection of nuclear materials and nuclear facilities are defined in the Atomic Act and SÚJB Decree No. 361/2016 Coll., on securing a nuclear facility and nuclear material, as amended.

The supervising activity of the state in this sphere is performed by SÚJB focusing on checking the physical protection of the Czech Republic nuclear facilities and inspections aimed at the physical protection of nuclear facilities, nuclear materials and radioactive waste, and transport of nuclear materials. An important part of SÚJB activity during assessment of measures securing the physical protection of nuclear material transports is also the approval of casks intended for transport of nuclear materials. SÚJB inspectors perform inspections of all transports of fresh and spent nuclear fuels and radioactive waste. Information on the transport and physical protection of nuclear materials is governed by Act No. 412/2005 Coll., on the Protection of Classified Information and Security Eligibility, as amended.

After the attacks on New York on 11 September 2001, all states with an advanced nuclear power engineering increased the protection of all the nuclear facilities against terrorist attacks carried out by means of large passenger airliners. As compared with plane crashes 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 primary protection against intentional attacks is the responsibility of the state (intelligence services, terrorist activity monitoring, air space protection, prevention under air transport conditions, etc.). As far as SMR Temelín NPP is concerned, the load of a large plane crash as a consequence of an intentional attack will be considered for the design of selected buildings significant in terms of safety. The design parameters of the plane and scenarios of an attack under consideration are secret information.

All the suppliers of reference designs for SMR Temelín NPP confirmed, in the technical information, the resistance of their power units to a plane crash, i.e., including a large passenger plane. The assessment of a large passenger plane crash will follow the US NRC approach specified in 10 CFR Section 50.150 Aircraft Impact Assessment requiring for applicants for new nuclear power plant licences to carry out a realistic assessment of the effects of a large passenger plane crash on the power plant, and this event is considered to be part of the design extension conditions. To fulfil the requirement for resistance to a large passenger plane crash, it must be proved that the reactor core will continue being cooled (or the containment integrity will continue to stay intact) and spent nuclear fuel cooling will continue to stay intact (or the spent fuel pool integrity is secured). Likewise, requirements for resistance of the new reactors to a large passenger plane crash are specified in the WENRA 2020 report as well.

B.III.6.1.6. Other Radiation Risks related to the Operation of Nuclear Facilities

The safety requirements for transport of Atomic Act materials and radioactive wastes are regulated in Act No. 263/2016 Coll., the Atomic Act, as amended, and Act No. 258/2000 Coll., on Public Health Protection, as amended. On the basis of authorisations included in these laws, the following implementing legal regulations, concerning transport of nuclear materials and radioactive waste, were issued:

- SÚJB Decree No. 379/2016 Coll., on the type approval of certain products in the field of peaceful utilisation of nuclear power and ionising radiation and transport of radioactive or fissile material, as amended,
- SÚJB Decree No. 422/2016 Coll., on radiation protection and security of radionuclide source, as amended and
- SÚJB Decree No. 361/2016 Coll., on securing a nuclear facility and nuclear material, as amended.

Basic transports of materials, related to the nuclear power source operation, include transport of fresh fuel from the supplier to SMR Temelín NPP, transport of treated radioactive waste (RAO) from SMR Temelín NPP to the RAO storage, transport of spent nuclear fuel from SMR Temelín NPP to the storage and transport of spent nuclear fuel from the storage to the place of permanent storage (or reprocessing). The basis of risk management during transport of nuclear materials and RAO follows the following principles anchored in the above mentioned legislative documents:

- a transport licence must be issued, or consent of licensing authorities according to the applicable laws,
- transport must take place according to approved processes and related requirements of national legislative regulations and international obligations and treaties of the Czech Republic,
- transport processes must take into account possible risks and minimise the probability of accident occurrence,
- material being transported must be stored in approved transport casks (or transport and storage casks) which provably ensure that no radioactive material will leak into the vicinity in case of an accident and subcriticality will not decrease below a permissible limit in case of nuclear fissile materials, nor in case of water floods,
- The dose rate in the vicinity of transported casks and surface activity must be minimised in accordance with legal regulations of the Czech Republic, the dose rate at a distance of 2 m from the surface of a means of transport must not exceed the value of 0.1 mSv/h in relation to exposure of persons in the vicinity of the transport.

Given the present operation of the existing Temelín NPP 1,2 units and scheduled NJZ Temelín NPP and SMR Temelín NPP, it is possible to assume up to 5 transports per year on average of fresh nuclear fuel to the Temelín site, and in accordance with the National Energy Policy, advance buying of fuel is assumed for several years onward. As nuclear fuel is not produced at present in the Czech Republic, fuel will be supplied from abroad in a combination of rail, road, water and air transport. Spent nuclear fuel can be transported to future spent nuclear fuel storage by rail or road transport at a maximum of single transport units per year.

As compared with transport of different hazardous goods (with transport of different types of fuels from the power point of view), transport of radioactive materials is much less risky. Above all, there is no danger of explosion and fire as in the case of transports of conventional fuels when an accident leads to direct danger to life and often has tragic consequences for participants of the accident. The possibility of leaks of radioactive substances into the environment is limited to the lowest possible extent. Processes are compiled for each transport on how to restrict radiation consequences of an accident so that the health of the population is not jeopardised.

B.III.6.2. Non-radiation Risks

From the non-radiation point of view, the design 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 a leak of contaminated wastewaters (by damage to the sewerage tightness or a failure of function of the oily water treatment plant), an escape of stored substances (chemicals, driving fuels, lubricants and heat-carrying agents, cleaning agents etc.) from the storage tanks or pipe bridges, or during transport. The possibility of media or other materials igniting 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. The consequences of the mentioned type of events can be dealt with by readily available means.

C.

(DATA OF THE STATE OF THE ENVIRONMENT IN THE AFFECTED TERRITORY)

C. DATA OF THE STATE OF THE ENVIRONMENT IN THE AFFECTED TERRITORY

C.I.

LIST OF THE MOST SIGNIFICANT ENVIRONMENTAL CHARACTERISTICS OF THE AFFECTED TERRITORY

1. List of the Most Significant Environmental Characteristics of the Affected Territory with Special Emphasis on its Ecological Sensitivity

The Project is located in the territory of the South Bohemian Region, district of České Budějovice, municipality of Temelín (cadastral area of Křtěnov, Kočín, Temelínec and Březí u Týna nad Vltavou) and the municipality of Dříteň (cadastral area of Chvalešovice). The site of the Project is located in immediate contact with the existing industrial site of the Temelín NPP.

Table C.1: List of Environmental Characteristics of the Affected Territory

	Areas for the location and construction of the Project	Wider affected area
Population and Public Health		
residential area	no	yes
densely populated area	no	no
Atmosphere and Climate		
area with exceeded limits	no	no
Noise and other physical and biological characteristics		
protected outdoor area, protected outdoor building site	no	yes
radionuclide effluents discharged into the environment	no	yes
Surface and ground water		
natural water accumulation protected area	no	no
protective zone of surface water resources	no	no
protective zone of ground water resources	no	no
flood area	no	no
Land		
agricultural land resources	yes	yes
lands intended for forest area	no	yes
landscape components in agricultural landscape	no	yes
Rock environment and natural resources		
active exploitation areas	no	yes
protected deposit reserve	no	yes
mining subsidence area, historical mine workings	no	no
landslides and other geodynamic phenomena	no	no
old environmental burdens	no	no

Fauna, flora and ecosystems		
national park	no	no
protected landscape area	no	no
small-scale specially protected areas	no	yes
Natura 2000 sites (European Site of Community Importance, bird protection area)	no	no
territorial system of supraregional ecological stability	no	yes
territorial system of regional ecological stability	no	yes
territorial system of local ecological stability	yes	yes
biotope of specially protected species of large mammals, core territories	no	no
biotope of specially protected species of large mammals, core corridors	yes	yes
occurrence of specially protected species of plants or animals	yes	yes
registered significant landscape element	no	no
significant landscape element by law	yes	yes
notable tree	no	yes
Landscape		
wildlife park	no	yes
area completely transformed by man (anthropogenic)	yes	yes
area with a balanced relationship between the natural element and man	yes	yes
area with a predominance of natural elements	no	no
Movable property and cultural monuments		
Third-party immovable property	no	yes
architectural and historical monuments	no	yes
archaeological sites	no	yes
Transport and other infrastructure		
road	yes	yes
railway	no	yes
other technical and transport infrastructure	yes	yes

For more detailed data, see the respective chapter of Part C.II. CHARACTERISTICS OF THE STATE OF ENVIRONMENTAL ELEMENTS IN THE AFFECTED TERRITORY (page 75 of this Notification and the following pages).

C.II.

CHARACTERISTICS OF THE STATE OF ENVIRONMENTAL ELEMENTS IN THE AFFECTED TERRITORY

2. Brief characteristics of the state environmental element states in the affected territory that will probably be significantly influenced

C.II.1. Population and Public Health

The Project is located in an area immediately adjacent to the southern edge of the existing industrial site of the Temelín power plant, outside close contact with residential objects. The nearest residential objects and/or areas defined by land plans for the location of residential objects are located at the following distances from the location of the Project:

- municipality of Temelín (local part of Kočín): approx. 1.1 km south of the Project location area,
- municipality of Temelín: approx. 2.5 km south-west of the Project location area.

The distance of the other municipalities generally exceeds 3 km from the Project location area.

The health condition of the population in the area if monitored on a long-term basis as part of the Programme of Monitoring and Assessment of the Effects of the Temelín Nuclear Power Plant on the Environment (ČEZ, a. s., INVESTprojekt, s.r.o., 1999). This programme defines the set of monitoring and assessment components and indicators of the state of the environment beyond the framework of the legal obligations of the power plant's operating organisation. The programme documented the health condition of the population in the pre-operational period of the power plant, subsequently current data are taken and assessed in regular annual intervals for the past period for people living in the vicinity of the Temelín power plant (o-called exposed area), for people living in other more remote regions with similar natural and socio-economic conditions (so-called control areas). The sponsor of the population's health condition monitoring area as part of this programme is the Faculty of Medicine of Masaryk University in Brno.

The following facts arise from the latest published results of the Programme (ČEZ, a. s., 2023):

- Data relating to total mortality (for all age groups and for the productive age group) for the exposed area showing values close to the national average. In terms of relative data, the period of 2020 and 2021 is affected by the Covid-19 pandemic. Higher mortality in the control area relates to the rural nature of the territory and landscape and its specific characteristics.
- In terms of the mortality indicators, a long-term decrease can be observed of the Lost Years of Potential Life indicator which develops in accordance with the national trend. During the Covid-19 pandemic there was an increase in this trend in exposed and control areas.
- The overall development of the incidence of all malignant tumours in males and females is stable and is maintained at the level of the development values of the control areas. Changes in development reflect the national scale and data from numerically smaller exposed areas are more sensitive to short-term deviations.
- The incidence of childhood leukaemia is isolated, new cases have only appeared in one of the control areas in recent years, there are no clusters of new cases.
- The incidence of spontaneous miscarriages and birth rate of babies with a low birth weight are stable over time.
- No new or unexpected changes in the health condition of the population have been found.

The psychological condition of the population of the affected area and the public opinion is also periodically determined as part of this Programme and the results show the following facts:

- The development of the psychological characteristics of the population in the vicinity of the Temelín Nuclear Power Plant shows a relatively stable and positive trend. Its stability undoubtedly depends on its trouble-free operation and safety of nuclear power as a whole.
- The population’s public opinion is relatively positive. Although the population regards the potential safety threat, most of the population regards the Temelín Nuclear Power Plant as safe, operated according to high safety standards.

The results clearly show that the health condition of the population of the affected territory is stable, in accordance with the national trends. The negative effect of the operation of the Temelín Nuclear Power Plant (which could be seen in comparison with the control areas) is not shown in the Programme’s results.

The Temelín Nuclear Power Plant is a significant positive socio-economic factor of the affected territory. It directly employs more than approx 1,300 people, and indirectly many other in follow-up sectors of production and services. In addition, it contributes in the form of supporting programmes to the development of the infrastructure and public amenities of the affected territory. The attractiveness of the housing in the vicinity also relates to this. The Comparative Study of the Development of Real Estate Prices in the Region of the Temelín Nuclear Power Plant and the Control Area (Institute of Technology and Business in České Budějovice, Department of Expertise and Valuation, 2023) shows that the power plant has a positive effect on the real estate market.

C.II.2. Atmosphere and Climate

C.II.2.1. Air Quality

To assess the background immission situation of the affected territory or assessment of whether any of the immission limits are being exceeded, the average values of concentration for 1 km^2 of territory is used according to Section 11 (6) of Act No. 201/2012 Coll., On Air Protection, as amended, always for the previous five calendar years. These values are annually published by the Czech Hydrometeorological Institute. The last current published data for 2018-2022 show that the immission limits of basic pollutants in the affected territory are being observed. The development trends given by the comparison with earlier data are rather positive when there was a fall in values in most of the monitored indicators.

C.II.2.2. Climatic Factors

In climatic terms, the Project or the Temelín site is situated in the temperate climatic region MT7 (according to Quitta, update 2012) with normally long, temperate and mildly dry summer, short transitional periods with a mild spring and mildly warm autumn and normally long, temperate, dry to mildly dry winter with a short lasting snow cover. The basic characteristics of the climatic region are listed in the following table.

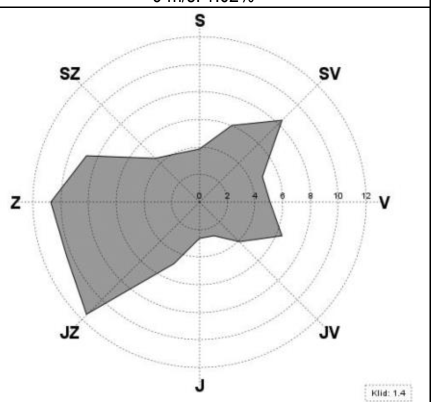
Table C.2: Characteristics of the Climatic Region MT7

Number of summer days	30 to 40
Number of days with an average temperature of 10°C and more	140 to 160
Number of frost days	110 to 130
Number of ice days	40 to 50
Average temperature in January	-2°C to -3°C
Average temperature in April	6°C to 7°C
Average temperature in July	16°C to 17°C
Average temperature in October	7°C to 8°C
A number of days with precipitation of 1 mm and more	100 to 120
Total precipitation in the growing season	400 mm to 450 mm
Total precipitation in the winter season	250 mm to 300 mm
Number of days with snow cover	60 to 80
Number of cloudy days	120 to 150
Number of clear days	40 to 50

The Czech Hydrometeorological Institute (ČHMÚ) Temelín Observatory is situated in the vicinity of the Temelín NPP or SMR Temelín NPP site, which has an extensive measuring programme and above-standard instrumentation for the monitoring of the local climatic situation. The location of the observatory is also subject to this which is representative of the characteristics of the local climate.

The basic climatic data from the ČHMÚ Temelín observatory are summed up in the following table.

Table C.3: Results of the Climatic Measurements for 2011 - 2023, ČHMÚ Temelín station

	2011 - 2023
Average annual air temperature	9.4°C
Average annual maximum air temperature	13.9°C
Absolute annual maximum air temperature	35.8°C
Average annual minimum air temperature	5.2°C
Absolute annual minimum air temperature	-21.4°C
Total annual precipitation	600.4 mm
Number of days of precipitation	209.2
Seasonal height of new snow	50 cm
Average seasonal maximum total of snow cover	14 cm
Number of days of snowfall	51
Number of days of storm	20.6
Number of days of fog	83
Number of days of black ice, rime and hoar frost	35.6
Relative frequency of wind speed	0 m/s: 1.44% 0-1 m/s: 15.80% 2-4 m/s: 59.72% 5-9 m/s: 22.02% >9 m/s: 1.02%
Relative frequency of wind direction	

Based on the long-term monitoring of meteorological parameters at the Temelín NPP site, the Czech Hydrometeorological Institute determines the scope of the parameters of extreme conditions for basic meteorological phenomena that can occur at the Temelín NPP site. These parameters are periodically re-assessed on the basis of measurement results. The current results, taking into account records of measurements up to 2018, are listed in the following tables (ČHMÚ, 2019).

Table C.4: Extreme Temperatures at the Temelín NPP Site

Extreme temperature proposed values	Repetition time	
	100 years	10,000 years
Maximum instantaneous temperature [°C]	42.0	52.0
Maximum 6-hour average [°C]	38.6	46.2
Maximum 24-hour average [°C]	32.0	39.3
Maximum 7-day average [°C]	27.8	34.6
Minimum instantaneous temperature [°C]	-35.6	-47.0
Minimum 6-hour average [°C]	-30.4	-46.4
Minimum 24-hour average [°C]	-24.3	-37.3
Minimum 7-day average [°C]	-20.4	-33.1

Table C.5: Extreme Wind Speed at the Temelín NPP Site

Extreme wind speed proposed values	Repetition time	
	100 years	10,000 years
Wind gust 1 s [m/s]	48	65
Wind gust 10 s [m/s]	38.9	52.7
Ten-minute mean speed [m/s]	26.8	36.3

Table C.6: Total Extreme Precipitation (rain) at the Temelín NPP Site

Total extreme precipitation (rain) proposed values	Repetition time	
	100 years	10,000 years
mm/15 min	39.0	59.0
mm/3 hours	71.0	120.0
mm/6 hours	80.0	140.0
mm/24 hours	105.0	180.0

Table C.7: Extreme Snowfall at the Temelín NPP Site

Extreme snowfall proposed values	Repetition time	
	100 years	10,000 years
Total snow water equivalent [mm of water column]	109	189
Height of fresh snow layer in 24 hours [cm]	46.5	76.2

Table C.8: Probability of the Occurrence of a Proposed Tornado at the Temelín NPP Site

Tornado category	Repetition time	
	100 years	10,000 years
F1	0.002	0.24
F2	0.002	0.196

C.II.3. Noise and Other Physical and Biological Characteristics

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C.II.3.1. Noise

The Project is located in an area immediately adjacent to the southern edge of the existing industrial site of the Temelín power plant, well away from the noise-protected area. The nearest or potentially the most affected outdoor area and protected outdoor building area is situated in the municipality of Temelín, local part of Kočín, at a distance of approx. 1.1 km from the Project (see Chapter C.II.1. Population and Public Health, page 75 of this Notification). In this area the supporting documents were compiled for the prolongation of the validity of the EIA opinion for the new nuclear source at the Temelín site (ČEZ, a. s., 2024) control noise measurement, including the full power plant operation. The results of the measurement are listed in the following table.

Table C.9: Results of the Notice Measurement in the Nearest Protected Area

Location description	$L_{Aeq,T}$ [dB]
North-east of the edge of the municipality of Kočín	35.2 ± 2.0
Edge of the municipality of Temelín	33.9 ± 2.0

Source: ČEZ, a. s., Greif-akustika, s.r.o., 2024

In none of the cases was the hygiene limit ($L_{Aeq,T}$ = 50/40 dB day/night), exceeded and none of the number of previous measurements detected that the limit was exceeded. So the Temelín power plant complied with all the applicable requirements of Government Regulation No. 272/2011 Coll., on health protection against adverse effects of noise and vibrations, as amended.

C.II.3.2. Ionising Radiation

C.II.3.2.1. General Data on Sources of the Population Exposure to Radiation

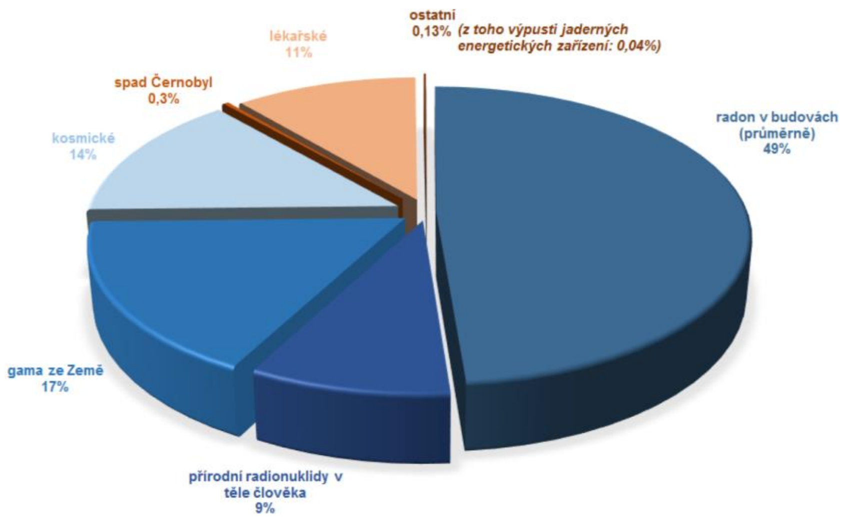
Ionising radiation is a natural part of the environment. Ionising radiation sources causing exposure of the population to radiation are divided into natural and artificial sources according to origin.

Natural radiation is caused by two sources, i.e. cosmic radiation falling to Earth and natural radionuclides occurring on Earth. Cosmic radiation falls to Earth from space and irradiates a person externally depending on the height above mean sea level and position on Earth. Natural radionuclides occur in the human environment, are found in the earth's crust and core, in water and air. This may be primordial radionuclides with a very long half-life of decay, formed in the early stages of the universe, which became part of the Earth when forming the Solar System approx. 4-5 billion years (potassium K-40, uranium U-238 and U-235, thorium Th-232), radionuclides forming as a result of the effect of cosmic radiation on elements on Earth or on radionuclides forming from secondary decay of other radioactive elements. External human exposure is caused above all by the presence of radionuclides in rocks and soils of the surface layers of the Earth and cosmic radiation. In terms of internal exposure, the dominant contribution is caused by the inhalation of products of radon transformation in buildings; exposure to natural radionuclides in the human body is also significant, particularly of potassium.

Artificial source of exposure particularly include medical exposure (X-rays, radiopharmaceutical products etc.). Furthermore, a minor share includes technogenic sources (use of radionuclides in consumer and other goods, a content of radionuclides in building materials), occupational irradiation at work, and so-called global fallout where radionuclides form as residuals from tests of nuclear weapons and accidents at nuclear power facilities). This also includes exposure from nuclear facility effluents.

The general distribution of radiation doses among population (according to SÚRO) are shown in the following figure.

Fig. C.1: Distribution of Doses among Population



Source: https://www.suro.cz/cz/prirodnioz

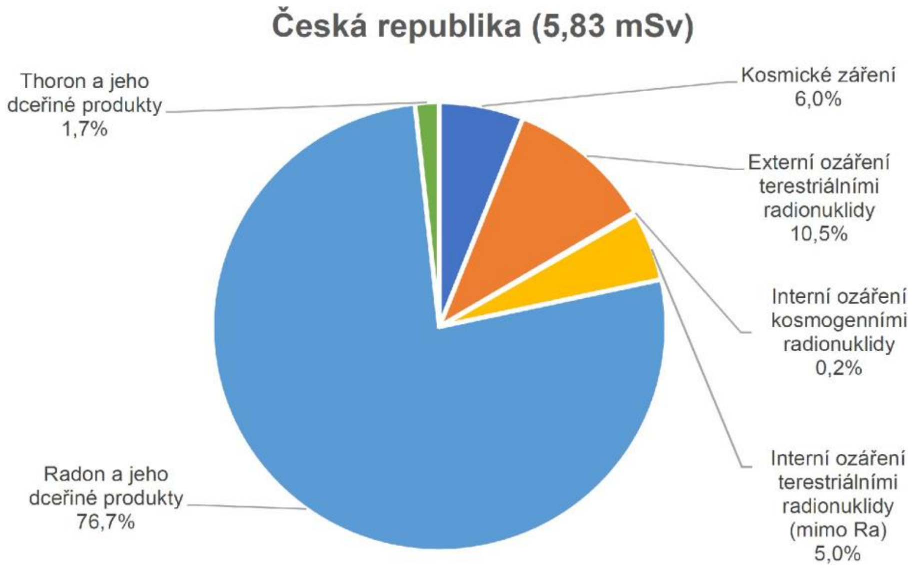
ostatní 0,13% (z toho výpustí jaderných energetických zařízeni: 0,04%)	other 0.13% (of this nuclear power facility effluents: 0.04%)
radon v budovách (průměrné) 49%	radon in buildings (average) 49%
přírodní radionuklidy v těle člověka 9%	natural radionuclides in the human body 9%
gama ze Země 17%	terrestrial gamma 17%
kosmické 14%	cosmic 14%
spad Černobyl 0,3%	Chernobyl fallout 0.3%

lékařské 11%	medical 11%

Despite the fact that these are general/average values, serving to provide an overview in the overall context, it is clear from the figure that the decisive share of population exposure, comes from exposure from natural sources, which represents approx. 89% of the average population exposure. In terms of artificial sources of exposure, it is medical exposure that is predominant. Other contributions, including effluents of the nuclear power plants, are minor.

According to the European Atlas of Natural Radiation (2019), total radiation exposure from natural sources in the Czech Republic is on average 5.83 mSv/year, of this an estimated effective dose from internal radon contamination and its daughter products is 4.47 mSv/year. The dose distribution is clearly shown in the following figure.

Fig. C.2: Share of Weighted Annual Average Effective Dose (in %) for Various Natural Sources of Exposure out of the Total Effective Dose for the Czech Republic

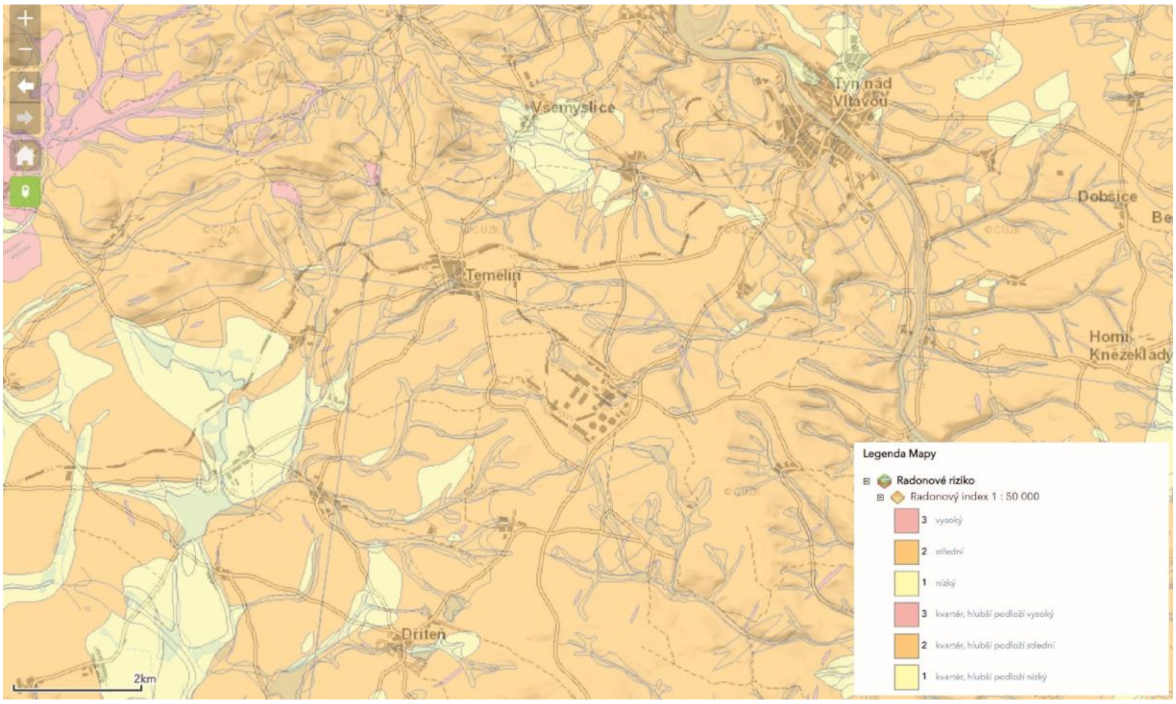


Source: CINELLI, G., DE CORT, M. and TOLLEFSEN, T. editor(s). European Atlas of Natural Radiation. 2019. ISBN 978-92-76-08258-3. [own edited version]

Česká republika (5,83 mSv)	Czech Republic (5.83 mSv)
Kosmické záření 6,0%	Cosmic radiation 6.0%
Externí ozáření terestriálními radionuklidy 10,5%	External terrestrial radionuclide exposure 10.5%
Interní ozářeni kosmogenními radionuklidy 0,2%	Internal cosmogenic radionuclide exposure 0.2%
Interní ozáření terestriálními radionuklidy (mimo Ra) 5,0%	Internal terrestrial radionuclide exposure (apart from Ra) 5.0%
Thoron a jeho dceřiné produkty 1.7%	Thoron and its daughter products 1.7%
Radon a jeho dceřiné produkty 76,7%	Radon and its daughter products 76.7%

The Temelín site lies in a region with a medium value of the radon index (see the following figure), average radon exposure and its daughter products range here on an average level of approx. 4.47 mSv/year.

Fig. C.3: Radon Risk in the Geological Substratum



Source: https://mapy.geology.cz/radon/

Legenda Mapy	Map legend
Radonové riziko	Radon risk

Radonový index 1 : 50 000	Radon index 1: 50,000
vysoký	high
střední	medium
nízký	low
kvartér, hlubší podloží vysoký	Quaternary, deeper substratum high
kvartér, hlubší podloží střední'	Quaternary, deeper substratum medium
kvartér, hlubší podloží nízký	Quaternary, deeper substratum low

C.II.3.2.2. Radiation Situation in the Affected Territory

C.II.3.2.2.1. Methodological Data

The basic information for assessing radiation exposure from an operated nuclear facility is measurement at the source, i.e. measurement of dose rates and monitoring gaseous and liquid effluents of these facilities. Model calculations are made from the measured values to determine population radiation exposure in the vicinity of a nuclear facility caused by effluents and the effective dose is calculated for a so-called representative person. The representative person is defined according to the Atomic Act as an individual from the population representing a selected group of natural persons who are most exposed to the given source and the given pathway.

Further information for the assessment of the radiation situation of the affected territory comes in the form of results of the monitoring of the environment in the vicinity of the Temelín NPP carried out by the Radiation Control Laboratory in the vicinity of the Temelín NPP, T.G. Masaryk Water Research Institute in Prague, University of South Bohemia in České Budějovice, Czech Technical University in Prague, Masaryk University in Brno and any other institutions.

From the nuclear equipment at the Temelín NPP site a limited amount of radioactive substances is released into the environment only from the operated Temelín NPP 1,2 units, and a limited amount of radioactive substances will be released during the operation of SMR Temelín NPP and the future scheduled NJZ Temelín NPP. No radioactive substances in the form of effluent from the spent nuclear fuel storage at the site (SVJP Temelín NPP) are discharged into the environment.

C.II.3.2.2.2. Emission Situation

Authorised Limit

Effluents from radioactive substances from nuclear equipment at the Temelín NPP site are limited, so-called authorised limits, i.e. annual committed effective doses from external and internal exposure for a representative person. Not exceeding the authorised limits is proven by not exceeding the exposure limits as set out by the Atomic Act and SÚJB Decree No. 422/2016 Coll., on radiation protection and securing of a radionuclide source, as amended. These limits are set at 10 μSv for gaseous effluents per calendar year and 4 μSvPro for liquid effluents per calendar year for the Temelín NPP 1,2 units currently under operation[1]. Before commencement of operation, the authorised limits will also be set for SMR Temelín NPP and NJZ Temelín NPP.

The Temelín NPP operating organisation assesses observance of the limit every year and presents it in annual reports to the competent supervisory bodies, which subsequently publish the results in their annual reports. The results are listed in the following table.

Table C.10: Annual Effective Dose of the Representative Person (Formerly an Individual from the Critical Population Group) from the Temelín NPP Operational Effluents

Year	Effluents discharged into the atmosphere			Liquid effluents		
	Authorised Limit	Drawing the authorised limit		Authorised Limit	Drawing the authorised limit	
	[μSv]	[μSv]	[%]	[μSv]	[μSv]	[%]
2006	40	0.053	0.133	3	0.396	13.200
2007		0.050	0.125		0.302	10.067
2008		0.030	0.075		0.584	19.467
2009		0.0115	0.029		0.6839	22.797
2010		0.01354	0.034		0.5564	18.547
2011		0.02298	0.057		0.8210	27.367
2012		0.02442	0.061		0.6129	20.430
2013		0.01830	0.046		0.3934	13.113

[1] The authorised limit up to 2022 was set at 40 μSv per year for effluents discharged into the atmosphere as stipulated by SÚJB Decisions ref. no. 16920/2002, ref. no. 28718/2007 and ref. no. SÚJB/RCČB/24102/2017, and 3 μSv per year for effluents discharged into a watercourse by SÚJB Decisions ref. no. 8096/2005, ref. no. SÚJB/OROPC/26161/2009 and SÚJB/RCCB/32016/2021. The authorised limit as of 2023 is set at 10 μSv per year for effluents discharged into the atmosphere as stipulated by SÚJB Decision ref. no. SÚJB/RCCB/5497/2023 and 4 μSv per year for effluents discharged into a watercourse by SÚJB Decision ref. no. SÚJB/RCCB/31153/2022.

2014		0.02537	0.063		0.8367	27.890
2015		0.02919	0.073		0.9513	31.710
2016		0.01435	0.036		0.6470	21.567
2017		0.02114	0.053		0.7493	24.977
2018		0.01103	0.028		0.6024	20.080
2019		0.01653	0.041		0.5769	19.230
2020		0.01575	0.039		0.3501	11.670
2021		0.01844	0.046		0.4046	13.487
2022		0.02355	0.059		0.5545	18.483
2023	10	0.02139	0.214	4	0.4024	10.060

Source: Results of the Monitoring of Effluents and the Radiation Situation in the Vicinity of the Temelín Nuclear Power Plant, 2018-2023.

The data show that when releasing radionuclides from effluents of Temelín NPP into the environment in the form of effluents into the atmosphere and effluents into watercourses, the authorised effective dose limit and its load for the representative person are reliably observed.

Monitoring of Effluents

Effluents are monitored for the purpose of checking observance of the set limits. Considering that radioactive substances will be released into the environment during the operation of SMR Temelín NPP, the SMR Temelín NPP construction Project will have an effect on the way of monitoring effluents at the Temelín site.

Gaseous effluents are monitored at the operated Temelín NPP units by following, measuring, assessing and recording the quantities and parameters in the internal and external ventilation stacks at the main power units HVB1 and HVB2, in the ventilation stack at the BAPP and behind the sumps vacuum air pumps of the main condenser of both HVBs. Liquid effluents are monitored at the point of the released wastewaters, i.e. in control tanks, and then at the point of the release of water into the watercourse, i.e. in waste-water sumps (or in drainage channel).

C.II.3.2.2.3. Immission Situation

The immission situation is ensured by the monitoring of the radiation station in the vicinity of Temelín NPP. This is carried out by monitoring, measuring, assessing and recording the quantities and parameters characterising fields of ionising radiation and occurrence of radionuclides in the vicinity of Temelín NPP. The monitoring is carried out by the Environmental Radiation Control Laboratory (LRKO) of Temelín NPP situated in České Budějovice. The monitoring is carried out according to the monitoring programme approved by SÚJB and the results of the measurement are forwarded by the power plant to the state supervisory and administrative bodies. At the initiative of the Temelín NPP operating organisation, monitoring is extended in accordance with the Programme of the Monitoring and Assessment of the Impact of the Temelín Nuclear Power Plant on the Environment. This monitoring is carried out by other entities.

In terms of radiation protection, the following elements of the environment in the vicinity of Temelín NPP are monitored:

- outdoor environment,
- atmosphere - aerosols, gaseous elements, precipitation, atmospheric fallout,
- surface waters, ground waters, potable water,
- food chain components - milk, fish meat, agricultural and other crops,
- sediments,
- land.

Outdoor Environment Monitoring

The outdoor environment is monitored by measuring the spatial dose equivalent input of gamma radiation using thermoluminiscent integral dosimeters installed in the Temelín NPP internal emergency planning area (a total of 42 measuring points). The measured values are at the level of the natural background. The measured values are at the level of the natural background, e.g. In 2018 - 2023 they reached average values from all measuring points 0.100 - 0.127 µSv/h. The values at the individual measuring points in 2022 and 2023 are listed in the following table.

The values at the individual measuring points in 2022 and 2023 are listed in the following table.

Table C.11: Spatial Dose Equivalent Input of Gamma Radiation in the Temelín NPP Emergency Planning Area

Number	Location	Spatial dose equivalent input [µSv/h]							
		I/2022	II/2022	III/2022	IV/2022	I/2023	II/2023	III/2023	IV/2023
1	Bohunice	0.099	0.094	0.108	0.102	0.107	0.102	0.110	0.097
2	Neznašov	0.131	0.132	0.127	0.138	0.136	0.138	0.126	0.129
3	Chrášťany	0.100	0.109	0.098	0.117	0.107	0.118	0.098	0.111
4	Týn nad Vltavou	0.099	0.107	0.103	0.110	0.103	0.112	0.102	0.103
5	Záluží	0.094	0.105	0.095	0.110	0.098	0.114	0.101	0.108
6	Koloděje nad Lužnicí	0.111	0.116	0.110	0.127	0.118	0.123	0.109	0.117
7	Týn nad Vltavou	0.104	0.111	0.106	0.115	0.108	0.116	0.108	0.109
8	Zvěrkovice	0.095	0.096	0.096	0.102	0.101	0.105	0.099	0.098
9	Březnice	0.095	0.103	0.091	0.109	0.100	0.111	0.092	0.103
10	Hněvkovice	0.083	0.096	0.087	0.102	0.088	0.106	0.089	0.097
11	U Palečků	0.092	0.097	0.097	0.101	0.096	0.105	0.098	0.099
12	Dobšice	0.084	0.091	0.085	0.097	0.091	0.099	0.087	0.093
13	Žimutice	0.084	0.088	0.084	0.094	0.092	0.097	0.086	0.089
14	Horní Kněžeklady	0.098	0.099	0.099	0.107	0.105	0.111	0.101	0.102
15	Pořežany	0.094	0.097	0.101	0.099	0.104	0.107	0.099	0.095
16	Modrá Hůrka	0.093	0.090	0.095	0.096	0.099	0.099	0.096	0.090
17	Litoradlice	0.083	0.083	0.083	0.090	0.089	0.092	0.083	0.085
18	Kostelec	0.096	0.098	0.096	0.106	0.103	0.110	0.093	0.101
19	Býšov	0.082	0.090	0.083	0.094	0.084	0.097	0.085	0.087
20	Purkarec	0.105	0.102	0.100	0.110	0.111	0.111	0.101	0.104
21	Poněšice	0.087	0.087	0.087	0.096	0.094	0.099	0.089	0.091
22	Coufalka	0.078	0.090	0.081	0.096	0.084	0.100	0.083	0.094
23	Chlumec	0.111	0.118	0.109	0.125	0.118	0.127	0.108	0.119
24	Nová Ves	0.103	0.111	0.102	0.116	0.105	0.119	0.104	0.112
25	Olešník	0.097	0.117	0.097	0.125	0.103	0.125	0.099	0.118
26	Zliv	0.097	0.112	0.096	0.119	0.103	0.121	0.095	0.114
27	*Kočín*	0.099	0.099	0.102	0.104	0.107	0.110	0.105	0.100
28	Dříteň	0.086	0.115	0.083	0.123	0.092	0.123	0.083	0.115
29	Dívčice	0.084	0.092	0.082	0.099	0.086	0.099	0.083	0.093
30	Malešice	0.089	0.098	0.090	0.106	0.096	0.108	0.093	0.101
31	Záblatí	0.095	0.099	0.098	0.106	0.099	0.109	0.100	0.103
32	Sedlec	0.089	0.085	0.090	0.089	0.095	0.095	0.095	0.087
33	Číčenice	0.107	0.108	0.105	0.111	0.112	0.115	0.107	0.110
34	Lhota Pod Horami	0.096	0.114	0.095	0.121	0.101	0.123	0.096	0.117
35	Těšínov	0.087	0.100	0.089	0.106	0.093	0.110	0.091	0.104
36	Krč	0.118	0.123	0.115	0.130	0.123	0.136	0.148	0.162
37	Protivín	0.161	0.165	0.158	0.172	0.161	0.174	0.162	0.169
38	*Temelín*	0.092	0.096	0.096	0.103	0.097	0.108	0.099	0.101
39	Tálín	0.149	0.150	0.148	0.158	0.153	0.161	0.152	0.154
40	Všemyslice	0.134	0.187	0.132	0.164	0.140	0.155	0.130	0.146
41	Všeteč	0.114	0.117	0.117	0.124	0.121	0.128	0.122	0.118
42	Albrechtice nad Vltavou	0.153	0.146	0.148	0.156	0.160	0.168	0.156	0.149
Average of all points		0.101	0.108	0.102	0.114	0.107	0.116	0.104	0.109

Source: Results of the Monitoring of Effluents and the Radiation Situation in the Vicinity of the Temelín Nuclear Power Plant, 2022 and 2023.

The results show that the measured values in the nearest municipalities of Temelín (local part of Kočín) and the municipality of Temelín itself are at or below the level of average values set from the entire area of the Temelín NPP emergency planning area.

The monitoring of the radiation situation at the Temelín NPP site is ensured by a teledosimetry system (TDS), which is part of the Temelín NPP Workplace Monitoring Programme. TDS comprises 24 measuring stations installed close to the border line of the Temelín NPP and continuously monitors the dose equivalent input of gamma radiation. The spatial dose equivalent input at these stations is comparable with the values of the natural background measured in the above mentioned emergency planning area. The radiation situation of the SMR Temelín NPP site will be monitored before SMR Temelín NPP is put into operation.

The dose equivalent input of gamma radiation in the vicinity of Temelín NPP is also measured within the early detection networks. The measured values including the TDS Temelín NPP system are sent on-line to the MonRaS database (SÚJB database). The measurement results in 2018-2023 show that the values are within the limits of the measurement results of previous years.

The outdoor environment is also monitored by measuring the area gamma activities of uncultivated and cultivated soils in a total of nine localities in the vicinity of Temelín NPP. Of the artificial radionuclides only caesium-137 is detectable which comes from global fallout, other artificial radionuclides are below the value of minimally detectable activities.

Atmosphere Monitoring

Atmosphere activity in the vicinity of Temelín NPP is monitored by following the activities of gamma-emitting radionuclides, strontium Sr-90 and gaseous forms of iodine I-131. Small environmental radiation protection stations (SRKO) located in Nová Ves, Litoradlice, Zvěrkovice, Bohunice, Sedlec, Týn nad Vltavou, České Budějovice and the Temelín NPP site. The volume activity of tritium during precipitation is measured at the Temelín meteorological station. The volume activity of atmospheric fallout is measured at Litoradlice SRKO and Zvěrkovice SRKO.

The results show that the activity of artificial radionuclides (except tritium) were below the value of minimum detectable activity in 2018 - 2023. The activity of tritium in precipitation water in 2018 - 2023 in most analysed samples did not exceed the value of the smallest detectable activity or was slightly above this value. The maximum measured activity of tritium in precipitation water in this period was 6.4 Bq/l. The activity of natural radionuclides such as Be-7, K-40 and Pb-210 significantly prevailed in the measured samples.

Water Monitoring

The activity of surface waters is monitored by measuring the volume activity of gamma radionuclides, the volume activity of tritium, total volume activity of alpha particles, total volume activity of beta particles and volume activity of strontium Sr-90. The measuring points at which monitoring takes place are Vltava - Hladná, Vltava - Solenice, Vltava - Hněvkovice (below the dam), Vltava - Kořensko (above the dam), Temelínec municipal landfill site, Bělohůrecký fishpond, Býšov retention basin and Býšov rainwater septic tank. Methods of laboratory semiconductor spectrometry, liquid scintillation spectrometry of beta particles and methods in accordance with ČSN 757611 and ČSN 757612 are used to assess samples.

In terms of the operation of Temelín NPP, the main attention in surface waters is devoted to monitoring radionuclides tritium H-3, caesium Cs-137 and strontium Sr-90. With the exception of tritium, most of the results of measuring the activity of artificial radionuclides is below the minimum detectable activity and all values are reliably below permissible contamination set out by Government Regulation No. 401/2015 Coll., on indicators and values of permissible contamination of surface waters and wastewaters. For the main source of activity of surface water, which is tritium, the maximum permissible activity is set at 3,500 Bq/l, while the measured values reach tens of Bq/l.

The activity of potable water is monitored by measuring the volume activity of tritium and the volume activity of gamma radiation. Measured samples are extracted from the well in Kočín and Temelín, and the public water main in Dříteň and Týn nad Vltavou. The volume activity of caesium Cs-137 in samples extracted in 2018 - 2023 did not exceed the lowest detectable value. The activity of tritium H-3 in most samples extracted during this period was also below the minimum detectable value. The highest measured activity of tritium in this period, i.e. 4.1 Bq/l, with a reserve meets the indicative value of 100 Bq/l set out in Government Regulation No. 401/2015 Coll., for the annual average of activity of water used for potable water treatment. In accordance with SÚJB No. 360/2016 Coll., potable water samples are also extracted twice per year to determine the volume activity of Sr-90, it level in the extracted samples has not exceeded the minimum detectable value.

The of ground water is monitored by measuring the volume activity of tritium in shallow and deep wells at the Temelín NPP site and its vicinity, in the well at Křtěnov and in the drainage wells at the Temelín NPP site and by measurement of the volume activity of gamma radiation in shallow and deep well at the Temelín NPP site and its vicinity. The most significantly monitored radionuclides in ground waters are tritium and caesium Cs-137. To sum up, it can be stated that for 2018 - 2023 the volume activity of caesium Cs-137 in ground water was below the limit of determination for all measured sites (within and outside the Temelín NPP). The activity of tritium in ground water of monitored wells in the vicinity of the Temelín NPP site was below or at the limit of determination. In some measured sites in the Temelín NPP site it was above the limit of determination, with the highest measures values in tens of Bq/l.

Monitoring Items of the Food Chain

Milk activity is monitored by measuring the volume activity of gamma radiation and volume activity of strontium Sr-90 in samples extracted from a cowshed in the Temelín NPP emergency planning area. Milk samples are extracted in fourteen-day intervals from the Dynín agricultural collective (Bohunice cowshed), or from the Všemyslice production and trade cooperative. The content of artificial radionuclides in extracted samples was below the values of minimally detectable activities in the period of 2018 - 2023. The measured values were lower in order than for the natural radionuclide potassium K-40.

The activity of fish is monitored by measuring the specific activity of gamma radiation in fish extracted in the Býšov retention basin or in a different water reservoir in the Temelín NPP emergency planning area. In the extracted samples, values of artificial radionuclides above the minimum detectable activity were detected only for caesium Cs-137, whose activity was lower in order than the activity of the natural radionuclide potassium K-40 in extracted samples.

Crops are monitored by measuring the activity of gamma radiation for agricultural crops, cereals, fruit, forest fruits, vegetables, feedstuffs and fodder crops. The sample extraction points lie in the Temelín NPP emergency planning area. The results of the assessment of activity of samples of agricultural plant production do not show the growing trend of the values of activity in comparison with the values of 1994 - 2000, i.e. before the commissioning of the Temelín NPP. The activity of most samples is below the minimum detectable value. The insignificant increase of Cs-137 activity in some samples obviously relates to the water deficient in soils during the growth of the relevant crops.

Monitoring of Sediments

The activity of sediments is monitored by measuring specific activity of gamma radiation in samples extracted at the Vltava - Hladná extraction points and Býšov septic tank and rainwater tank. In the samples from artificial radionuclides there was measurable activity of caesium Cs-137 which mostly comes from global fallout. Up to 2022 artificial radionuclide Cs-134 was also identified in sediments at the Býšov basin and tank and in the Vltava River in concentrations of 2 - 3 Bq/kg, whose occurrence is related to the leakage of steam generator no. 4 at the Temelín NPP unit 2 in June 2015. In 2023 the activity of radionuclide Cs-134 was below the minimum detectable value, which is related to its relatively short half-life of decay. The activity values of this radionuclide was smaller in order than for the natural radionuclide potassium K-40 and also lower than the investigation level as part of the Monitoring Programme of the vicinity of Temelín NPP (10 Bq/kg). The activity of samples of sediments affected and unaffected by the operation of Temelín NPP of the opening of the waste channel into the Vltava is monitored by the extended Temelín NPP Impact Monitoring Programme. The measurement results show that the impact of the operation of Temelín NPP on the activity of sediments is minimal and virtually unidentifiable.

Monitoring of Soils

The activity of soils is monitored by measuring the specific activity of gamma radiation and specific activity of strontium Sr-90 at the sites of Bohunice, Litoradlice, Nová Ves and Sedlec. Samples are extracted from a soil cross section at a depth of 0 - 5 cm. In the analysed samples only the activity of caesium Cs-137 of artificial radionuclides is measurable coming from global fallout, which is lower in order than the activity of the natural radionuclide potassium K-40. By measuring the activity of radionuclides in the soil as part of the extended monitoring of the impact of Temelín NPP on the environment, it is not possible to observe a trend even in the long-term of the development of the monitored radionuclides, with the exception of the slight fall in the activity of caesium Cs-137. This indicates that the activity of soil radionuclides in the vicinity of Temelín NPP is not affected by the operation of Temelín NPP.

C.II.3.3. Further Physical and Biological Characteristics

Further significant factor that should be taken into account have not been identified. In the affected territory there are a number of electrical power national grid and distribution network facilities, or telecommunication devices, operated always in accordance with the respective hygiene limits according to Government Regulation No. 291/2015 Coll., on health protection against non-ionising radiation, as amended.

The territory of the Project and its vicinity follows on to an area of heavy industry (Temelín NPP site), the state of the environment corresponds to this in its nature.

C.II.4. Surface and Ground Waters

C.II.4.1. Surface Waters

From the regional-hydrological point of view, the Project is located in the main basin of the Czech Republic - the Elbe Basin 1-00-00 (catchment area of the North Sea). According to the more detailed administrative differentiation, the affected territory belongs to area II of the partial basin of the Upper Vltava. In this area affected are the basin of the 2nd order 1-06 Vltava to Lužnice and 1-08 Otava and Vltava from Otava to Sázava, 3rd order 1-06-03 Vltava from Malše to Lužnice and 1-08-03 Blanice and Otava from Blanice to Lomnice. The location of interest lies in the detailed differentiation, i.e. the area for the location of the SMR and areas/corridors of technical infrastructure, in the basin of these watercourses:

- Strouha, hydrological order number 1-06-03-0730 with a basin area of 13.2 km^2,
- Palečkův brook, hydrological order number 1-06-03-0770 with a basin area of 11.6 km^2,
- Temelínský brook, hydrological order number 1-08-03-0792 with a basin area of 5.6 km^2,
- Malešický brook, hydrological order number 1-08-03-0793 with a basin area of 8.8 km^2,

The area of the SMR and area considered for extending the H construction site hinterland in the Malešický brook basin, the area of the E1 construction site equipment is located in the Temelínský brook basin, areas of the temporary F1, F2 construction site equipment, are delineated in the Palečkův brook basin and the area considered for extending the G construction site equipment is delineated in the Strouha stream basin.

In the wider hinterland there are water reservoirs and fishponds. The following are located in the vicinity of the Project:

- Dvorčice fishpond (ID 108030793003), k.ú. Kočín,
- Karlovec fishpond (ID 106030730004), k.ú. Knín,
- Hůrecký fish pond (ID 106030730013), k.ú. Březí u Týna nad Vltavou,
- reservoir (ID 106030770026), k.ú. Březí u Týna nad Vltavou,
- Oběšený fishpond (ID 106030730004), k.ú. Březí u Týna nad Vltavou,
- Nový fishpond (ID 106030770003), k.ú. Březí u Týna nad Vltavou,

- reservoir (ID 106030770023), k.ú. Křtěnov,
- reservoir (ID 106030770014), k.ú. Křtěnov,
- reservoir (ID 106030770019), k.ú. Křtěnov,
- reservoir (ID 108030792006), k.ú. Temelínec.

The following is affected by the technological infrastructure:

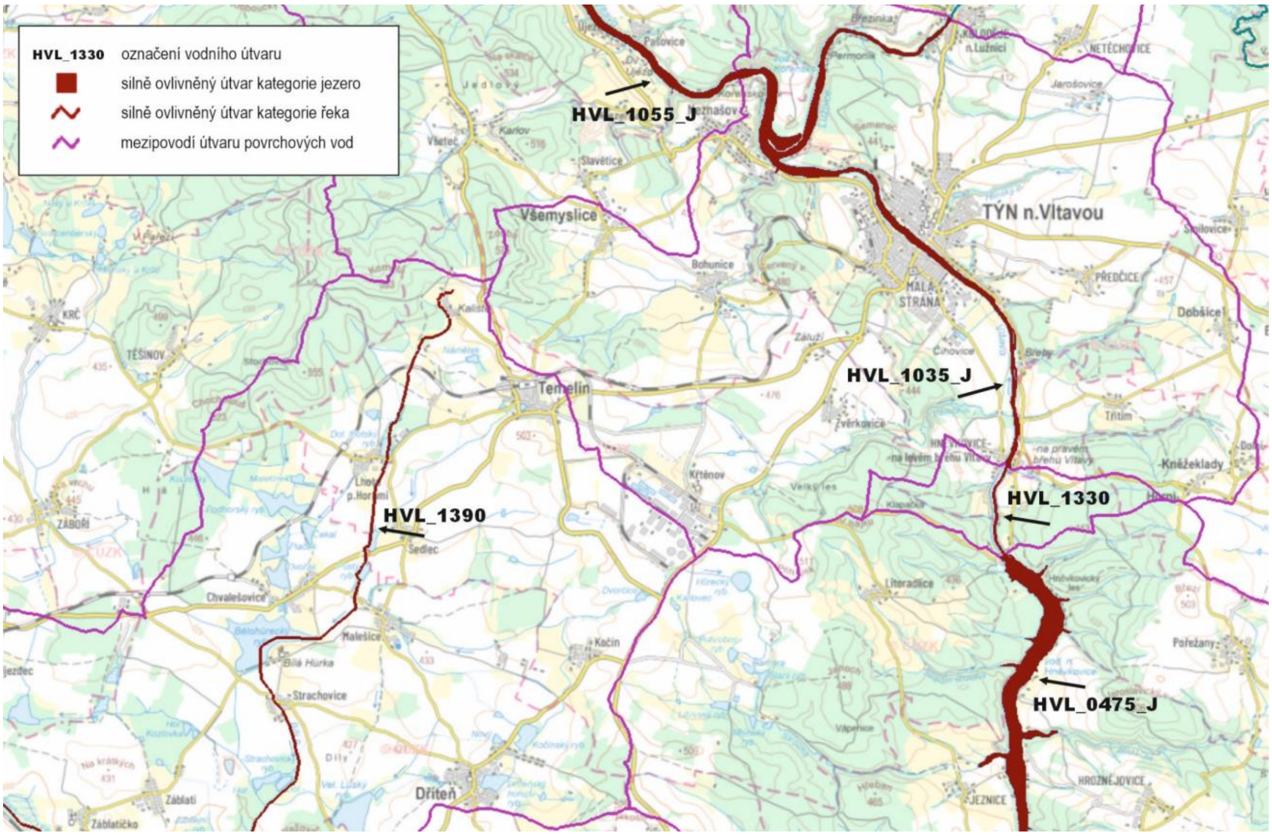
- Hněvkovice water reservoir (ID 106030760005), major water reservoir,
- Kořensko water reservoir (ID 107050010002).

The Hněvkovice water reservoir is the extraction point of the surface water of ČEZ's Temelín Nucler Power Plant (ID 111036).

The following water bodies of surface waters are delineated in the affected territory (in accordance with the Water Framework Directive[1]):

- HVL_1390 Radomilický brook from the source along the mouth to Blanice, river category,
- HVL_1035_J Kořensko reservoir on the Vltava River, lake category,
- HVL_3030 Vltava from the Hněvkovice reservoir dam to the backwater of the Kořensko reservoir,
- HVL_0475_J Hněvkovice reservoir on the Vltava River, lake category,
- HVL_1055_J Orlík I reservoir on the Vltava River.

Fig. C.4: Water Bodies in the Affected Territory



The existing assessment of the ecological state/potential and chemical state of these water bodies is based on the 3rd planning cycle 2021-2027 (source: https://heis.vuv.cz, https://www.pvl.cz)[2].

označení vodního útvaru	water body designation

1 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereinafter referred to as the Water Framework Directive). The aim of the Water Framework Directive is to avoid long-term deterioration of the state of surface and ground waters and improve the status of waters and water dependent ecosystems.

2 The main aim of the implementation of the Water Framework Directive is to generally achieve the good status for waters. The tool for achieving this objective is plans of basins, which are compiled in a six-year cycle (in 2010-2015, 2016-2021, 2022-2027) at three levels: international, national and sub-basin. The planning cycle comprises several key steps: characterisation of basins, identification of anthropogenic effects and assessment of their effects on the status of waters, setting up monitoring programmes, assessment of the status of waters, setting environmental objectives and draft measures to achieve them, potentially setting and justifying exemptions from achieving the environmental objectives.

silně ovlivněný útvar kategorie jezero	strongly affected lake category body
silně ovlivněný útvar kategorie řeka	strongly affected river category body
mezipovodí útvaru povrchových vod	surface water body interbasin

Table C.12: Results of the Assessment of the Ecological Status/Potential and Chemical Status of Surface Water Bodies

Water body ID	Category	Name	Hydromorphological nature	Ecological potential	Chemical status
HVL_1390	river	Radomilický brook from the source along the mouth to Blanice	strongly affected	destroyed	good
HVL_3030	river	Vltava from the Hněvkovice reservoir dam to the backwater of the Kořensko reservoir	strongly affected	damaged	not known
HVL_1035_J	lake	Kořensko reservoir on the Vltava River	strongly affected	destroyed	not known
HVL_0475_J	lake	Hněvkovice reservoir on the Vltava River	strongly affected	destroyed	not known
HVL_1055_J	lake	Orlík I reservoir on the Vltava River	strongly affected	damaged	not known

Assessment criteria

Ecological status/potential:	Chemical status:
• good and better potential • medium potential • damaged potential • destroyed potential	• good status • not achieving good status • unknown status

Note:

In water bodies of a strongly affected hydromorphological nature it is not possible from the essence of its definition to achieve a good ecological status. Therefore, the ecological potential of these bodies is determined and not their ecological status.

The results of the assessment of the chemical status and/or individual elements of the ecological potential are assessed for individual indicators and possible sub-elements. The resulting status or potential water body is determined as the worse result of the assessment of the chemical status and ecological status/potential. For an assessment is generally means that if at least one parameter in the element is unsatisfactory, the assessment of the entire element ("one-out – all-out" principle) is unsatisfactory.

The designation of a body as strongly affected (hydromorphological watercourse nature) relates to the physical change of the watercourse (stabilisation of banks, channelisation, amelioration) and utilisation of waters (supplying industry with water, energy, river transport, tourism and recreation, fish farming).

The ecological potential of lake category water bodies in case of HVL_1035_J, HVL_0475_J is assessed as destroyed, in case of HVL_1055_J as damaged while its status (with regard to the stated lack of data) was assessed only for the phytoplankton element. The physical chemical elements show a good and/or medium status, hydromorphological elements are not assessed. The predominant sources causing monitored indicators to be exceeded are directly discharged municipal wastewaters (from municipal wastewater treatment plants or direct discharge), agriculture (no discharge), or an unknown anthropogenic effect. In the case of river category water bodies HVL_1390 the ecological potential is destroyed as a consequence of the assessment of the status for the fish element, macrozoobenthos is assessed as damaged, phytobenthos as medium, other biological elements are not assessed. The physical chemical elements and hydromorphological elements show a medium and/or good status. The ecological potential of the water body HVL_3030 is assessed as damaged (stated as only phytoplankton), the physical chemical elements and hydromorphological elements show a medium status.

The chemical status of water bodies in case of HVL_1390 is designated as good, in HVL_3030, HVL_1035_J, HVL_0475_J and HVL_1055_J the status is designated as unknown. A situation when in a given representative cross section none of the chemical status indicators monitored as part of the Upper Vltava Sub-basin Area Plan is classified as unknown status. The status of such a body was, as a precaution, designated as "unknown" (formerly "good")[1]. However, it is generally true that the concentration of pollutants may not exceed the environmental quality standard set out by Government Regulation No. 401/2015 Coll., on indicators and values of permissible pollution of surface waters and waste waters, requisites of a permit to discharge waste waters into surface waters, and into sewers and on sensitive areas, as amended. Data on previous planning cycles assesses the chemical status of all water bodies as good.

The water body quality status in the vicinity of the Temelín Nuclear Power Plant is specifically assessed within the Programme of Monitoring and Assessment of the Impact of the Temelín Nuclear Power Plant on the Environment (VÚV TGM, v.v.i.). The comparison is made using general indicators of permissible pollution according to Government Regulation No. 401/2015 Coll., The following indicators are monitored: water temperature (t), soluble substances (SS_{105}), soluble inorganic salts (SIS), insoluble substances (IS_{105}), water conductivity, reaction (pH), sulphates (SO_4^{2-}), chlorides (Cl^-), oxygen (O_2), non-polar extractable substances (NES), anionic tensides, ammoniacal nitrogen ($N\text{-}NH_4^+$), nitrogen nitrate ($N\text{-}NO_3$), $CHSK_{Mn}$, $CHSK_{Cr}$, BSK_5, potassium (K), sodium (Na), calcium (Ca), magnesium (Mg), phosphorus - phosphate ($P\text{-}PO_4^{3-}$), total phosphorus (TP), hydrocarbons C_{10}-C_{40}, adsorbable organically bound halogens (AOX), cadmium (Cd), mercury (Hg).

The status of quality of surface waters in 2022 for monitored Vltava Hněvkovice cross sections and Vltava Kořensko left bank (LB) and right bank (RB) is presented in the following table. The benchmark is the values of permissible pollution, annual average value (AA), or environmental quality standard - annual average (EQS-AA) or environmental quality standard of highest permissible concentration (EQS-HPC) according to Government Regulation No. 401/2015 Coll., on indicators and values of permissible contamination of surface waters and wastewaters, requisites of a permit to discharge waste waters into surface waters, and into sewers and on sensitive areas, as amended.

1 This is a change as opposed to the previous method of assessment. Based on an expert assessment, the competent basin manager could designate its status as "good" in case that in the assessed surface water body there is no significant anthropogenic effect (point source, diffuse or spatial nature of pollution).

Table C.13: Status of Quality of Surface Water in 2022 (annual average value) in the cross sections of Vltava Hněvkovice and Vltava Kořensko LB and PB

indicator	Vltava Hněvkovice cross section	Vltava Kořensko LB cross section	Vltava Kořensko RB cross section	Annual average limit:
water temperature (t),	11.5°C	11.8°C	12.6°C	29°C
soluble substances (SS_{105}),	113 mg/l	139 mg/l	144 mg/l	750 mg/l
soluble inorganic salts (SIS)	73 mg/l	92 mg/l	96 mg/l	not stated
insoluble substances (IS_{105})	6.7 mg/l	10.8 mg/l	11.3 mg/l	20 mg/l
conductivity	163 µS/cm	211 µS/cm	209 µS/cm	not stated
water reaction (pH)	7.5	7.9	8.0	5-9
sulphates (SO_4^{2-})	13.7 mg/l	17.2 mg/l	17.0 mg/l	200 mg/l
chlorides (Cl^-)	12.5 mg/l	18.3 mg/l	18.7 mg/l	150 mg/l
oxygen (O_2)	8.9 mg/l	10.2 mg/l	10.4 mg/l	>9 mg/l
extractable substances (ES)	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l	not stated
anionic tensides	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l	not stated
ammoniacal nitrogen ($N\text{-}NH_4^+$)	0.14 mg/l	0.09 mg/l	0.09 mg/l	0.23 mg/l
nitrogen nitrate ($N\text{-}NO_3$)	0.9 mg/l	1.2 mg/l	1.1 mg/l	5.4 mg/l
$CHSK_{Mn}$	8.7 mg/l	10.4 mg/l	11.2 mg/l	not stated
$CHSK_{Cr}$	19.8 mg/l	26.1 mg/l	28.6 mg/l	26 mg/l
BSK_5	2.2 mg/l	3.6 mg/l	4.2 mg/l	3.8 mg/l
potassium(K)	2.9 mg/l	3.9 mg/l	3.8 mg/l	not stated
sodium(Na)	10.3 mg/l	13.2 mg/l	13.3 mg/l	not stated
calcium (Ca)	13.2 mg/l	16.8 mg/l	17.3 mg/l	190 mg/l
magnesium (Mg)	3.7 mg/l	4.6 mg/l	4.8 mg/l	120 mg/l
phosporus - phosphate ($P\text{-}PO_4^{3-}$)	0.03 mg/l	0.03 mg/l	0.03 mg/l	not stated
total phosphorus (P_{celk})	0.09 mg/l	0.12 mg/l	0.14 mg/l	0.15 mg/l
hydrocarbons C_{10}-C_{40}	0.1 mg/l	not monitored	not monitored	0.1 mg/l *)
adsorbable organically bonded halogens(AOX)	20.6 µg/l	not monitored	not monitored	25 µg/l *)
cadmium (Cd)	0.2 µg/l	not monitored	not monitored	0.45 µg/l **) ***)
mercury (Hg)	0.4 µg/l	not monitored	not monitored	0.07 µg/l **) ***)
*) limit according to EQS-AA **) limit according to EQS-HPC ***) soluble				

The limits of Government Regulation No. 401/2015 Coll., are also met in all monitored indicators. The values almost at limit level or exceeding the limit is identified in annual averages for the O_2 indicator in the Vltava Hněvkovice cross section where the minimum value of 0.9 mg/l was not observed, in the Vltava Kořensko RB cross section in concentrations of $CHSK_{Cr}$ and BSK_5. More than a 50% limit is shown in 2022 by indicators $N\text{-}NH_4^+$, BSK_5 and TP (Hněvkovice cross section).

In the case of the assessment of indicators of hydrocarbons C_{10}-C_{40} and AOX, the environmental quality standard- annual average (EQS-AA) was used as a comparison with measured values and for indicators Cd and Hg the environmental quality standard of the highest permissible concentration (EQS-HPC) according to Government Regulation No. 401/2015 Coll.,

Analyses of the statistically significant development trend in 2016-2022 shows an increased of $CHSK_{Cr}$ in all cross sections and $P\text{-}PO_4^{3-}$ in the Kořensko RB cross section. In contrast, a decrease was assessed for the SO_4^{2-} indicator in all cross sections and $N\text{-}NO_3$ in the Kořensko LB cross section. There were no statistically significant changes assessed in other cross sections, even if almost in all indicators (with the exception of $N\text{-}NH_4^+$, temperature and $P\text{-}PO_4^{3-}$) there is relative deterioration of quality between the Hněvkovice and Kořensko cross sections (increase in indicator values). In the case of O_2 the increase is assessed as positive.

The cadastral areas of Kočín, Temelínec and Chvalešovice are vulnerable areas according to Government Regulation No. 262/2012 Coll., on identification of vulnerable area and on the action programme.

The territory of the project is not part of any natural water accumulation protected area (CHOPAV) or surface water accumulation protected area. In the vicinity of the Project there are no delineated protected water zones and/or medicinal sources of surface waters and no extraction of surface water samples for human consumption is recorded here.

The Project does not lie in a flood area or in its active zone.

C.II.4.2. Ground Waters

The Project is located in the territory of the hydrogeological region of the basic layer of 6320 crystalline complex in the Middle Vltava basin. Crystalline complex rock can generally be assessed as a hydrogeologically insignificant structure. This is a poorly permeable rock complex with relatively better weathered mantle permeability, in a near-surface fissure disconnection zone, in tectonically fractured zones and in more rigid rock fills. The main collector of ground waters in a narrower location is the crystalline complex fissure network, then mostly near-surface fissure disconnection zone.

The crystalline complex mantle rock, Quaternary covers together with a surface fissure bedrock disconnection zone forms generally uniform irrigation of a shallow circulation system with porous-fissure permeability, which with increasing depth passes into a clear fracture permeability. The porous permeability of cover deposits and eluvial gneiss is low, corresponding on average to the value of = 2.8×10^{-7} m/s. The level of ground water is usually located at the interface of the Quaternary cover and eluvial crystalline complex or at the eluvial base, it is found in the Project area at an average of m units below ground.

In terms of chemical composition, these are waters with low overall mineralisation, neutral to slightly acidic, with a predominant representation of ions $Na\text{-}Ca\text{-}Mg\text{-}HCO_3\text{-}SO_4$.

The Project (in accordance with the Water Framework Directive[1]) affects the water body (WB) of ground waters of the basic layer of the 63201 crystalline complex in the Central Vltava basin - southern part. The data of the 3rd planning cycle is used for assessing the quantitative and chemical status of this water body (source: https://heis.vuv.cz).

Table C.14: Affected Water Body of Ground Waters and Its Status

Body number	Name	Quantitative status	Chemical status	Pollutant concentration trend
63201	Crystalline complex in the Middle Vltava basin - southern part	good	unsatisfactory	unknown/unclear
Assessment criteria	Quantitative status: • unsatisfactory, • good, • unclassified.	Chemical status: • unsatisfactory, • good, • unclassified.		Concentration trend: • unchanging or downward, • potentially upward, • significantly constant upward, • unknown/unclear.

The reason for the unsatisfactory chemical status (source: http://www.heis.vuv.cz) is the failure to achieve good status for indicators: class of compounds polycylic aromatic hydrocarbons (PAHs), nitrates, metals (Ni, Pb, Hg and their compounds), pesticides. Old environmental burdens and agriculture are stated as sources of contamination. For indicators for which an unsatisfactory status is classified, the pollutant concentration trend in the 3rd planning cycle is designated as unknown/unclear.

The quality of ground waters in the vicinity of the existing power plant, according to the continuous monitoring system in 2009-2022 (VÚV TGM, v.v.i.) is stable, without the detection of more significant negative changes. Nitrate (NO_3^-) concentrations are often recorded as lower than is currently usual in the Czech landscape, which is probably due to restrictions on settlement and agricultural activities in the territory since the construction of Temelín NPP. The specific characteristics of the natural composition of ground waters at the site have typically higher values of iron (Fe), conductivity, and also lower hardness of ground water.

The anthropogenic effect is most often seen in higher values of chemical oxygen consumption (CHSK) as an indicator of the content of biodegradable organic matter. These are values typical of an anthropogenically affected landscape. Alternatively slightly elevated values of some typical indicators appear locally such as ammonium ions (NH_4^+), hydrocarbons C_{10}-C_{40} and chlorides (Cl^-), metals in landfills. These are not severe values, limits are very often exceeded in maximum (not average) values for the assessed period.

In the vicinity of the Project there are no delineated protected water zones and/or medicinal sources and no extraction of surface water samples for human consumption is recorded here. In the area of the existing power plant there is a record of the extraction point of ground waters of ČEZ's Temelín NPP Březí (ID 111068) installed for the purpose of reducing the level of ground water.

The territory of the Project is not part of the natural water accumulation protected area (CHOPAV).

C.II.5. Land

C.II.5.1. Land

Land parcels for the location of the Project are mostly used for agriculture registered according to the real estate cadastre (land registry) as arable land and/or permanent grassland. There are a minority of land parcels intended for use as forest land.

Brown soils, or cambisols, predominate in the territory of interest (HP or KA according to the soils classification system of the Czech Republic), which predominate throughout the Czech Republic, or the most widespread soil type, are mainly formed by the weathering of crystalline rocks.

[1] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereinafter referred to as the "Water Framework Directive). The aim of the Water Framework Directive is to avoid long-term deterioration of the status of surface and ground waters and improve the status of waters and water dependent ecosystems.

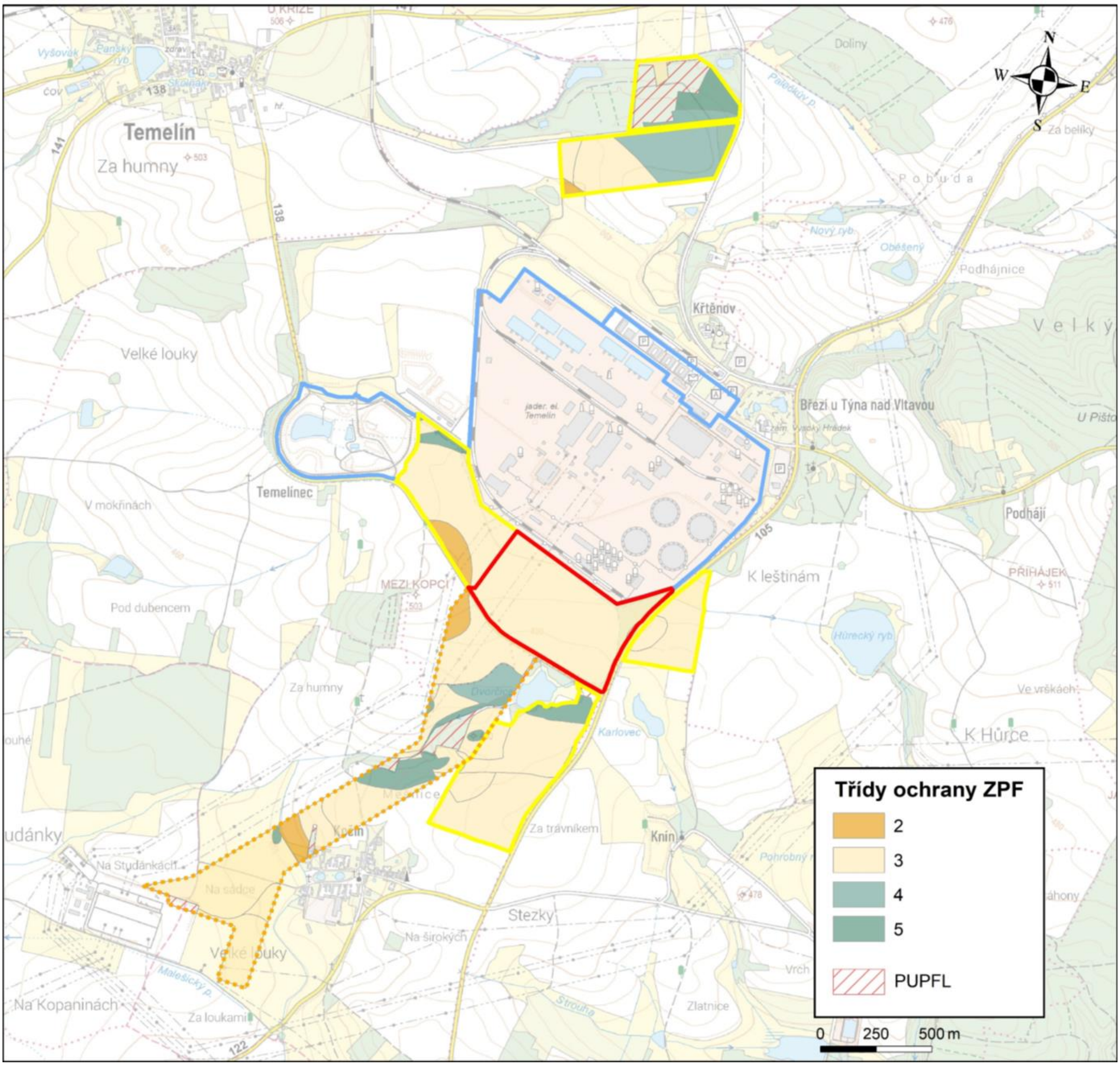
The soil types are cambisol gleyzation (Kag) and pseudogley, modal or typical cambisol (KAm), acidic meso basic cambisol (KAa) and ranker cambisol (KAs). Gley soils are concentrated above all along watercourses.

In the area of the main SMR construction site there is almost exclusively pseudogley soil (BPEJ 5.50.01, protection class III). These are soils with a low rate of infiltration, clay loam to clayey, of very poor production (on a scale from 6 to 100 the point yield is expressed by the value of 43). Its production potential, especially in the spring months, is affected, among other things, by excessive humidity delaying entry of mechanisation onto the land, fluctuations and periodic reduction of aeration and reduction-oxidation potential (periodically waterlogged soil).

Areas of temporary requisition (construction site hinterland, construction site equipment) comprise mostly brown soils belonging to II (In the minority), III, IV and V conservation class. These are medium to low quality soils (the content of humus strongly fluctuates, its composition is usually of lower quality), with a medium infiltration rate, medium to well drained, loamy-sandy to clay-loamy. The main drawback is the small thickness of the soil cross section and frequent skeletonization, locally affected representation of individual subtypes.

The definition of conservation classes in the affected territory is clearly shown in the following figure.

Fig. C.5: Conservation Classes of Agricultural Land Resources (ZPF) and Forest Land Parcels in the Project Areas



Note: Rated Soil Ecological Unit (BPEJ), and therefore also conservation classes are registered in the Research Institute for Soil and Water Conservation (VÚMOP) Register also for the area of Temelín NPP 1,2 units. Thus, they do not reflect land requisition for other than agricultural purposes in an earlier period. However, these are not ZPF and are therefore not presented here.

Třídy ochrany ZPF	ZPF conservation classes
PUPFL	Lands Intended for Forest Area (PUPFL)

The Project also affects land parcel intended for use as forest land (F2 area, corridor for offsite power transmission). In all cases, these are forests included in the managed forest category, whose main function is to produce wood material. In terms of pedology, the forest land usually comprises modal and lithic cambisols. These are lighter soils, permeable with a shallow humus horizon.

No ecologically significant elements, i.e. landscape components in agricultural landscape, are recorded in the areas of the project, which are defined in Government Regulation No. 307/2014 Coll., as amended.

The soils in the affected territory are not susceptible to the threat of water erosion. In the territory soils predominate that are included under the non-endangered (NEO) category, locally part of the land parcels are included in the slightly endangered (MEO) category. However, most of the soils in the territory of interest are threatened by wind erosion, or are susceptible to wind erosion. The cause is the excessive size of the land parcels with one type of crop, no windbreaks, whether naturally or artificially planted tree alleys, copses, etc. The lack of vegetation cover has a large influence on soil erosion. The occurrence of soil erosion is affected above all by climatic factors (wind intensity, direction and humidity) and soil structure, roughness of the soil surface and humidity of the soil.

C.II.6. Natural Resources

C.II.6.1. Natural Resources

In the area of Interest, there are no mineral deposits registered in the Czech Geological Survey - Geofond, there are old mines and mining subsidence areas. It is assumed that there are no geological or paleontological monuments given the nature of the area.

Delineated as closest to the Project (approx. 4.7 km northwards) are the protected deposit reserve of (ID 13990000) Bohunice nad Vltavou, exclusive deposit (ID 3139900) Bohunice nad Vltavou, exploitation mined area (ID 71125) Bohunice I. The mineral is a brick-making material of the diatomite nature - loam - clay - lignite - loess. This is a currently surface mined mineral.

C.II.7. Biodiversity

C.II.7.1. Biogeographical Characteristics of the Territory

According to the biogeographical differentiation of the Czech Republic (Culek 1996), the affected territory is part of the 1.21 Bechyňský bioregion. In the territory there is a predominance of 3rd oak-beech vegetation zone and 4th beech vegetation zone.

According to the zoogeographical differentiation (Mařan in Buchar 1983), the territory lies in the Czech section of foliaceous forests.

In terms of the regionally-phytogeographical differentiation (Skalický in Hejný et Slavík 1988), the territory is located in the phytogeographical area of mesophytic plants, in the circumference of Czech Moravian mesophytic plants, in the district of Czech Moravian mesophytic plants, in the district the South Bohemian highlands, in the sub-district of the Písecko-Hlubocký ridge.

C.II.7.2. Specially Protected Areas, Sites of Natura 2000 System

C.II.7.2.1. Specially Protected Areas

In areas for the location and construction of the Project or on the site of the existing power plant there are no specially protected area according to Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended, i.e. national parks (NP), protected landscape area (CHKO), national nature reserve (NPR), nature reserve (PR), national natural monument (NPP) and natural monument (PP).

The nearest specially protected areas are:
- Lužnice PP (approx. 6 km north-east),
- Velký and Malý Kamýk PR (approx. 8 km north-west).

In the immediate vicinity of the current Temelín NPP site (approx. 500 m south of the site edge) there is the Dvorčice fishpond, which is some documents is marked as a natural monument. However, this area has not been declared a specially protected area according to Section 14 of

Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended. The territory is rare above all for the occurrence of the Siberian iris *(Iris sibirica)*, aquatic birds and amphibians, the declaration of its territorial protection is not excluded in future.

C.II.7.2.2. Natura 2000 Sites

The Natura 2000 system is the European network of sites protected in the specific manner across all the EU member states. These areas were selected to be part of the system on the basis of their biodiversity and status of ecosystems that have to be prioritised from the EU point of view. Two types of protected areas are distinguished, so-called the sites of community importance (SCIs) and the bird protection areas (POs), within the Natura 2000 site system.

No sites of the Natura 2000 system, categorised in the national list according to Act No. 114/1992 Coll., as amended, are situated on or interfere with areas for the Project location and construction and the area of the existing power plant.

The following sites are situated nearest to the Project:

- Lužnice and Nežárka SCI, CZ0313106 (approx. 6 km north-east),
- Velký and Malý Kamýk SCI, CZ0310020 (approx. 8 km north-west),
- České Budějovice fishponds PO, CZ0311037 (approx. 7 km south-west),
- Hlubocké game parks, CZ0311036 (approx. 7 km south-east).

C.II.7.3. Natural Parks, Significant Landscape Components, Notable Trees

C.II.7.3.1. Natural Parks

In accordance with Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended, a natural park (PřP) serves to protect scenery with significant concentrated aesthetic and natural values, and a nature protection authority can restrict use of the territory that would result in destruction, damage or disturbance of its status.

No natural parks are situated on nor interfere with the areas for the Project location and construction and the area of the existing power plant. The closest to the Project is the Písecké hory national park, at a distance of approx. 7 km north-west of the Project.

C.II.7.3.2. Significant Landscape Components

According to Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended, a significant landscape element is defined as an ecologically, geomorphologically or aesthetically valuable part of landscape forming its characteristic appearance or contributing to maintenance of its stability. Significant landscape components are then determined at two levels, i.e., as VKP by law (these include all the forests, bogs, watercourses, fishponds, lakes, valley plains) or as registered VKP (these can also include other parts of the landscape that are registered by a nature protection authority).

Forests, watercourses and fishponds are situated in the area under consideration closest to the vicinity of the Project and construction site. The areas for the location and construction of the Project that concern these VKPs by law are:

- forest complex (area of the temporary F2 construction site equipment) - young forest stand mostly of oaks and pines, currently comprising a canopy screening the Temelín NPP from the nearest views,
- nameless tributary of the Hůrecký fishpond (are considered for extending the G construction site hinterland), crossing the north part of the G area - this is an artificial bed, dry at the time of the field investigation (May 2024), with accompanying stands of prunus,
- Dvorčický brook (area for SMR construction) - an artificial bed delineated along the eastern boundary of the Project territory, at the northern part of the territory the brook is piped, the unpiped part had no continuous flow at the time of the field investigation (May 2024).

According to some mapping documents, a nameless tributary of the Dvorčice fishpond is located at the southern part of the construction of SMR Temelín NPP, nevertheless currently (May 2024) these areas are visible and visually do not indicate the presence of a watercourse.

In the vicinity of the Project there are also the Dvorčice, Karlovec and Hůrka fishponds (significant landscape element (VKP) by law).

No registered VKP is located in the affected territory. The closest registered VKP lies within the territory of the Týn nad Vltavou municipality with extended powers (ORP):

- Fišárecká ditch VKP, approx. 6 km north-north-east,
- Lipová alley Kostelec VKP, approx. 6 km north-north-east.

C.II.7.3.3. Notable Trees

Notable trees under Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended, are defined as exceptionally remarkable trees, groups of trees, and rows of trees, which may be declared by the decision of the nature protection authority to be notable trees. Notable trees comprise three categories - notable trees as solitary, groups of notable trees and notable alleys. It is prohibited to damage, destroy notable trees and to disturb their natural development; their tending is carried out with the approval of the nature protection authority that declared their protection.

There is not notable tree in the affected territory. The nearest notable tree is:

- a solitary small-leaved linden, approx. 3 km east (in the urban area of the municipality of Litoradlice).

C.II.7.4. Territorial System of Ecological Stability

The territorial system of ecological stability (ÚSES) is defined within Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended, as an interconnected set of natural and altered, but naturally close ecosystems which maintain a natural stability. The main purpose of ÚSES is to enhance ecological landscape stability maintaining or restoring stable ecosystems and their interaction, the aim is to create an optimal spatial basis of ecologically stable areas (segments) in the landscape, ensuring the most optimal transfer of the gene pool through the landscape including their maximum positive effect on the surrounding less stable part of the landscape.

ÚSES comprises so-called compositional parts, which comprises supra-regional, regional and local biocorridors and biocentres, including so-called interacting elements.

The Project in not in territorial conflict with any supra-regional and regional ÚSES element. The nearest supra-regional and regional ÚSES elements are:

- NBK2 delineated within the Vltava River, approx. 5.5 km east,
- Janoch RBC, approx. 2.5 km east.

The following local ÚSES elements are located in the territory of interest of the nearest vicinity of the Project and construction site areas:

- Dvorčice fishpond LBC1a and the accompanying wetland herbaceous and woody plant stands, from the south adjacent to the Project areas, functional,
- LBK2a delineated alongside the Dvorčický brook, partly functional,
- Karlovec fishpond LBK3 and accompanying wetland, meadow and woody plant stands, part of the LBK only delineated in land planning documentation (ÚPD), but not implemented (areas for arable land, crossing through the road), part (area of the fishpond, its littoral stands and woody plant formations) is functional,
- LBK25 delineated partly on arable land, alongside woody plant stands lining the local road and alongside the nameless tributary of the Hůrka fishpond, partly functional,
- LBK26 delineated alongside the ecotone edge of the existing young forest, comprising plantations particularly of oaks and pines, functional,
- Hůrka fishpond LBC5a and accompanying meadow and woody plant stands, functional,
- IP14b delineated between extensive tracts of arable land, not functional.

The area for construction of SMR Temelín NPP is not in territorial conflict with any local ÚSES element. Areas for the construction site equipment will interfere with the following local ÚSES elements:

- IP14b - delineated in the eastern region of the H area,
- LBK 3 - delineated in the northern region of the H area,
- LBK25 - delineated alongside the eastern edge of the G area,
- LBK26 - delineated alongside the northern edge of the F2 area.

C.II.7.5. Fauna and Flora

The status of the flora and fauna in the affected territory was verified by a biological survey in the period of July 2023 to June 2024.

The surveys took into account the status of late summer and spring aspect of vegetation (botany) and occurrence of relevant groups of representatives of fauna: molluscs (malacology), insects (entomology), amphibians and reptiles (batrachology and herpetology), birds (ornithology) and mammals (mammalogy) including bats (chiropterology). The results of the field surveys are supported by data from the occurrence database of the Nature Conservation Agency of the Czech Republic - Species Occurrence Database AOPK ČR (NDOP) and other available sources (Bejček 2009, Kostkan 2017, 2019).

C.II.7.5.1 Flora

Botanical Survey

No specially protected or endangered plant species were found in the areas of interest for the construction of SMR Temelín NPP as part of botanical surveys. These are mainly agricultural land biotopes part of the SMR area, part of the area of the offsite power transmission corridor, F1 area, H area) with the introduction of common ruderal representatives (e.g. wintercress (*Barbarea vulgaris*), scentless chamomile (*Tripleurospermum inodorum*), red clover (*Trifolium pratense*), white clover (*T. repens*), tansy (*Tanacetum vulgare*), common thistle (*Cirsium vulgare*), creeping buttercup (*Ranunculus repens*), common vetch (*Vicia sativa*), field horsetail (*Equisetum arvense*), ground ivy (*Glechoma hederacea*), bushgrass (*Calamagrostis epigejos*), silverweed (*Potentilla anserina*), hairy vetch (*Vicia hirsuta*), horseradish (*Armoracia rusticana*), shepherd's purse (*Capsella bursa-pastoris*), tower rockcress (*Arabis glabra*), bugloss (*Lycopsis arvensis*), sticky mouse ear chickweed (*Cerastium glutinosum*), figwort (*Scrophularia nodosa*), thyme-leaved speedwell (*Veronica serpyllifolia*), field penny-cress (Thlaspi arvense), thale cress (*Arabidopsis thaliana*), white campion (*Silene latifolia*), field forget-me-not (*Myosotis arvensis*), nipplewort (*Lapsana comunnis*), Persian speedwell (*Veronica persica*), corn speedwell (*Veronica arvensis*), or with the introduction of ruderal to mesophytes (e.g. white dead-nettle (*Lamium album*), field chickweed (*Cerastium arvense*), ribwort plantain (*Plantago lanceolata*), germander speedwell (*Veronica chamaedrys*)).

Forms of woody plants in the area for the location of SMR are represented by the small-leaved linden (*Tilia cordata*), silver birch (*Betula pendula*), Scots pine (*Pinus sylvestris*), black pine (*Pinus nigra*) and fly honeysuckle (*Lonicera xylosteum*). The species identified in the forests and copses of the areas of the offsite power transmission corriodor (EL) were the English oak (*Quercus robur*), silver birch (*Betula pendula*), blackthorn (*Prunus spinosa*).

The F2 area particularly comprises approx. 30-year old, probably forest recultivation after the completion of Temelín NPP 1,2. The Scots pine (*Pinus sylvestris*), Norway spruce (*Picea abies*) and English oak (*Quercus robur*) particularly predominate in the plantation of trees and the silver birch (*Betula pendula*) can also be seen. The richest is the boundary of the forest growth appearing spontaneously comprising the woody plants silver birch (*Betula pendula*), pussy willow (*Salix caprea*) and European aspen (*Populus tremula*). The herb layer here is depleted and there is growth for example of bushgrass (*Calamagrostis epigejos*), wavy hair-grass (*Avenella flexuosa*) and white wood-rush (*Luzula luzuloides*).

C.II.7.5.2 Fauna

Malacological Survey

The survey detected the occurrence of a total of 9 species of molluscs, of this 8 terrestrial (white-lipped snail *Cepaea hortensis*, slippery snail *Cochlicopa lubrica*, field slug *Deroceras agreste*, rotund disc *Fruticicola fruticum*, freshwater snail *Galba truncatula*, Roman snail *Helix pomatia*, lovely vallonia *Vallonia pulchella*, shiny glass snail *Zonitoides nitidus*) and one water snail (dwarf pond snail *Galba truncatula*).

The investigated biotopes were all poor in species and not one of the identified species is protected in any way. A higher richness of malacofauna is assumed to be linked to the biotope of the Dvorčice fishpond, i.e. outside the immediate territory of the Project.

Entomological Survey

The survey detected the occurrence of a total of 36 species of insects, of these two are specially protected under Act No. 114/1992 Coll., as amended, listed in Decree No. 395/1992 Coll., as amended. One species is listed in the Red List of Invertebrates (ČS) (Farkač 2017). The complete list of all found species is presented in the table below.

Table C.15: List of Species Detected by the Entomological Survey

Species		Protection			Sub-area						
Scientific name	Common name	Section	Red List (ČS)	EU	SMR	EL	E1	G	H	F1	F2
Byctiscus populi	aspen leaf-rolling weevil				x						
Deporaus betulae	birch leaf roller				x						x
Taeniapion urticarium	seed weevil				x	x	x		x	x	x
Byturus ochraceus	raspberry beetle				x						x
Cantharis fusca	soldier beetle				x			x			
Poecilus cupreus	coppery-green ground beetle				x		x	x			
Coccinella septempunctata	seven-spot ladybird				x	x	x	x	x	x	x
Harmonia axyridis	Asian lady beetle				x	x	x	x	x	x	x
Tetrops praeustus	plum beetle				x						
Acalyptus carpini	Carpin's snout beetle				x			x			
Ceutorhynchus obstrictus	cabbage seed weevil				x						
Ceutorhynchus pallidactylus	cabbage stem weevil				x						
Ceutorhynchus typhae	brown blackish weevil				x						
Curculio glandium	acorn weevil				x						

Ellescus bipunctatus	weevil				x						
Lixus myagri	stem borer		vulnerable species (VU)		x						
Nedyus quadrimaculatus	small nettle weevil				x			x	x	x	x
Phyllobius pomaceus	short-nosed weevil				x		x		x	x	x
Phyllobius pyri	common leaf weevil				x						
Polydrusus cervinus	polydrusus weevil				x						
Tytthaspis sedecimpunctata	sixteen-spot ladybird				x	x		x	x	x	x
Trichosirocalus troglodytes	small weevil				x	x				x	x
Prosternon tessellatum	chequered click beetle				x			x			
Crepidodera aurata	willow flea beetle				x						x
Crepidodera aurea	flea beetle				x			x			
Malachius bipustulatus	common malachite beetle				x						x
Bombus	bumblebee	endangered species (O)			x			x	x	x	x
Formica	European red wood ant	endangered species (O)			x						
Polyommatus icarus	common blue butterfly				x						
Aglais urticae	small tortoise butterfly				x			x		x	x
Araschnia levana	map butterfly					x		x	x		
Inachis io	peacock butterfly				x			x			x
Anthocharis cardamines	orange tip butterfly				x			x			x
Gonepteryx rhamni	common brimstone butterfly				x	x		x	x		
Pieris brassicae	cabbage white butterfly				x			x			
Coenonympha pamphilus	small heath butterfly				x			x			x

Batrachological and Herpetological Survey

The survey detected 3 species of reptiles and 6 species of amphibians, mostly in the area considered for the extension of the construction site hinterland (H). All the found species are included among specially protected species according to the Act on Nature and Landscape Conservation (ZOPK) and Decree No. 395/1992 Coll., almost all listed in the Red List for the Czech Republic (Chobot 2017) in the category higher than least concern “LC” and are mostly part of the annexes to the Habitats Directive, see the table below. In the area of the offsite power transmission corridor no species of amphibians and reptiles were found.

Table C.16: List of Species Detected by the Batrachological and Herpetological Survey

Species		Protection			Sub-area						
Scientific name	Common name	Section	Red List (ČS)	EU	SMR	EL	E1	G	H	F1	F2
Lacerta agilis	sand lizard	highly endangered species (SO)	near threatened species (NT)	IV	x			x	x	x	x
Anguis fragilis	slow-worm	highly endangered species (SO)		-							
Natrix	grass snake	endangered species (O)	near threatened species (NT)	-					x		
Lissotriton vulgaris	smooth newt	highly endangered species (SO)	vulnerable species (VU)	-					x		
Triturus cristatus	northern crested newt	highly endangered species (SO)	endangered species (EN)	II, IV					x		
Bombina	European fire-bellied toad	highly endangered species (SO)	endangered species (EN)	II, IV					x		
Pelophylax esculentus	green/edible frog	highly endangered species (SO)	near threatened species (NT)	IV					x		
Rana dalmatina	agile frog	highly endangered species (SO)	near threatened species (NT)	IV					x		
Pelophylax lessonae	pool frog	highly endangered species (SO)	vulnerable species (VU)	IV					x		

Ornithological Survey

In the territory of interest a total of 8 specially protected species of birds were detected, part in the areas for the construction site equipment, part in the areas for the location of SMR. Some specially protected species (ZCHD) have no closer link to the affected areas (migrations, nesting bond to structures at the Temelín NPP site, different biotope preferences).

Winter surveys (2023) did not show occurrence of any species of owls in sub-areas of the Project. The subsequent spring surveys (2024) confirmed above all common species of birds inhabiting agricultural landscape with scattered greenery and groves of trees and bushes without hollow trees, i.e. copses created primarily by succession.

Table C.17: List of Species Detected by the Ornithological Survey

Species		Protection			Sub-area						
Scientific name	Common name	Section	Red List (ČS)	EU	SMR	EL	E1	G	H	F1	F2
Accipiter nisus	sparrowhawk	highly endangered species (SO)	vulnerable species (VU)		A	-	0	-	-	-	-
Alauda arvensis	Eurasian skylark			II	B	A	A	A	A	-	-
Apus	common swift	endangered species (O)			0	-	0	0	0	-	-
Ardea cinerea	grey heron		near threatened species (NT)		0	-	-	0	0	-	-
Buteo	common buzzard				0	endangered	0	0	0	0	0

						species (O)					
Circus aeruginosus	western marsh harrier	endangered species (O)	vulnerable species (VU)	I	0	-	-	0	0	-	-
Columba palumbus	common wood pigeon			II, III	C	endangered species (O)	0	0	0	B	A
Cyanistes caeruleus	Eurasian blue tit				C	-	-	A	-	B	A
Delichon urbica	western house martin		near threatened species (NT)		0	-	0	0	0	-	-
Emberiza citrinella	yellowhammer				B	B	A	A	A	A	-
Erithacus ribecula	European robin				A	-	A	A	-	A	A
Fringilla coelebs	common chaffinch				B	A	A	A	-	A	A
Hirundo rustica	barn swallow	endangered species (O)	near threatened species (NT)		0	endangered species (O)	0	0	0	-	-
Lanius collurio	red-backed shrike	endangered species (O)	near threatened species (NT)	I	A	-	-	-	-	-	-
Larus ridibundus	black-headed gull		vulnerable species (VU)	II	0	-	0	0	0	0	0
Motacilla alba	white wagtail				B	-	-	-	A	-	-
Motacilla flava	western yellow wagtail	highly endangered species (SO)	vulnerable species (VU)		-	-	-	B	-	-	-
Oriolus	Eurasian golden oriole	endangered species (O)			0	-	-	-	-	A	-
Parus major	great tit				B	-	-	-	-	A	A
Passer domesticus	house sparrow				-	-	-	-	-	-	-
Perdix	grey partridge	endangered species (O)	near threatened species (NT)	II, III	-	-	A	-	-	-	-
Phylloscopus collybita	common chiffchaff				B	A	-	-	-	A	A
Streptopelia decaocto	Eurasian collared dove			II	C	-	-	-	0	B	A
Turdus merula	common blackbird			II	B	A	-	-	0	A	B
Turdus philomelos	song thrush	highly endangered species (SO)	vulnerable species (VU)	II	B	-	-	A	-	A	-
Explanations: A - possible nesting B - probable nesting C - proven nesting, 0-flyover											

Only the following of the detected species are assumed to have a closer biotope link:

- sparrowhawk (Accipiter nisus),
- red-backed shrike *(Lanius collurio)*,
- western yellow wagtail *(Motacilla flava)*,
- Eurasian golden oriole *(Oriolus oriolus)*,
- grey partridge *(Perdix perdix)*.

Mammal Survey (land mammals)

The survey of small mammals (2023) recorded 25 taxons of land mammals. However, most of the recorded species belong to relatively common representatives of our fauna and these are mostly species capable of inhabiting non-forest biotopes, including intensively cultivated agricultural fields or scattered woody greenery in an agrarian landscape, these are typically small land rodents (e.g. voles, yellow-necked mice), insectivores (e.g. mole, hedgehog, common shrew), small carnivores (e.g. marten, fox) and ungulates (roebuck, pig), often living synanthropically.

Detected specially protected species of land mammals were observed in the wider area and their closer link to the areas of the Project was not confirmed even by the surveys themselves or available sources (Species Occurrence Database (NDOP), surveys of Bejček 2009, Kostkan 2017, 2019). These are the following:

- bicoloured white-toothed shrew (*Crocidura leucodon*), protection section - endangered species (O)
- red squirrel (*Sciurus vulgaris*); protection section - endangered species (O)
- Eurasian otter *(Lutra lutra)*, protection section - endangered species (O), Red List (ČS) - near threatened (NT), EU - II

Of the species included in the Red List of the Czech Republic, the European hare is found in the territory of interest. It is included in the near threatened category. It is a game farmed species whose population was significantly depleted in the 1970s (a decline of about 80%), despite the partial restriction of hunting, the number remains permanently at a reduced level (total and subpopulations) (Anděra and Hanzal 2017). It is widespread in the territory of interest.

A migration corridor of specially protected species of large mammals (wolf, lynx, bear, moose) crosses the area of the Project (areas of the temporary F1, F2 construction site equipment). The section of the corridor crossing the II/105 road between Březí u Týna nad Vltavou and Zvěrkovice is marked as critical.

Mammal Survey (chiroptera)

The survey detected the occurrence of a total of 9 species of flying mammals. All species belong to specially protected animal species according to Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended, and Decrees No. 395/1992 Coll.

Table C.18: List of Species Detected by the Chiropterological Survey

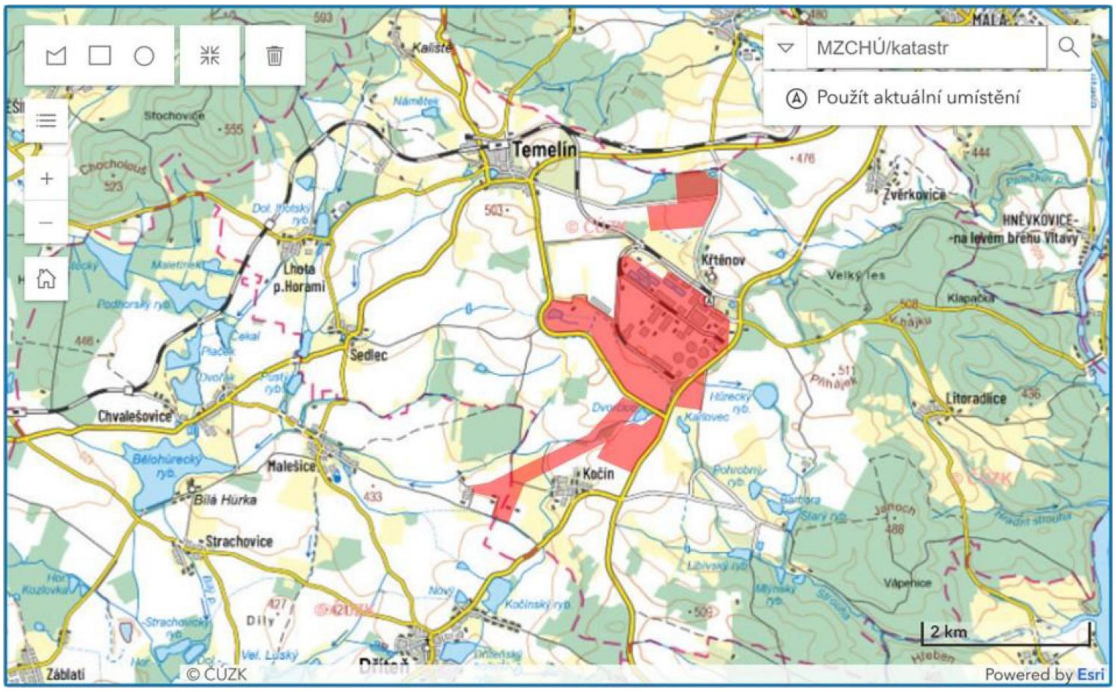
Species		Protection			Sub-area						
Scientific name	Common name	Section	Red List (ČS)	EU	SMR	EL	E1	G	H	F1	F2
Nyctalus noctula	Noctule bat	highly endangered species (SO)		II					x		
Pipistrellus nathusii	Nathusius' pipistrelle	highly endangered species (SO)		II					x		
Plecotus auritus	Brown long-eared bat	highly endangered species (SO)		II							x
Eptesicus serotinus	serotine bat	highly endangered species (SO)		II							
Myotis daubentonii	Daubenton's bat	highly endangered species (SO)		II					x		
Eptesicus nilssonii	northern bat	highly endangered species (SO)		II							
Plecotus austriacus	grey long-eared bat	highly endangered species (SO)		II			x				
Myotis nattereri	Natterer's bat	highly endangered species (SO)	vulnerable species (VU)	II							
Pipistrellus pygmaeus	soprano pipistrelle	highly endangered species		II					x		

		(SO)									

C.II.7.5.3 Analysis of the Species Occurrence Database of the Nature Conservation Agency of the Czech Republic (AOPK ČR) and Further Sources

As of 1 January 2014, the Species Occurrence Database of the AOPK ČR (NDOP) lists a total of 120 entries concerning 75 species of plants and animals (there are several entries for some species). Of this number, 20 species are specially protected and endangered according to Act No. 114/1992 Coll., and Decree No. 395/1992 Coll., 21 species are listed in one of the current red lists for the Czech Republic (red lists of 2017) and ten species are listed in some of the EU directives for the conservation of habitats, species and birds (Natura 2000 site network).

Fig. C.6: Extent of Territory Verified in the NDOP



MZCHÚ/katastr	Small-scale specially protected areas (MZCHÚ)/cadastre
Použít aktuální umístění	Use current location

Of the species which were confirmed by the surveys in the investigated areas, these are above all slow worm, sand lizard, grass snake, viviparous lizard, common quail and western yellow wagtail.

Areas of the Dvořice fishpond and its immediate vicinity were also included in the affected territory for the purposes of database analyses and historically conducted surveys (Bejček 2009, Kostkan 2017, 2019). This area/biotope is not in direct conflict with the Project, nevertheless it is immediately connected to it and is the habitat of protected species of plants and animals. Of the representatives of flora, these are 2 species (broad-leaved marsh orchid and Siberian iris), of the representatives of fauna 7 species of amphibians (European fire-bellied toad, common toad, European tree frog, edible frog, pool frog, agile frog, northern crested newt), 3 species of reptiles (slow worm, sand lizard, grass snake, viviparous lizard) and 5 species of birds (great reed warbler, common kingfisher, garganey, western marsh harrier, little grebe).

The territory is rare above all for the presence of a local wetland, which is the biotope of the Siberian iris. According to the communication of the Measures of a General Nature of the Regional Authority of the South Bohemian Region, there has been regular annual management since 2014 at the Dvorčice site, including above all manual mowing of permanently wet and fragmented meadows, cleaning of vegetation growth edges, removal of unwanted woody plants (above all willow suckers).

C.II.8. Landscape

From the historical--typological point of view, the affected territory belongs to the region of residential landscapes of High Middle Age colonisation. A larger part of the wider territory of interest represents a typical forest field landscape of medium highlands to Hercynian highlands, more continuously inhabited since the High Middle Ages. In the north western part of the wider territory interest (forested area of the ridges of Vysoký Kamýk) and larger enclaves of forest landscape spread alongside the Vltava River. Here the edge of the pond basin extends from the south-west and south, representing a unique type of landscape.

In terms of the utilisation of the territory and current vegetation cover, various types alternate within the wider territory of interest. Forest stands are mainly linked to the valleys of the rivers Vltava, Malše and higher positions in the area of the Vysoký Kamýk ridges, and hilly parts in the vicinity of Litoradlice and further south. The deforested plateaux are dominated by arable land, represented by numerous copses. The Temelín NPP site itself lies in a deforested enclave at a slightly elevated position. Towards the north-west, the terrain rises slightly into the forest field and forest landscape, where the wooded ridge of Vysoký Kamýk is more prominent. Towards the north and north-east the terrain gently slopes towards the Vltava valley. Týn nad Vltavou, situated in the Vltava valley, represents a relatively larger settlement. Its significant building development in recent decades has been spurred by the construction of the nearby Temelín Nuclear Power Plant, which is above all reflected by the prefabricated panel construction of residential buildings. Towards the south-west the terrain slopes gradually into the České Budějovice basin, where consolidated medium-sized and irregular shaped blocks of arable land are enhanced by numerous copses and fishponds. From many places in the vicinity of Temelín NPP southwards, panoramic views open out into the České Budějovice basin, where the Šumava foothills and Blanský forest with the Kleť peak can be seen on the horizon on days of clear visibility. In addition to the copses, numerous, mostly smaller ponds (especially in the south-west) as well as linear and riparian accompanying and alluvial vegetation along a dense network of watercourses and fishponds add variety to the landscape mosaic.

The Temelín NPP site itself represents a significant and extensive technical construction or set of buildings and is a dominant feature of the wider region whose technological objects and particularly the cooling towers with the characteristic plumes of water steam can be seen even from great distances. Corridors of particularly extreme and extra high voltage lines are concentrated in the area south of the Temelín NPP site, which converge from a wide area to the Kočín substation.

According to the general landscape nature of the South Bohemian Region (Vorel et al., 2009) the territory of interest lies in Bechyňsko-Vltavotýnsko a zone of landscape character (ObKR), the České Budějovice basin ObKR extends from the south-west, nevertheless the Temelín NPP site extends into the affected landscape area (DOKP) of a total of 11 zones:

- Písecko ObKR 05, marginally extends into the DOKP in the western part
- Milevsko ObKR 06, extends into the DOKP in the northern part
- Táborsko-Soběslavsko ObKR 07, extends into the DOKP in the eastern part
- Putimsko-Protivínsko ObKR 11, marginally extends into the DOKP in its north-western part
- Bechyňsko-Vltavotýnsko ObKR 12 , the entire territorial zone is within the DOKP
- Volyňsko-Prachaticko ObKR 13-, marginally extends into the DOKP in the western part
- České Budějovice basin ObKR 14 , the entire territorial zone is within the DOKP
- Lišovský práh-western Třeboňsko ObKR 15 , marginally extends into the DOKP in the south-eastern part
- Třeboňsko (Protected Landscape Area - CHKO) ObKR 16-, marginally extends into the DOKP in the eastern part
- Blanský forest (Protected Landscape Area CHKO) ObKR 22-, marginally extends into the DOKP in the southern part
- Kamenoújezdsko ObKR 23, marginally extends into the DOKP in the southern part

C.II.9. Movable Property and Cultural Heritage

C.II.9.1. Movable Property

In the Project location areas, there are no movable property (houses or other objects) of third parties that would be in spatial conflict with the Project. Most land parcels for the construction of SMR Temelín NPP is owned by an investor, some land parcels in the areas of the construction site equipment are owned by third parties. The surrounding roads are owned by the South Bohemian Region.

C.II.9.2. Architectural and Historical Monuments

There are no architectural or historical monuments at the Project location site.

The nearest feature of solitary architecture is a cast iron cross with a stone base, situated approx. 100 m south of the F1 area.

C.II.9.3. Archaeological Sites

The Project location site lies in a ÚAN III architectural site territorial category, this is territory where the occurrence of archaeological sites is not currently expected, but it cannot be fully excluded. Some parts of the territory under consideration (north-eastern quadrant of the SMR Temelín site construction areas, north-western tip of the E1 area and the entire F1 and F2 area) are included in the ÚAN IV architectural site territorial category, i.e. in territory without archaeological sites.

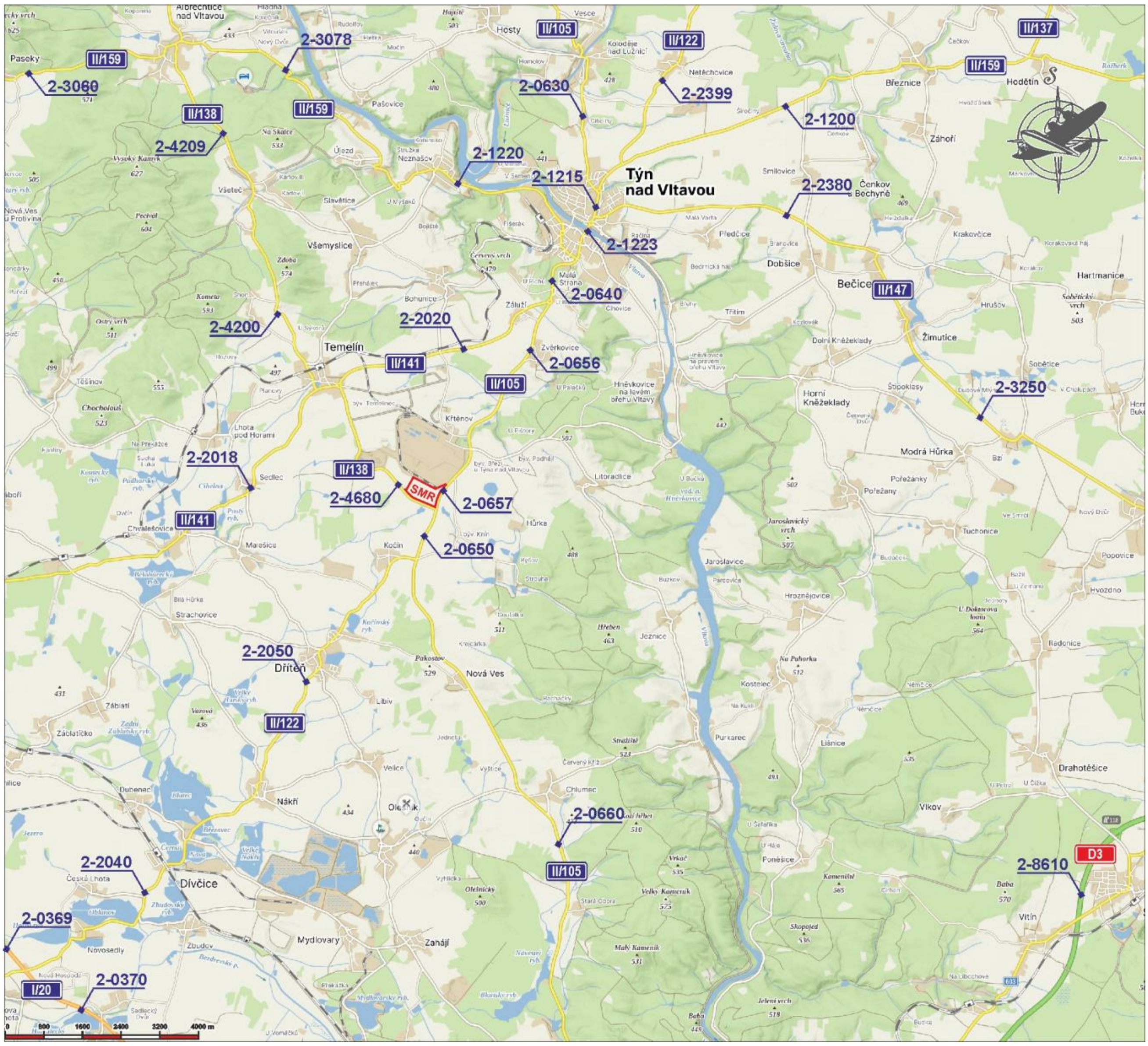
C.II.10. Transport and Other Infrastructure

C.II.10.1. Transport Infrastructure

The Project is located in the Temelín NPP site immediately next to the existing Temelín NPP site. The II/105 road provides the site's road traffic service, which runs immediately alongside the Temelín NPP site, the II/138 road section will also be used for access to the Temelín NPP site. These and related roads are part of the regional transport infrastructure with adequate capacity, construction and winter maintenance, including the preparation of construction bypasses of municipalities in the potentially most affected sections and thus ensure a problem-free link of the Project on a local and regional or national scale (especially the link to the D3 motorway and class I road).

The diagram of the communication network of the affected territory is shown in the following figure.

Fig. C.7: Diagram of the Communication Network of the Affected Territory, Road Numbers and Census Cross Sections



Traffic intensity in the communication network (according to the last current census of the Road and Motorway Directorate of the Czech Republic of 2020) is shown in the following table.

Table C.19: Traffic Intensity on the Communication Network of the Affected Territory, Year 2020

Road	Cross section	Annual average of daily traffic intensity [vehicles/24 h], year 2020			
		Heavy-duty vehicles (of these light-duty freight)	Passenger vehicles	Motorbikes	Total vehicles
II/105	2-0630	334 (194)	2488	27	2849
	2-1215	1252 (706)	6291	135	7678
	2-1223	1340 (716)	11743	179	13262
	2-0640	1187 (624)	6888	55	8130
	2-0656	910 (450)	4975	62	5947
	2-0657	857 (422)	5446	42	6345
	2-0650	857 (422)	5446	42	6345
	2-0660	1283 (586)	6418	99	7800
II/138	2-4680	306 (80)	786	4	1096
	2-4200	142 (60)	495	13	650
	2-4209	142 (60)	495	13	650
II/141	2-2020	461 (212)	1292	24	1777
	2-2018	376 (110)	774	8	1158
II/159	2-1200	343 (159)	1704	32	2079
	2-1220	295 (144)	1894	13	2202
	2-3078	121 (60)	767	48	936
	2-3060	278 (124)	1521	25	1824
II/122	2-2399	265 (132)	1307	13	1585
	2-2050	328 (104)	1520	46	1894
	2-2040	245 (74)	819	20	1084
II/147	2-2380	429 (172)	1419	18	1866
	2-3250	429 (172)	1419	18	1866
I/20	2-0369	2194 (912)	8457	83	10734
	2-0370	2194 (912)	8457	83	10734
D3	2-8610	3784 (1531)	10798	53	14635

There is a naturally growing traffic intensity development trend, the traffic intensity development coefficients (according to the Technical Conditions of the Ministry of Transport TP 225 Forecast of Car Intensity, correction no. 1, Ministry of Transport, October 2018) are listed in the following table.

Table C.20: Traffic Intensity Development Coefficients

Time horizon	Passenger vehicles				Light-duty freight vehicles				Heavy-duty vehicles			
	motorway	Class I	Class II	Class III	motorway	Class I	Class II	Class III	motorway	Class I	Class II	Class III
South Bohemian Region												
2016	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2020	1.05	1.05	1.05	1.05	1.06	1.07	1.07	1.08	1.04	1.04	1.04	1.04
2025	1.10	1.10	1.09	1.10	1.14	1.15	1.15	1.16	1.08	1.08	1.07	1.08
2030	1.13	1.13	1.12	1.13	1.26	1.26	1.24	1.25	1.12	1.12	1.10	1.11
2035	1.15	1.15	1.14	1.15	1.36	1.36	1.34	1.34	1.15	1.16	1.13	1.14
2040	1.15	1.16	1.14	1.15	1.40	1.40	1.38	1.38	1.18	1.19	1.16	1.16

Note: Considered are coefficients for distances up to 20 km from the regional capital, which includes most of the affected territory.

Considering the above data, it is possible to proceed from the following basic forecast of traffic intensity on the communication network of the affected territory, due to the natural development of traffic intensity (i.e. without the Project's effect), for the time horizon of 2040.

Table C.21: Traffic Intensity Forecast on the Communication Network of the Affected Territory, Year 2040 (without the Project)

Road	Cross section	Annual average of daily traffic intensity [vehicles/24 h], year 2040		
		Heavy-duty vehicles (of these light-duty freight)	Passenger vehicles + motorbikes	Total vehicles
II/105	2-0630	407 (250)	2741	3148
	2-1215	1522 (911)	7004	8527
	2-1223	1623 (924)	12995	14618
	2-0640	1436 (805)	7568	9003
	2-0656	1096 (581)	5490	6586
	2-0657	1032 (544)	5982	7014
	2-0650	1032 (544)	5982	7014
	2-0660	1537 (756)	7104	8640
II/138	2-4680	356 (103)	861	1217
	2-4200	169 (77)	554	723
	2-4209	169 (77)	554	723
II/141	2-2020	552 (273)	1434	1987
	2-2018	440 (142)	852	1292
II/159	2-1200	411 (205)	1892	2303
	2-1220	355 (186)	2079	2434
	2-3078	146 (77)	888	1034
	2-3060	332 (160)	1685	2018
II/122	2-2399	319 (170)	1439	1758
	2-2050	385 (134)	1707	2092
	2-2040	287 (95)	915	1201
II/147	2-2380	510 (222)	1566	2076
	2-3250	510 (222)	1566	2076
I/20	2-0369	2656 (1195)	9394	12050
	2-0370	2656 (1195)	9394	12050
D3	2-8610	4567 (2021)	11936	16503

As for other transport infrastructure, Temelín power plant is connected to the national railway network by a siding branching off from the Číčenice - Týn nad Vltavou line at Temelín station. This siding will be adopted or used for the SMR Temelín NPP.

Measures for water transport of oversized and heavy components are being prepared and implemented on the course of the Vltava (and further on the Elbe) in connection with the preparation of NJZ Temelín NPP particularly involving ensuring the possibility of reloading these components for overcoming transversal obstacles on the river course (waterwork dams), and for reloading between water and road traffic. These measures may also be used for the transport of oversized and heavy components for SMR Temelín NPP.

C.II.10.2. Other Infrastructure

All the usual technical infrastructure is available in the affected territory, i.e.

- national grid and distribution network of electrical power,
- water management systems,
- gas mains and pipelines,
- other networks.

national grid and distribution network of electrical power: The affected territory is characteristic, in view of its electrical power function, considerable amount of power lines of the national grid and distribution lines (including the relevant substations), intended for offside power transmission from power facilities to the electricity network (Kočín transformer station), connection with other elements of the national grid and link up to the distribution network for supplying cities and municipalities with electrical power. In addition, measures are prepared here for increasing their transmission capabilities and reliability. These systems are used for the Project of SMR Temelín NPP.

Water management systems: An independent water management system has been built in the territory for the operation of the Temelín Nuclear Power Plant, i.e. a pump station of raw water from the reservoir of the Hněvkovice waterworks and raw water force main into the water reservoir of the existing power plant, gravity mains of wastewaters into the Kořensko waterworks and precipitation waters into the Strouha stream and the Vltava River. These systems are used for any retrofitting/capacity, and for the Project of SMR Temelín NPP.

Gas mains and pipelines: Distribution gas mains for supplying the municipality and high-pressure gas mains of the transmission systems run through the affected territory. Their use for the SMR Project is limited, only for the purpose of supply the boiler plant which, however, will not operating constantly.

Other networks: A wire and wireless communication system is available in the territory (including the transmission of a radio and television signal), systems for the transmission of information of the power plant's emergency preparedness system, or further infrastructure. These systems will be adapted and used for the Project of SMR Temelín NPP.

C.II.11. Other Characteristics of the Environment

C.II.11.1. Rock Environment, Seismicity of the Territory

C.II.11.1.1. Rock Environment

C.II.11.1.1.1. Geomorphological Characteristics of the Territory

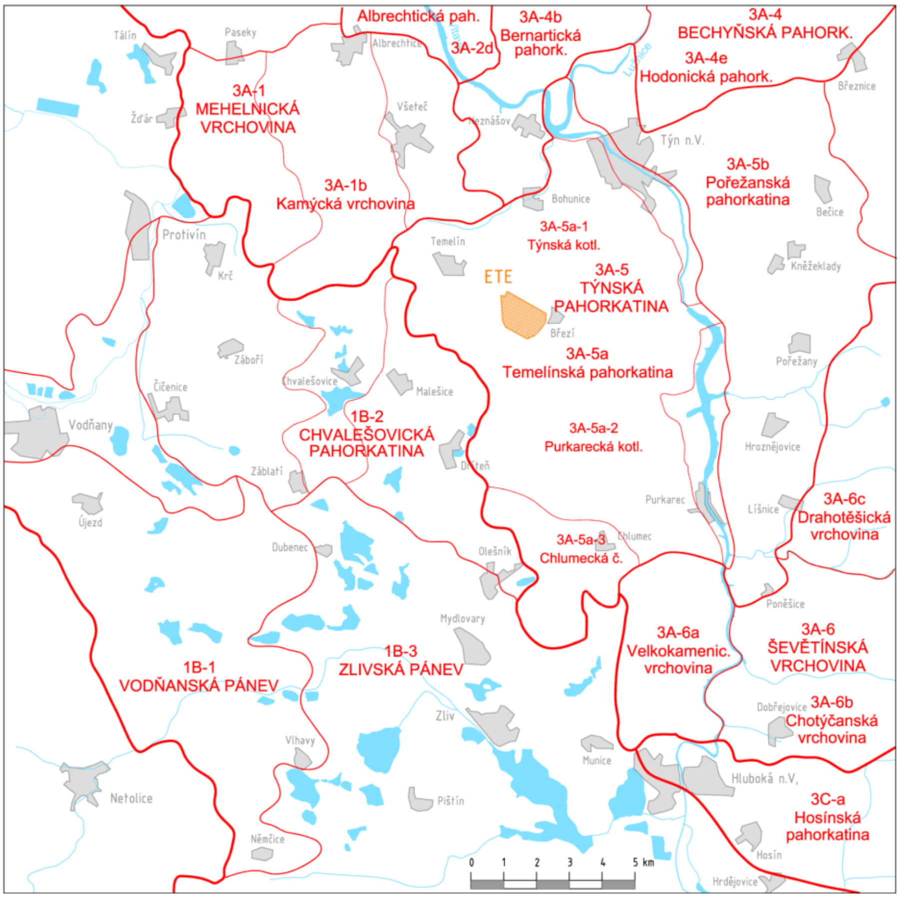
In terms of geomorphological differentiation (Demek, Mackovič a kol., 2006), the Temelín district belongs to the following units:

Province: Bohemian Massif
Sub-province: Bohemian-Moravian sub-province
Area: Central Bohemian highlands
Unit: Táborská highlands
Sub-unit: Písecká highlands
District: Týnská highlands

The Project is situated in the geomorphological district of the Týnská highlands. According to the areal differentiation of the present relief with the Týnská highlands district is differentiated into two sub-districts - Temelínská highlands and Pořežanská highlands.

The geomorphological differentiation of the territory of interest is clear from the following figure.

Fig. C.8: Areal Differentiation of the Relief in the Temelín NPP Site



Albrechtická pahorkatina	Albrechtická highlands
Bernartická pahorkatina	Bernartická highlands
Bechyňská pahorkatina	Bechyňská highlands
Hodonická pahorkatina	Hodonická highlands
Mehelnická vrchovina	Mehelnická highlands
Pořežanská pahorkatina	Pořežanská highlands
Karnýcká vrchovina	Karnýcká highlands
Týnská kotlina	Týnská basin
Týnská pahorkatina	Týnská highlands
Temelínská pahorkatina	Temelínská highlands
Chvalešovická pahorkatina	Chvalešovická highlands
Purkarecká kotlina	Purkarecká basin
Drahotěšická vrchovina	Drahotěšická highlands
Chlumecká část	Chlumecká part
Vodňanská pánev	Vodňanská basin
Zlivská pánev	Zlivská basin
Velkokaminická vrchovina	Velkokaminická highlands
Ševětínská vrchovina	Ševětínská highlands
Chotýčanská vrchovina	Chotýčanská highlands
Hosínská pahorkatina	Hosínská highlands

The Temelínská highlands are characterised mostly by a solid erosion denudation relief, more differentiated in the strip at the Vltava, with extensive aligned surfaces in the distribution areas (usually between 480-510 metres above sea level). The Project of SMR Temelín NPP is situated on one of these plateaux, at approx. 497 metres above sea level.

C.II.11.1.1.2. Geological Conditions

Geological Conditions in the Wider Vicinity

The existing Temelín Nuclear Power Plant, including the considered new nuclear source and SMR Project are situated in the southern part of the Bohemian Massif, in territory that is part of the Moldanubian complex. Since the Mesozoic the geological and tectonic development of this area has been influenced by the neighbouring Alpine mountain-building movements. Its individual phases were reflected in the tectonic activity of significant fault systems of the platform edge and influenced by the formation and development of basin structures in south Bohemia. The basins were formed in territory where two fault systems significant for the Moldanubian complex intersect - Blanický, in a north to north-east-south to south-west direction and Jáchymovský, north-west to south-east direction. The activity of these systems gave rise to the emergence of the significant basin structures and allowed the paleogeographic expansion of Cretaceous and Tertiary sedimentation.

The crystalline foundation of this area is the Moldanubian complex, which is represented here by both its litofacial units - monotonous and colourful series. The structure of the Moldanubian crystalline complex was plastically and ruptually formed in several phases right up to the Paleozoic, while the older structures were repeatedly activated and reshaped.

The most widespread rocks are biotic, biotic-sillimanite to biotic-cordieritic paragneiss and migmatites, in places with quartzite, amphibolite, granulite and orthgneiss veins. These metamorphites are the product of complicated polyphase deformation of a nappe nature of the Cadomian Orogeny, Hercynian Orogeny metamorphic and deformation cycle.

The present morphology of the South Bohemian region in which the Project of the SMR Temelín NPP site is located as the result of long-term geological development influenced by tectonics, sedimentation and erosion. The development of the South Bohemian region was fundamentally influenced by Alpine folds, whose individual phases were reflected in the tectonic activity of Hercynian and older fault systems of at the edge of the Bohemian Massif. In the individual phases of the revival of the activity of these faults, which were manifested by inverse, mainly vertical movements, there was Senonian, Paleogene, Miocene and Pliocene sedimentation. While the Senonian sediments were tectonically disrupted by vertical fault movements in the order of hundreds of metres (up to 300 m), in contrast, the Miocene and Pliocene sedimentation developed in conditions of regional tectonic activity, without significant vertical fault movements. In the Pleistocene the waning tectonic activity manifested itself above all in the south (in the border mountains) and gradually reverberated towards the north.

Geological Conditions in the Territory of the Construction and its Immediate Vicinity

In terms of the geological structure, the substratum of the area under consideration and its near vicinity consists above all of monotonic series of Moldanubian metamorphites, comprising a complex of sillimanite-biotitic paragneiss and migmatites. Veins or irregular granitoid rock bodies cut across this complex primarily in a south-eastern-south-western direction. The predominant rock type is leucocratic granite veins, represented abundantly by pegmatites and vein quartz.

The rock massif of the “Vltava-Týns crytalline complex” represents a minimally tectonically disturbed fault block comprising of various degrees of isochemically migmatised paragneiss, with heterogeneity essentially limited to the alternation of finer banded and massive positions. A significant stabilising element is relatively intensive calcification.

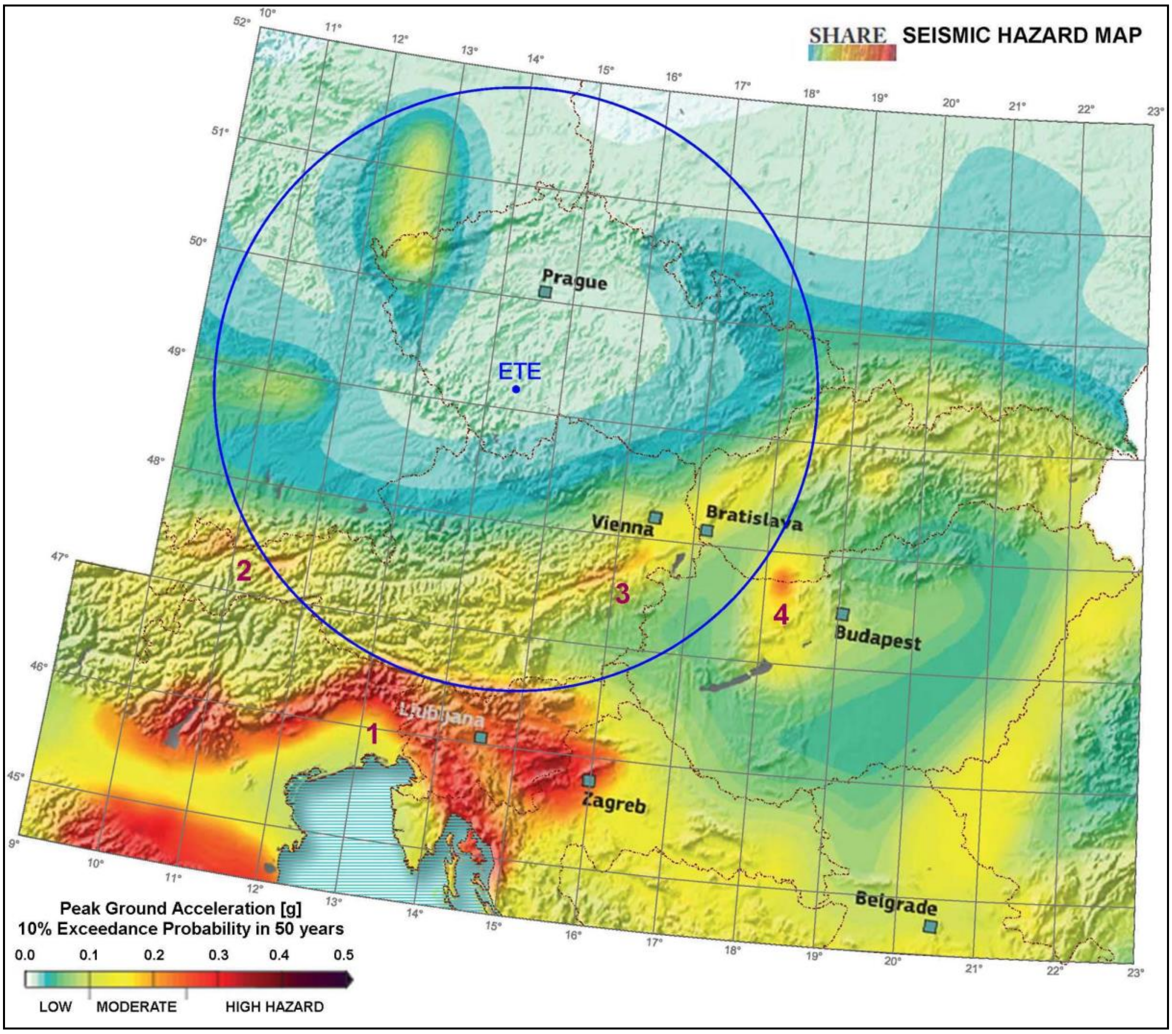
A thin layer of Quaternary cover then lies on the heavily weathered crystalline substrate. The Quaternary cover comprises primarily loamy-sandy sediments, with a small proportion of lay loans or clayey gravel based on the covering layer complex.

C.II.11.1.2. Seismicity of the Territory

The territory of the Czech Republic is situated in a seismotectonic domain, which is characterised by a low to moderate seismicity. Most of the territory of the Czech republic, including the Project site, is part of an area with macroseismic intensity value of V to VI on the MSC-64 scale. Seismicity is assessed in accordance with Decree No. 378/2016 Coll., on the location of a nuclear facility, as amended, to a distance of 300 km from the Temelín NPP site. The region of interest is affected by east Alpine earthquakes, which spread into the Bohemian Massif with reduced attenuation.

The Interactive Map of Seismic Hazard, produced as part of the SHARE project (Seismic Hazard Harmonization in Europe, 2013), is clearly shown in the following figure.

Fig. C.9: Section from the Seismic Load Map



Legend: 1 - Friuli, 2 - Inntal, 3 - Mur-Mürz fault system, 4 - Komárno

The map shows the distribution of the value of peak ground acceleration (PGA) expected in the territory of Europe with a 90% probability of not exceeding in a period of 50 years (with a return period of 475 years).

The last revalidation of the seismic exposure of the Temelín NPP site was carried out in 2022[1]. During the probabilistic approach and state-of-the-art processes recommended by the IAEA was applied. A logic tree was created in which 4 alternative models of seismic sources were included. Three branches of the logic tree represented traditional seismic source models - model of small scale aerial seismic source zones (SASZ), model of large scale aerial source zones (LASZ) and model of fault source zones (F1). Bayesian statistics (model SV1.0) was applied to create the fourth branch of the logic tree covering aerial and fault sources. In both approaches zones of diffuse seismicity were also included in the models.

The construction of the models was based on a newly compiled catalogue of earthquakes, drawn up in the framework of the SIGMA 2 project [2] and the Technology Agency of the Czech Republic (TACR) - seismic map [3].

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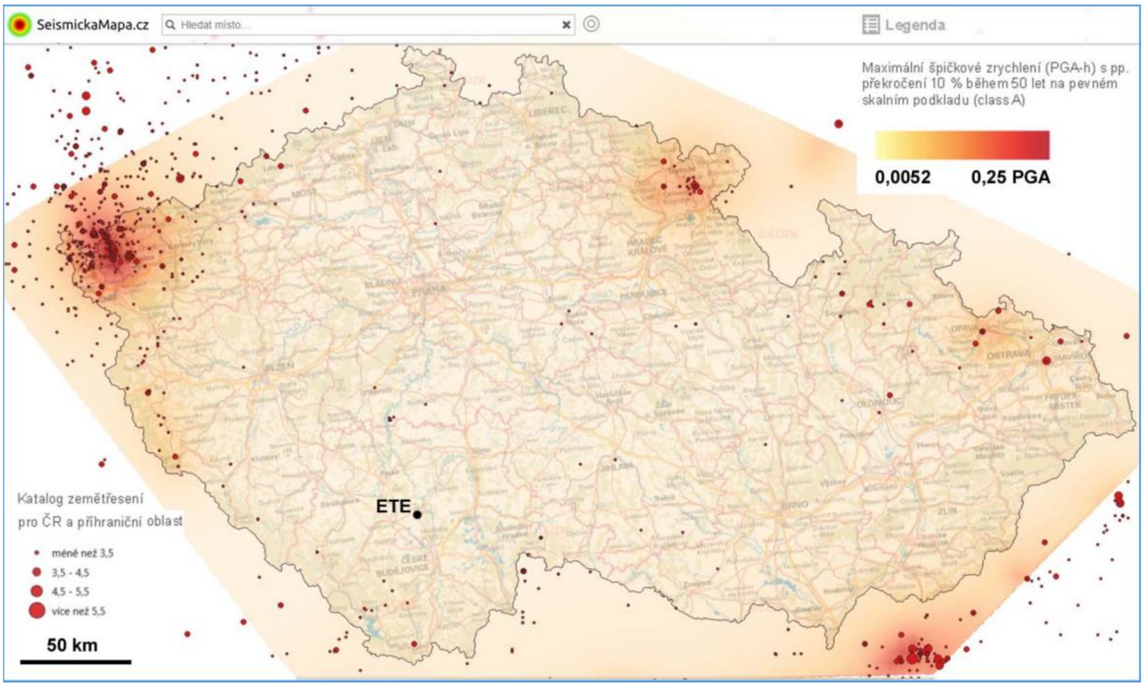
1 Málek, J., Vackář, J., Prachař, I., Špaček, P., Eds., 2022. Probabilistic Seismic Hazard Assessment (PSHA) of the Temelín NPP/Dukovany NPP Site. Technical Report. Institute of Rock Structure and Mechanics of the Czech Academy of Sciences, Prague; IPConsult, Prague; Institute of Physics of the Earth, Brno. ČEZ, a.s., Prague, 12/2021

2 Prachař, I., Pazdírková, J., Prachařová, H., Pazdírek, O., Krunčík, L., Lachová, B., 2020. CZ-NEC - The Revision of the Czech National Earthquake Catalogue. Version CZ-NEC_2021. Report No. SIGMA2-2020-D2-046/2 compiled in the framework of the SIGMA 2 Project "Research and Development Program on Seismic Ground Motion". IP Consult, Prague & Institute of Physics of the Earth, Masaryk University, Brno

3 Málek, J., Vackář, J., Prachař, I., 2023. Interactive seismic map. Technical Report. Institute of Rock Structure and Mechanics of the Czech Academy, Prague, IPConsult, Prague. Prague, 09/2023. Available at https://seismickamapa.cz a Prachař, I., Pazdírková, J., Fojtíková, L., 2023. TACR_v2023. Earthquake Catalogue. Interactive map of seismic hazard of the Czech Republic. Research project TK03010160. THÉTA program to support applied research, experimental development, and innovation. Institute of Rock Structure and Mechanics of the Czech Academy of Sciences, IPConsult Praha, 2023

Fig. C.10: Preview of the Screen of the Seismic Map of the Czech Republic Produced in the Framework of the TACR project (2023)



SeismickaMapa.cz	SeismickaMapa.cz
Hledat místo	Find site
Legenda	Legend
Maximální špičkové zrychlení (PGA-h) s pp. překročení 10 % během 50 let na pevném skalním podkladu (class A)	Maximum peak ground acceleration (PGA-h) with the probability of exceeding 10% in 50 years on a solid rock base (class A)
0,25 PGA	0.25 on PGA
Katalog zemětřesení pro ČR a příhraniční oblast	Czech National Earthquake Catalogue and Border Area
méně než 3.5	less than 3.5
více než 5,5	more than 5.5

Furthermore, 6 attenuation relations were used (GMM models). These changes led to a more accurate estimate of the seismic risk and to reduce epistemic uncertainties. The new calculation was successfully discussed at the IAEA SEED Mission in May 2022.

In accordance with the requirements of the Czech regulator (SÚJB), the following values of seismic design motions were determined from the probability curves of a seismic hazard for Temelín NPP[1]:

- SL1 = 0.004 g,
- SL2 = 0.038 g.

Current calculations of the seismic hazard for the Temelín NPP site confirms the accuracy of the original estimate of seismic hazard and adequate reserve of the received value SL2 = 0.1 g, used as project input of the existing nuclear installations at the Temelín NPP site (operated Temelín NPP 1,2 and SVJP).

The required minimum seismic resistance for the SMR Temelín NPP Project, represented by postulated peak ground horizontal acceleration (PGAH) of the substratum of the nuclear facility will, in accordance with the requirements of SÚJB Decree. 329/2017 Coll. and international recommendations for a site with a low seismic hazard value, be equal to 0.1 g, and therefore with a reserve higher than the specifically determined seismic hazard value of SL-2 for the Temelín NPP site.

C.II.11.2. Old Environmental Burden

The surveys conducted in the territory intended for construction of the Project do not provide proof of the existence of an environmental burden.

The Temelín NPP site and its vicinity, including the SMR Project site are not recorded as a site with a predicted and/or verified environmental load according to the Registration System of Contaminated Areas (SEKM) database.

[1] SL1 is the average value of the peak surface horizontal acceleration during an earthquake, which occurs on average once in 100 years, this value is therefore very likely to occur during the lifetime of the power plant. SL2 is the median of peak surface horizontal acceleration during an earthquake which occurs on average once in 10,000 years, this value is therefore very unlikely to occur during the lifetime of the power plant, but it needs to be prepared for it.

C.II.11.3. Mining Subsidence Area

According to the Czech Geological Survey (CGS) database, there are no old mines or mining subsidence areas at the Project site and in its immediate vicinity, translational landslides or rock falls are not registered here.

C.II.11.4. Further Characteristics of the Environment

No other characteristics relevant to the Project are specified.

D.

(DATA OF PROJECT EFFECTS ON PUBLIC HEALTH AND THE ENVIRONMENT)

D. DATA OF POSSIBLE SIGNIFICANT PROJECT IEFFECTS ON PUBLIC HEALTH AND THE ENVIRONMENT

D.I.

CHARACTERISTICS OF POSSIBLE EFFECTS

1. Characteristics of Possible Effects and Estimate of their Size and Significance (in terms of probability, duration time, frequency and reversibility)

D.I.1. Effects on the Population and Public Health

D.I.1.1. Health Effects and Risks

D.I.1.1.1. Radiation Effects

In terms of the Project's possible effects on population and public health, an ionising radiation effect can be considered to be the most monitored (thereby also the most closely analysed), i.e., the effect of radioactive effluents from the SMR Temelín NPP (in concurrent effect with radioactive effluents of the other nuclear facilities at the site) into the environment, i.e., into the atmosphere and watercourses. These effluents become part of the ecosystem and their radioactive components, spread in various ways, are subsequently received by population by their presence in the environment, by inhalation and ingestion.

Given the considered the radioactive effluents from the Project, the existing effects of radioactive effluents from the nuclear facilities at the site as well as a generally insignificant percentage of nuclear power causing population exposure to radiation (for more detailed information, see Chapter C.II.3.2. Ionising Radiation, page 79 of this Notification), the Intent negative effects on population health are not assumed, even when concurrent effects of the other nuclear facilities in the site are taken into account.

However regardless of this fact, the effects on population and public health will be assessed in the Project environmental impact documentation, i.e., based on detailed calculations of effects of radioactive effluents into the atmosphere and of liquid radioactive effluents, i.e., determination of effective doses and committed effective doses for the most affected groups of population. An assessment will be carried out by both direct comparison with general legislative limits and (primarily) up-to-date health risk assessment processes.

The globally used health risk assessment method is used to prevent and minimise health risks whose source is a broad spectrum of chemical, physical and/or biological factors. This method is used in the process of determining permissible limits of harmful factors in the human environment, however its is the only method of how to assess human exposure to factors for which no limits are determined in terms of public health. However, this method makes it possible to gain further information about possible health effects than in a simple comparison with applicable legislative limits for factors which have binding legislatively set limits.

In the Czech Republic the health risk assessment method is regulated by processes set out in the guidelines of the Ministry of Health of the Czech Republic and Ministry of the Environment of the Czech Republic, which reflects the constantly developing processes within the European Union and United States Environmental Protection Agency (US EPA).

The health risk assessment method is based on the precondition that a certain degree of risk of detriment to health always exists and it cannot be avoided. The risk can be minimised, but not excluded. Therefore, achieving a zero health risk is virtually excluded in methodical terms and it is not even necessarily an attainable goal. However, the risk must be minimised to a bearable level.

The health risk assessment consists of four consecutive steps:

- Hazard identification,
- Dose - response assessment,
- Exposure assessment,
- Risk classification.

Hazard identification: It is an initial qualitative introduction to the Project, assessed site, relevant pollutants and circumstances of their potential adverse effect on the population. The basic output of this step is a list of health-significant pollutants and justification of the process used for their selection. The list is supplemented with a description of basic physical, chemical and toxicological properties of selected pollutants and their movement and prospective transformations in the environment, exposure pathways, effects in the human body, and possible health effects.

Dose - response assessment: This step identifies the relation between the level of exposure and size of risk. The hazard is usually expressed for each pollutant as a lifetime risk at unit exposure.

In terms of the health effects, pollutants are divided into two basic categories:

- Pollutants with a threshold effect, for which it is assumed that exposure has no adverse effect up to a certain level (threshold). The significance of the effect above the threshold level then increases with an increasing degree of exposure. This group includes most toxic substances as well as so-called deterministic effects of ionising radiation.
- Pollutants with a no-threshold effect, for which a certain adverse effect already from the lowest exposures is assumed. So risk increases with exposure already from its zero level. This group includes most carcinogenic substances as well as so-called stochastic effects of ionising radiation.

Assessments of a risk of threshold and no-threshold pollutants are in principle different.

A respective threshold, abbreviated to NOAEL (No Observable Adverse Effect Level), is determined for pollutants with a threshold effect on the basis of research works with experimental animals and epidemiological studies of people. This threshold is a measure of toxicity of a given substance (the lower the threshold, the more toxic the substance). On the basis of the NOAEL value and a safety factor and an uncertainty factor, the RfD (Reference Dose) value or the RfC (Reference Concentration) value is then calculated, usually by three to four orders lower (i.e., stricter) than the NOAEL value. RfD or RfC values are defined as an estimate of exposure to human population (including sensitive groups) that does probably not cause detriment to health during the lifetime effect.

A level of exposure considered to be "acceptable" is determined on the basis of scientific knowledge for pollutants with a no-threshold effect. It is abbreviated to RsD (Risk-specific Dose, a dose corresponding to an acceptable level of risk). A level of $1x10^{-6}$ (1E-06), i.e., one case in a million, is used as the strictest criterion for an acceptable risk of detriment, usually less strict levels (up to $1x10^{-4}$) are also allowed,

Exposure assessment: It determines levels (doses and concentrations) of pollutants, various groups of people are exposed to. An exposure level depends not only on concentrations of pollutants in the environment but also on age, place of residence, activity and living customs of people. The group of the population being the most affected by a pollutant under assessment is a so-called selected group of population. The representative person is an individual from the population representing a selected group of natural persons who are most exposed to the given source and the given exposure pathway.

Risk classification: It determines a risk, i.e., determination of health effects on exposed population based on integration of hazard data of individual pollutants and data of exposure to these pollutants. The risk is determined for the most affected (selected) group of the population, or representative person from the selected group of the population, i.e. those individuals from the population who are most exposed to the given source and the given exposure pathway. The risk is lower for other (less affected) groups of the population.

As far as pollutants with a threshold effect are concerned, exposure is compared with a limit or a reference value (exposure ratio). If exposure is lower than the limit, the risk is negligible.

As far as pollutants with a no-threshold effect are concerned, a risk is calculated for the number of cases of detriment to health. The strictest specified requirement is (as mentioned above) a risk in the order of E-06, i.e., after lifetime exposure, there is 1 case of detriment to health per 1 million exposed people.

Due to the very low doses of potential exposure (absorbed doses of up to 100 mGy are usually listed here for sparsely ionising radiation, up to 50 mGy for densely ionising radiation), it makes sense when assessing the effects of the SMR Temelín NPP Project (including the concurrent effect of other existing or scheduled nuclear installations at the Temelín site) to only assess the stochastic effects. Deterministic effects will not occur.

To assess the stochastic effects of ionising radiation, the best elaborated and scientifically justified risk estimate processes, developed by ICRP and published in its Report No. 103 (2007), will be used. Using the latest scientific knowledge, these define the estimate coefficients of so-called detriment to health[1], which will be used for assessment in the documentation of the effects of the Project on the environment.

D.I.1.1.2. Non-radiation Effects

Effects of non-radiation factors (air pollution, noise, or others) will be assessed, in addition to the radiation, potentially affecting the population. These effects will be assessed in detail, compared with respective limits and assessed in terms of health, in the Project environmental impact documentation. Due to the location of the Project at a sufficient distance from residential areas, no significant negative effects are expected. Compliance of requirements of relevant regulations, especially Act No. 258/2000 Coll., on Public Health Protection, Government Regulation No. 272/2011 Coll., on health protection against adverse effects of noise and vibrations, Government Regulation No. 291/2015 Coll., on health protection against non-ionising radiation, Act No. 201/2012 Coll., on Air Protection, always as amended, or other regulations is an essential condition.

A potential effect can also be an effect on the peace of mind of the population. However, the Project is situated in the territory where several nuclear facilities are in operation for a long time. Therefore, the relationship of the population in the affected territory to nuclear power is consolidated enough and the Project is unlikely to significantly affect it.

D.I.1.2. Social and Economic Consequences

The Project does not require any changes in the settlement structure of the territory (demolition of residential objects, abolition of municipalities etc.), therefore there are no social effects as a consequence of the re-settlement of the population. The Project does not represent a new (hitherto no-existing) activity in the territory, in principle it is a continuation of the existing activities. No significant change in the ownership structure of immovable property or their prices can be expected either. If so, an increase in demand can be expected first.

The Project will create a considerable number of job opportunities, i.e., for both highly qualified specialists and less qualified professions. It will also enhance the continuity of employment at the site in sectors related to the operation of the nuclear power facility. In terms of employment, there is not just a direct number of jobs (number of employees), but also an indirect number of workers of cooperating companies and tradesmen, as well as a number of jobs in the tertiary sphere (i.e. trade and service), which use the purchase power of employees and workers of the energy complex, including the SMR Temelín NPP Project. It concerns several thousand jobs in total.

We cannot omit the direct positive impact on the infrastructure of municipalities of the affected territory and its vicinity due to the long-term sponsorship programme of the Temelín Nuclear Power Plant operating organisation (ČEZ, a. s.).

D.I.1.3. Number of the Affected Population

The Project does not have a significant impact on any population.

D.I.1.4. Effects during Construction or Termination of Operation

No effect on the radiation situation of the affected territory (there will be no effluents of radionuclides discharged into the environment and no effluents of existing nuclear facilities will be affected), nor influence on the population will occur during the period of construction. A further decrease in radioactive effluents discharged into the environment, i.e., without a significant effect on the population, will occur during termination of the Project operation as compared with the period of operation.

The most significant effect on the population and public health will in principle continue to be the effects of building and construction activities during the Project construction and subsequently (after the lapse of operation time, i.e., after more than 60 years) during decommissioning and demolition activities. These activities are characterised by the operation of building mechanisation on the construction site and traffic on transport routes. Their effects, including in particular those on air quality and noise effects, will be analysed in detail in the Project environmental impact documentation.

As far as social and economic effects during construction are concerned, growth in employment but also requirements for the corresponding infrastructure of the affected territory (accommodation, trade, etc.), i.e., generally positive effect, are expected.

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[1] According to ICRP, detriment is "total detriment to health" which occurred in an exposed group and in its descendants, in consequence of the group exposure to a radiation source. It is a multidimensional term. Its basic components are these stochastic quantities: probability of induced terminal neoplasm, weighted probability of an induced curable neoplasm, weighted probability of severe hereditary and life shortening consequences due to damage. However, despite the given linear no-threshold model of stochastic effects of low radiation doses continues being a scientifically acceptable conception for radiation protection practice, it cannot be explicitly proved. Regarding this uncertainty, ICRP in Report No. 103 (2007) does not deem calculations of the hypothetical number of tumours, which could result from very low doses of radiation exposure of a high number of people over a very long period of time, as appropriate for the purposes of planning in the public health sphere.

D.I.2. Effects on the Atmosphere and Climate

D.I.2.1. Effects on Air Quality

The SMR Temelín NPP Project is not an incineration source, so it will not be significant source of emission of pollutants into the atmosphere (SO_2, NO_X, CO, TZL and others). These pollutants will be emitted to a lesser extent during operation of backup technological facilities (diesel-generator stations or backup boiler plant), i.e., only on an irregular basis during startup or tests, whose frequency is estimated in the order of tens of hours per year. The effect of these sources on the immission situation can be considered to be negligible.

A potential air pollution source will be car transport on transport routes (transport of employees and material). Considering the intensity of destination/source traffic of the Project in the order of lower hundreds of vehicles per day, the proportion of these sources is very low, in addition the effect of the estimated development of the composition of the traffic flow and natural replacement of the fleet can expect a gradual decline of car traffic in future and therefore the immission load on the territory. Thus, the effect of transport sources on air pollution can be considered not to be very significant, immission limits will continue to be reliably observed.

D.I.2.2. Effects on Climate

D.I.2.2.1. Effects on Local Climate

Emissions of heat and water from the Project‘s cooling tower operation can lead to the following climatic effects:

- change in air humidity and temperature at the ground layer of the atmosphere,
- change in the amount of precipitation and occurrence of ground fog and frost,
- formation of clouds from water steam from the cooling towers, i.e., change in the duration of sunlight.

These effects will (during concurrent operation) be concurrent with the effects of the existing power plant and possible NJZ Temelín NPP. Due to the low climatic effects of the existing power plant and insignificant effect of the cooling towers of NJZ Temelín NPP under consideration, more significant effects cannot be expected on the microclimate or the SMR Temelín NPP Project. The effects on the basic climatic characteristics (e.g. on the surrounding temperature or humidity) will be negligible and will be spatially limited only to the immediate vicinity of the Project, the possibility of frost, fog and falling water drops will be limited to the nearest vicinity. These effects will not be measurable within the long-term monitoring of the site. Generally, it concerns changes in the range of usual changes of weather and climate, with an increasing distance from the Project these effects will disappear entirely.

The effect that the plan can have will be an increase in the shaded area as a consequence of the shade of the cooling tower and formation of a steam plume (in case that this method of cooling is selected). However, it can be expected that shady areas outside the immediate vicinity of the cooling tower(s) (considering the Sun’s movement through the sky and variability of wind direction) will change considerably over time, therefore the impact of shading on the average temperature of the earth’s surface will be negligible. In case that the option with fan cooling towers is selected, this effect will be limited to the nearest vicinity. The construction of paved surfaces and civil objects will only have a very limited effect on the local climactic conditions in comparison with the heat released into the vicinity as a consequence of the cooling.

The Project is localised to the neighbourhood of the Temelín NPP site (Temelín NPP site) and is located mostly on agricultural land parcels (already used to a considerable extent for the Temelín 1,2 construction site and subsequently recultivated). It uses the links to connections to existing infrastructure particularly for the supply of raw water and discharge of wastewaters. The implementation of the Project will mean only partial interference with landscape greenery, appropriately compensated and will not result in changes to hydrological conditions which could be reflected in local microclimatic conditions.

D.I.2.2.2. Effects on Global Climate

To assess the effects of the Project on climate the processes used are those recommended in the Ministry of the Environment (MŽP) methodological guideline ref. no. MŽP/2017/710/1985 of 20 October 2017 and in the document Guidelines to the Incorporation of Climatic Changes and Biodiversity in the Environmental Impact Assessment (EU, 2013). These generally require taking into account:

- The effects of the Project on climate change (as a consequence of direct and indirect emissions of greenhouse gases),
- vulnerability of the Project with regard to climate change (as a consequence of temperature changes (heat waves, cold waves), long-term changes in precipitation (drought or on the contrary extreme precipitation), floods and inundation, storms and wind, landslides, rising sea levels and similar factors).

But the decisive factor is compliance of the Project with respective strategic climate documents of the Czech Republic.

These areas are included in the following sub-chapters.

D.I.2.2.2.1. Effect of the Project on Climate Change (Mitigation Measures)

The Project itself together with renewable energy sources is included among low-emission sources in terms of specific emission of greenhouse gases. This is clear from the following table.

Table D.1: Total Specific Emissions for Individual Energy Sources according to the Life-cycle Analysis

	Coal	Gas	Nuclear Power	Hydropower	Wind power	Photovoltaics
Greenhouse gas emissions [g $CO_{2\,ekv.}$/kWh]	753 - 1095 (without CCS) 149 - 470 (incl. CCS)	403 - 513 (without CCS) 92 - 221 (incl. CCS)	4.9 - 6.3	6.1 - 147	7.8 - 16 (terrestrial) 12 - 23 (in waters)	7 - 83

Source: Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources. United Nations Economic Commission for Europe, 2022.

In this regard, the Project is in line with sustainability criteria (so-called. EU taxonomy) according to Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investments ("Taxonomy Regulation"), or with the draft of the so-called Delegated Act of 2 February 2022, implementing changes in Commission Delegated Regulations (EU) 2021/2139 and 2021/2178.

The data shows that the Project itself is part of mitigation measures, i.e. measures to reduce greenhouse gas emissions in order to mitigate/slow climate change. The main benefit in this case is the synergistic effect of the Project in the gradual transition of the energy systems of the Czech Republic from incineration sources to renewable and low-carbon sources which can be considered sustainable activity in line with the taxonomy.

D.I.2.2.2.2. Vulnerability of the Project with regard to Climate Change (adaptation measures)

Adaptation to climate change is defined as a process of adaptation to current or expected climate and its effects. In human systems adaptation attempts to mitigate damage or avoid it, in some natural systems human interference can facilitate adaptation to the expected climate and its impacts (Intergovernmental Panel on Climate Change (IPCC), 2014). Successful adaptation to climate change results in the reduction of vulnerability and increase of resistance to its impacts without endangering the quality of the environment and economic and social development potential.

The principal adaptation measures is the technical and technological solution of the Project, resistant to the expected climatic load and preparedness for an extraordinary situation taking into account possible negative climatic effects. These areas are covered by the relevant design and construction standards and data on the climatic load of the territory. These factors are interconnected - the Project will be technically and technologically dimensioned in relation to the climatic load that comes into consideration.

The issue of technical resistance virtually goes beyond the area of the environmental impact assessment and addressed at design or structural level. It must be stressed that the climatic load and its development in time are fundamental facts which are the subject of the conditions for using nuclear power in accordance with the Atomic Act (see Chapter B.I.6.2.2. Basic Requirements for Nuclear Power Plants, page 30 of this Notification). The Project takes into account legislative requirements for regular safety assessment in accordance with Decree No. 162/2017 Coll., on safety assessment requirements according to the Atomic Act,, as amended, in which, among other things, there is verification that the possible load caused by climatic effects is regular reviewed. This Project respects the so-called adaptive procedure, i.e. readiness for continuous consideration of newly acquired knowledge in accordance with the above Guidelines to the Incorporation of Climatic Changes and Biodiversity in the Environmental Impact Assessment (EU, 2013).

D.I.2.2.2.3. Strategic Documents of the Czech Republic

The Project respects all relevant strategic climate documents of the Czech Republic:

Climate Change Policy in the Czech Republic (2017, update 2024). This policy defines the main targets and measures in climate protection at national level to ensure fulfilment of the targets to reduce greenhouse gas emissions following the obligations arising from international agreements (United Nations Framework Convention on Climate Change and its Kyoto Protocol, Paris Agreement and the commitments arising from European Union legislation). This climate protection strategy up to 2030, with an outlook to 2050, should contribute to the long-term transition to a sustainable low-emission economy of the Czech Republic.

Strategy for Adapting to Climate Change in the Conditions of the Czech Republic (2015). This strategy represents the National Adaptation Strategy of the Czech Republic, which apart from the assessment of probable impacts of climate change contains draft specific adaptation measures, legislative and partly economic analysis etc.

National Climate Change Adaptation Action Plan (2017). This action plan is the implementation document of the Strategy for Adapting to Climate Change in the Conditions of the Czech Republic (2015). The action plan is structured according to the manifestations of climate change, i.e. long-term drought, floods and flash floods, rising temperatures, extreme meteorological phenomena (heavy rainfall, extremely high temperatures or heat waves, extreme winds) and natural fires. Key sectors affected by the given manifestation of climate change and described main impacts, vulnerability and risks are identified in individual chapters. The action plan elaborates the measures set out in the Adaptation Strategy of the Czech Republic into specific tasks.

National Energy and Climate Plan of the Czech Republic (2019, 2023 update). The obligation to prepare the National Energy and Climate Plan arises from Article 3 of Regulation (EU) on the Governance of the Energy Union and Climate Action which came into force on 24 December 2018. The document contains the targets and main policies in all five dimensions of the so-called Energy Union. Under this document Member States are obliged, among other, to inform the European Commission of the national contribution to the approved European targets for greenhouse gas emissions, renewable energy sources, energy efficiency and electricity interconnectivity or National Grid. On 18 October 2023 the government of the Czech Republic took note of the proposed update of the National Energy and Climate Plan of the Czech Republic which outlines the way in which the Czech economy will undergo the process of decarbonisation and how it will meet its European climate and energy commitments up to 2030.

D.I.2.3. Effects during Construction or Termination of Operation

Effects during the construction will be generally low and spatially temporally limited. Measures will be adopted to reduce emissions during the construction, or demolition activities (especially dust emissions). The same applies to related traffic.

D.I.3. Effects on the Noise Situation and Other Physical and Biological Characteristics

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D.I.3.1. Noise Effects

Noise effects can be generally divided into:

- noise effects of stationary sources and tertiary roads (i.e., noise from the Project site and its technological facilities), and
- noise effects of transport on public roads.

Noise of the Project's stationary sources and purpose-built roads will be quantitatively as well as qualitatively similar as that of the existing noise sources in the power plant in operation. However, it will be located in a different place and will (during concurrent operations) run concurrently with existing sources (Temelín NPP 1,2) both at target status and with the new nuclear source under consideration at the Temelín site (NJZ Temelín NPP). The minimum distance of the Project location area from the protected area is approx. 1.1 km (north-east of the edge of the municipality of Kočín), and the distance of the significant noise sources will be higher, more than 1.3 km from the protected area. This distance is sufficient to meet the noise protection requirements, i.e., observance of noise hygiene limits[1] in the protected outdoor area and the protected outdoor area of constructions according to Government Decree No. 272/2011 Coll., on health protection against adverse effects of noise and vibrations, as amended. Proving this fact will be carried out in the Project environmental impact documentation, within the framework of which a detailed acoustic study will be performed. This will also deal with specific characteristics of noise sources (including prospective tone components in the spectrum) and a concurrent effect of all the facilities at the site (i.e. the SMR Project including the existing Temelín NPP 1,2, prepared NJZ Temelín NPP and other required sources).

Noise from traffic on public roads will be related to the contribution of the Project's traffic to background intensities of road traffic on transport routes, in particular on road II/105 and section of road II/138, which represents the access road to the site. Due to the expected traffic load as a consequence of the Project, an increase can be expected of noise levels in the vicinity of the affected roads at the level of low tenths of dB, which can be described as an invaluable change. In addition, it can be expected that hygiene limits according to Government Regulation No. 272/2011 Coll. will be observed for all potential operation statuses. If the indicated limits are exceeded, the relevant measures will be taken, which may involve either the implementation of noise barriers on roads or cladding on the affected objects, possibly also urban measures involving bypasses of the affected municipalities. Detailed data will be provided in the Project environmental impact documentation, within the framework of which a detailed acoustic study, assessing effects of traffic noise and dealing with prospective noise barriers, will be conducted.

[1] The Project operation can also be linked to special tests of individual facilities, announced in advance. Just as under the existing status, very short-term and time-limited disturbing effects cannot be excluded. These represent emergency statuses, intended for assurance of safety, and they cannot be assessed in relation to any noise hygiene limit. Therefore, disturbing effects can be expected for the short term during the Project operation during these tests, however they will be rather lower than those under the existing status and they will not represent a health risk to the population of the nearest municipalities in any case.

D.I.3.2. Ionising Radiation Effects

D.I.3.2.1. Effect of Radioactive Effluents discharged into the Atmosphere

Gaseous radioactive substances will be released from the SMR Temelín NPP into the atmosphere in a controlled manner in the form of effluents from ventilation stack of the power unit. In addition, radioactive substances will be released into the atmosphere in the form of effluents from Temelín NPP 1,2 units under operation and scheduled NJZ Temelín NPP for the period of the concurrent operation of Temelín NPP 1,2 units, SMR Temelín NPP and NJZ Temelín NPP. The activity of real effluents discharged into the atmosphere from SMR Temelín NPP (so-called source term) will not exceed the values given in Chapter B.III. Data of Outputs (page 64 of this Notification and the following pages).

The calculation of the spread of radioactive effluents through the environment (through air and exposure pathways linked to it) and their radiological effects under normal operation conditions will be performed in the Project environmental impact documentation, i.e., both for the operation of SMR Temelín NPP itself and the concurrent (cumulative) effects of the concurrent operation of the Temelín NPP 1,2 units with the scheduled NJZ Temelín NPP. When assessing the doses, all the relevant exposure pathways - external exposure from clouds and deposits and internal exposure by inhalation and ingestion, i.e., intake of radionuclides by inhalation and ingestion (radionuclides that reach food chains through atmospheric fallouts will be considered, including seasonality in the calculation of doses from food chains). Effective doses and committed effective doses will be determined and assessed for the vicinity of the power plant and nearest transboundary area.

Annual effective doses from effluents discharged into the atmosphere will be assessed for all age groups. A representative person will be appointed for SMR Temelín NPP who is an individual from the population representing the model group of natural persons most exposed to a given source and pathway. When comparing the annual doses of the representative person with the exposure limits, the activity will be used of the radionuclides released from SMR Temelín NPP, or all nuclear facilities at the site into the atmosphere in the respective calendar year. Given that the annual doses of the representative person will be determined using a verified model of the spread of radionuclides, the relevant data on the meteorological situation in the respective calendar year will also be used to determine them. It can be assumed that the representative person will be localised in places of the existing representative person regularly assessed for Temelín NPP 1,2, because the place of the gaseous effluents of SMR Temelín NPP and NJZ Temelín NPP will be found in the near vicinity to Temelín NPP 1,2.

Doses will be compared with respective legislative limits and at the same time they will become an input for the assessment of the effects on the population and public health (for additional information, see Chapter D.I.1. Effects on the Population and Public Health, page 114 of this Notification).

It is possible to state tentatively that based on the choice of technology for SMR Temelín NPP and the existing experience with the operation of the nuclear facilities at the Temelín site, no significant negative effects are expected of radioactive effluents discharged into the atmosphere. The dose optimisation limit will be reliably met for the effluents discharged into the atmosphere for SMR Temelín NPP itself and for the concurrent (cumulative) action of SMR Temelín NPP, operated Temelín NPP 1,2 and the scheduled NJZ Temelín NPP. The Atomic Act stipulates the dose optimisation limit for the representative person of 0.25 mSv per year and 0.2 mSv for effluents discharged into the atmosphere in the case of a nuclear power facility.

However, in any case, it is true that the final conclusions will be provided in the Project environmental impact documentation on the basis of very detailed analyses of exposure pathways and health risk assessments.

D.I.3.2.2. Effect of Liquid Radioactive Effluents

Liquid radioactive substances will be released from SMR Temelín NPP in the form of liquid effluents into the recipient (Vltava River) in the Kořensko cross section in a controlled manner through new waste mains. In addition, wastewaters will be discharged into this cross section and the same pathways containing radioactive effluents from Temelín NPP 1,2 units under operation and scheduled NJZ Temelín NPP for the period of the concurrent operation of Temelín NPP 1,2 units, SMR Temelín NPP and NJZ Temelín NPP. The activity of real liquid effluents discharged from SMR Temelín NPP (so-called source term) will not exceed the values given in Chapter B.III. Data of Outputs (page 64 of this Notification and the following pages).

The Project environmental impact documentation will determine volume activities of radioactive substances (in particular tritium) in the recipient watercourse and compare them with legislative limits according to Government Decree No. 401/2015 Coll., on indicators and values of permissible pollution of surface and wastewaters, requisites of a permit for discharging wastewater into surface waters and sewage systems and on sensitive areas, as amended.

The calculation of the spread of radioactive effluents through the environment (through the environment and exposure pathways linked to it) and their radiological effects under normal operation conditions will be performed in the Project environmental impact documentation, i.e., both for the operation of SMR Temelín NPP itself and the concurrent (cumulative) effects of the concurrent operation of the Temelín NPP 1,2 units with the scheduled NJZ Temelín NPP. The spread of radioactive substances and their daughter products will be taken into account through the water environment and all the relevant exposure pathways - effect of potable water ingestion from the Vltava River, ingestion of fish living in the water of the Vltava River, ingestion of meat and milk of animals fed by water from the Vltava River, ingestion of agricultural products irrigated with water from the Vltava River, bathing in the water, ship navigation, stay on sediments (stay ashore), and stay on land irrigated from the Vltava River.

Annual effective doses from liquid effluents will be assessed for all age groups. A representative person will be appointed for SMR Temelín NPP who is an individual from the population representing the model group of natural persons most exposed to a given source and pathway. When comparing the annual doses of the representative person with the exposure limits, the activity will be used of the radionuclides released from SMR Temelín NPP, or all nuclear facilities at the site into the watercourse in the respective calendar year. Given that the annual doses of the representative person will be determined using a verified model of the spread of radionuclides, the relevant data on the hydrological situation in the respective calendar year will also be used to determine them. It can be assumed that the representative person will be localised in places of the existing representative person regularly assessed for Temelín NPP 1,2, because the place of the liquid effluents of SMR Temelín NPP and NJZ Temelín NPP will be found in the near vicinity to Temelín NPP 1,2.

Doses will be compared with respective legislative limits and at the same time they will become an input for the assessment of the effects on the population and public health (for additional information, see Chapter D.I.1. Effects on the Population and Public Health, page 114 of this Notification).

It is possible to state tentatively that based on the choice of technology for SMR Temelín NPP and the existing experience with the operation of the nuclear facilities at the Temelín site, no significant negative effects are expected of liquid radioactive effluents. the dose optimisation limit will be reliably met for the effluents discharged into the Liquid effluents for SMR Temelín NPP itself and for the concurrent (cumulative) action of SMR Temelín NPP, operated Temelín NPP 1,2 and the scheduled NJZ Temelín NPP. The Atomic Act stipulates the dose optimisation limit for the representative person of 0.25 mSv per year and 0.05 mSv for effluents discharged into surface water in the case of a nuclear power facility.

However, in any case, it is true that the final conclusions will be provided in the Project environmental impact documentation on the basis of very detailed analyses of exposure pathways and health risk assessments.

D.I.3.3.3. Other Effects of Ionising Radiation.

There will be no effluents discharged into ground waters from SMR Temelín NPP.

Other effects of ionising radiation can be excluded. An ionising radiation field (i.e., effect of electromagnetic (gamma) radiation or neutrons directly from the technological objects, without the contribution of effluents) is not significant in the immediate vicinity of the technological objects of SMR Temelín NPP, as well as the existing facilities, and cannot have any effect on the surrounding environment (a public area).

D.I.3.3. Effects of Other Physical and Biological Characteristics

D.I.3.3.1. Vibration Effects

Potential effects of vibrations are excluded. Vibrations caused by the operation of technology (especially turbines) resonate in the substratum in the immediate vicinity of the place of their origin, just as potential vibrations as a consequence of transport and handling activities. Therefore, their effect on the environment, structures or population is excluded.

D.I.3.3.2. Non-ionising radiation effects

The potential effects of non-ionising radiation (i.e. magnetic or electric field in the vicinity of electrical devices) will not be significant. The limits according to Government Regulation No. 291/2015 Coll., on health protection against non-ionising radiation, as amended, will be met by a standard design solution, i.e. compliance with the required height of conductors of the offsite power transmission over freely accessible terrain.

D.I.3.3.3. Effects of Light Pollution

The Project will be lit in a way that excludes light pollution of the vicinity. The lighting of the Project will be addressed in accordance with MŽP methodological guideline ref. no. MZP/2023/710/2146 and standard ČSN 36 0459 Restriction of the Adverse Effects of Outdoor Lighting to Exclude Light Pollution of the Vicinity.

D.I.3.3.4. Effects of Other Factors

The effects of other physical or biological factors are excluded.

D.I.3.4. Effects during Construction or Termination of Operation

The Project will be implemented in connection with the industrial site of the Temelín power plant far beyond the noise protected outdoor area or protected outdoor area of the structures. Construction will involve intensive activity on the main construction site and the construction site equipment (or also routes of infrastructure networks) as well as construction traffic on public roads (transport of building and construction materials as well as transport of workers). The construction site itself (including sites of infrastructure networks - electric and water system connections) is situated at a sufficient distance from the protected area, observance of hygiene limits for noise from building activity is therefore reliably achievable.

In view of the effect on areas protected against noise, it is the effect of transport on public roads serving the purpose of construction that is decisive. The contribution of building traffic is in the order of hundreds of vehicles 24 hours (of which approx. 50% heavy-duty vehicles), and in case of background intensity at the most affected sections an increase of +2 dB in noise levels in the road vicinity can be expected. This may be an increase of up to approx. +3 dB at peak times of considered concurrent construction of SMR Temelín NPP and preparation phase of construction of NJZ Temelín NPP ETE. These are values that must be assessed in relation to observance of the hygiene limit. In case the exceeded limit is indicated, it will be necessary to take appropriate measures that can consist of the implementation of noise barrier on roads or on cladding of the affected objects, or also urban measures of the nature of bypasses of the affected municipalities. Detailed data will be provided in the Project environmental impact documentation, within the framework of which a detailed acoustic study, assessing the effects of construction activity noise and dealing with prospective noise barriers, will be performed. It can be assumed that the effects of noise during termination of operation will be less significant as compared with the stage of operation or construction.

There are no effects of radiation during construction of the Project. The effects of other factors (vibrations, non-ionising radiation or other) are excluded.

Effluents will be gradually significantly reduced (by several orders) in the period of termination of operation and decommissioning of SMR Temelín NPP as compared with the period of operation. There will also be a proportional decrease in the corresponding effective dose for the population.

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

D.I.4.1. Effects on Surface Waters

The source of raw water will be the Vltava River, thus the total offtake of raw water in concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 129,100,000 m^3/year. Process wastewater will be discharged by the existing wastewater mains of Temelín NPP 1,2 to the recipient river (the Vltava River in the Kořensko cross section), thus the total discharge of process wastewater in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 29,487,000 m^3/year. The offtake of raw water is ensured in quantitative terms. In qualitative terms, the effect will above all depend on the amount of pollution pumped in together with surface water and thickening of pollution due to evaporation, furthermore the effects of chemicals for production of demineralised water, treatment of chemical modes of cooling water, and also contribution of sewage water pollution (see below). A significant adverse effect is not expected.

A The offtake of potable water will be assured by the supply system of the Temelín NPP site from the Zdoba water tank, thus the total offtake of potable water in concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 204,000 m^3/year. The cleaned sewage water will be discharged together with the process wastewaters by the existing wastewater mains of Temelín NPP 1,2 to the recipient river (the Vltava River in the Kořensko cross section), thus the total discharge of process wastewater in the concurrent effect of the operation of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 164,000 m^3/year.Therefore, the offtake of potable water will be assured in quantitative terms and no significant negative impact is expected in qualitative terms.

The implementation of the Project will result in stabilisation of actually agriculturally cultivated or grassed areas, on which significant water infiltration takes place under existing conditions. An increase in paved surfaces will result in an increase of precipitation water, i.e., a maximum amount of 85,000 m^3/year. The conditions in the territory are not appropriate for infiltration (a system of hydrological objects are in operation at the Temelín NPP site intended to reduce the levels of ground waters), so captured precipitation waters will be discharged into the recipient Strouha stream through a service main connected to the existing Temelín NPP sewerage system. At the same time, the hydrological conditions will be take into account of the Dvorčický brook and the Dvorčice and Karlovec fishpond so their biological function is not affected (see Chapter D.I.7.5. Effects on Flora, Fauna and Natural Habitat, page 130 of this Notification). The amount of drained precipitation water will not significantly affect the existing character of the drainage of the territory or the hydrological characteristics of the recipient watercourse.

The quality of the surface waters will be affected to a minimum extent by the Project’s operation. The implementation of the Project will not cause any watercourses to be diverted and no other significant interference with the bodies of surface waters. The character of the drainage of the area will not be affected beyond the framework of the existing (already existing) status, the hydrological characteristics of the territory will not be significantly altered by the Project. The Project does not affect the delineation of the flood area.

For more detailed data, see the environmental impact documentation.

D.I.4.2. Effects on Ground Water

The implementation of the Project will result in the development of currently unpaved surfaces, production of precipitation waters is considered in the volume of approx. 85,000 m^3/year (a conservative estimate of the drainage of precipitation water from the SMR Temelín NPP site based on its area). Precipitation waters will be drained through a newly built service mains connected to the existing precipitation sewerage of Temelín to the ultimate recipient (the Vltava River). Infiltration is not being considered in view of the complicated hydrological conditions in the territory.

It cannot be excluded that as a consequence of the implementation of the Project, it will be necessary to extend the existing system of drainage wells serving to artificially reduce the level of ground water used to artificially reduced the level of ground water at some of the technological objects of the existing power plant at a time of higher precipitation.

There are no protected areas of natural accumulation of ground waters or sources of surface or ground waters in the affected territory that could be disturbed by the implementation of the Project.

The Project has no potential to affect the qualitative or quantitative parameters of the affected water body of ground waters.

D.I.4.3. Effects during Construction or Termination of Operation

Effects on surface and ground waters will be insignificant. The need for raw and potable water for the period of construction and subsequently the amount of process wastewater and sewage water is not specified in detail. Demands are expected to be in the order of a several hundred thousand m^3/year at most (raw water) and up to hundreds of thousands m^3/year (potable water), so the requirement for an increase of the contractual offtake of potable water for the Temelín NPP site above the existing permitted amount cannot be excluded in the period of the concurrent construction of SMR Temelín NPP and NJZ Temelín NPP. The amount of process wastewater from the construction is not more closely specified and will be overall insignificant, the water for example becomes part of the building construction (mixing water), evaporates or is reused. Potentially contaminated waters (tests of technological facilities, flushings, etc.) will be collected in drainless pits and depending on the physical-chemical analyses they will be disposed of in the appropriate manner. The amount of sewage water in the course of construction is estimated in the order of several hundred thousand of m^3/year, the Vltava River will be the recipient of the cleaned sewage water from the construction.

During the termination of the operation, the demands for offtake/discharge of waters will be gradually reduced.

Drainage of temporary areas of the main construction site as well as temporary requisition of the area of the construction site installations will be temporary and after construction has been completed, the original condition will be restored. The existing status will be maintained in the other areas.

It is also likely that a temporary decrease of the groundwater level will be necessary during the construction of the foundation structures of selected technological parts of the Project. After construction has been completed, the level of ground water will be restored to the original level. The extent of the depression cone can be specified in the order of the first tens of metres from the construction site boundary.

The possibility of affecting the quality of ground and surface waters and threat to the leak of hazardous substances during construction corresponds to the common risks during any construction, which will be eliminated by compliance with the stipulated technological processes and technological discipline.

D.I.5. Effects on the Land

D.I.5.1. Effects on the Land

In general, the effects on land are due to the requisition of areas of the land categorised in the Agricultural Land Resources (ZPF), furthermore lands intended for forest area (PUPFL) or the total influence of its quality.

The permanent requisition of the land of the main SMR construction site (the Project itself including the related structures and operational areas) is conservatively set out in full, i.e. 28.7 ha. Protected area such as ZPF comprise approx. 65% of territory (approx. 18.7 ha), approx. 35% (approx. 10 ha) belongs to other areas. Lands intended for forest area are not affected by the permanent requisition of an area for SMR.

The existing Temelín NPP 1,2 site has an area of approx. 123.3 ha (the boundary of the permanent requisition delineated by fencing of the guarded area of the existing power plant, without the storage management area at the Temelínec site), according to the EIA documentation the total requisition of Temelín NPP 1,2+NJZ Temelín NPP will not exceed approx. 187.2 ha. Thus, the total permanent requisition in the concurrent effects of Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP will not exceed 215.9 ha.

ZPF land on the area of SMR Temelín NPP are, according to Decree No. 48/2011 Coll. laying down basic requirements for ensuring safety, as amended, classified under protection class III (BPEJ 5.50.01). This is land with soils of very low production capacity and a medium degree of protection that can be used for eventual construction through land-use planning.

An area for locating an electrical connection (in Annex 1.1 marked as area EL) as a whole does not represent an area of permanent requisition. The permanent requisition of electric connection only consists of the built-up area of foundations for offsite power transmission line masts or back-up supply of building consumption from the Kočín substation, which in total generates requisition in the order of units of thousands of m^2 at most (a conservative estimation of up to 1 ha). The requisition could affect protection II to V class soils, or forest land parcels (area of the mast, including the protected power line zone).

Land requisition is generally a negative issue however it will be justified in accordance with the requirements of Act No. 334/1992 Coll., on the Protection of Agricultural Land, as amended.

D.I.5.2. Effects during Construction or Termination of Operation

Areas of permanent and temporary requisition (construction site equipment) will be used for construction (movement of construction machinery, civil engineering work itself).

Temporary requisition represents an area for the installation of construction site equipment. An area for the installation of construction site equipment comprises areas of construction site equipment itself (in Annex 1.1 of this Notification marked as area E1), then areas of temporary construction site equipment (F1, F2) and areas considered for extending the construction site hinterland (G, H). In total, the above areas are of approx. 84.1 ha (temporary requisition), while most of the land parcels fall under ZPF protection. Temporary requisition will affect class II (in the minority, III predominate), protection class IV and V.

One of the areas of temporary construction site equipment (area F2) is delineated to forest land parcels, or PUPFL. Requisition represents approx 11.8 ha.

There is no demand for the temporary requisition of ZPF, PUPFL when implementing related infrastructure areas/corridors (these will be implemented through the existing supply and outflow routes of waters and/or term demands of construction do not require a period of more than 12 months).

The protection of the land cross section against water and wind erosion will be part of the construction organisation plan. Any threat to land outside the Project's delineated area will also be taken into account, e.g. erosion of land from adjacent land parcels into the area of the Project or threat of the quality of land by water erosion of lower quality land on the surrounding agriculturally cultivated land parcels.

The topsoil will be stripped and deposited onto landfill before construction commences. The overburden landfill or other material susceptible to erosion will be ensured in accordance with legislative requirements. After construction is complete, the original soil cross section will be restored, the land will be recultivated and restored to its original use.

The potential possibility of land contamination occurs during construction that could result in relocation of contaminated soils (if soils from other sites are transported) or there is a leak of hazardous substances from mechanisms used. Land contamination due to relocation of contaminated soils can be avoided by performing laboratory analyses before their use. During the usual use of construction machines that are in good technical condition, no significant introduction of foreign substances into soils takes place. In case of an accident with a subsequent leak of hazardous substances into soils, contaminated soils will be excavated, decontaminated or dumped at a site permitted for such contaminated soils. Therefore, a more significant risk of soil contamination does not occur during construction.

No further requisition of land is expected during termination of operation and/or after its termination.

D.I.6. Effects on Natural Resources

D.I.6.1. Effects on Natural Resources

Neither natural resources nor mineral resources will be affected by the Project. Recorded geological or paleontological monuments will not be damaged.

In view of the character of the construction, it is not necessary to considered its protection against radon from the substratum.

D.I.6.2. Effects during Construction or Termination of Operation

Effects on natural resources during construction are excluded.

D.I.7. Effects on Biodiversity

D.I.7.1. Effects on Biodiversity

The effect of biotic environmental components will be assessed in detail based on surveys and a biological assessment as part of the environmental impact assessment documentation. We provide a brief overview of the potential effects for the purposes of this Notification. These are:

- requisitions of territory with the occurrence of specially protected species of plants and animals, i.e. Interference with their biotope,
- removal of the existing woody vegetation (whether forest stands or woody plants growing outside the forest),

- effects on the territorial system of ecological stability,
- direct or indirect effect on watercourses and water bodies,
- effects related to construction such as the driving of vehicles, operation of technology and construction or use of access roads, disturbance.

Direct and indirect effects of the Project, which in their nature could affect the quantitative and qualitative characteristics of individual specially protected or endangered species will be taken into account to identify the expected effect of the Project on the interests of nature and landscape conservation. The list of analysed effects and their significance (scale) is identified in the following tables.

Table D.2: List of Possible Direct and Indirect Effects

1)	*Direct requisition of the biotope (requisition of the food biotope, disturbance of shelters, hatcheries and nesting sites)*
2)	*Effect of the qualitative characteristics of the biotope*
3)	*Disturbance and harmful interference with the natural development*
4)	*Accidental killing, wounding of individuals or destruction and damage to the developmental stages of animals*
5)	*Threat of coming into contact with power lines*
6)	*Damage and destruction of plants*
7)	*Fragmentation of territory*

Table D.3: Significance of Effects and Scale for Assessing the Effect of the Project on the Biota

Effect	Value	Description
Major negative effect	-2	Significant disruptive to fatal effect on the protected territory, function of significant landscape element (VKP), habitat or population of a species or its substantial part; major disturbance of environmental demands of the habitat or species, significant interference with the biotope or the natural development of the species.
Minor negative effect	-1	Limited/minor/insignificant negative effect. Minor disruptive effect on the protected territory, function of significant landscape element (VKP), habitat or population of a species; minor disturbance of environmental demands of the habitat or species, marginal interference with the biotope or the natural development of the species.
Zero	0	The project has no effect.
Minor positive effect	+1	Minor positive effect on the protected territory, function of significant landscape element (VKP), habitat or population of a species; minor improvement of environmental demands of the habitat or species, minor interference with the biotope or the natural development of the species.
Major positive effect	+2	Major positive effect on the protected territory, function of significant landscape element (VKP), habitat or population of a species; major improvement of environmental demands of the habitat or species, major interference with the biotope or the natural development of the species.

D.I.7.2. Effect on Specially Protected Areas and Sites of the Natura 2000 System

The Project is not in territorial conflict with any specially protected territory and/or sites of the Natural 2000 system.

The nearest specially protect territories are the Lužnice natural monument (PP) (approx. 6.4 km north of the Project) and Velký and Malý Kamýk nature reserve (PR) (approx. 8 km north-west). Both these territories are also protected in the European context as Natura 2000 sites.

In the immediate vicinity of the present Temelín NPP site (approx. 500 m south of the edge of the site) lies the Dvorčice fishpond, which in some documents is marked as a natural monument, nevertheless this territory has not hitherto been declared specially protected according to Section 14 of Act No. 114/1992 Coll., on Nature and Landscape Conservation, as amended. The territory is rare above all for the occurrence of the Siberian iris *(Iris sibirica)*, aquatic birds and amphibians. Although this is currently not a specially protected area, the declaration of territorial protection for this site in future cannot be excluded. Part of the EIA documentation will be a detailed assessment of the impact of the implementation of the Project on this site, especially with regard to its water regime.

The effect on the surrounding specially protected areas located in the wider territory of interest is excluded, because it is found at such a location/distance in which they cannot be significantly affected by the Project itself or related activities. A significant effect on sites of the Natura 2000 system, i.e. on the positive status of the subject of protection or integrity of European significant sites and/or bird area is excluded by the competent nature conservation authority (see Annex 2.1 of this Notification).

The environmental impact assessment documentation assesses the impact of the Project in more detail.

D.I.7.3. Effects on Natural Parks, Significant Landscape Components, Notable Trees

The Project is not in territorial conflict with a natural park, i.e. territory whose primary role is landscape conservation. The occurrence of notable trees in the immediate vicinity of the Project has not been detected. Areas are affected that are significant landscape components by law (a watercourse and its alluvial plain, fishpond, forest). Registered significant landscape components have not been declared in the territory affected by the Project.

Closest to the Project is the Písecké hory natural park, whose closest boundary is delineated approx. 7 km north-west of the SMR Temelín NPP area. The effect of the Project on the subject of protection is not expected.

The nearest delineated significant landscape component (VKP) is the registered Fišerácká ditch situated approx. 6 km north, in the cadastre of Týn nad Vltavou. The bed of the Dvorčický brook, which flows alongside the boundary of the SMR Temelín NPP area, is also assessed as a significant landscape component (VKP) by law. The flow is partly piped, the unpiped part had no continuous flow at the time of the field investigation (May 2024). There is a nameless tributary of the Dvorčice fishpond, nevertheless currently these areas are visible and visually do not indicate the presence of a watercourse. Among the VKPs by law are also the Dvorčice, Karlovec and Hůrecký fishpond, which are VKPs by law and together with their adjacent vegetation stands of a wetland character, are part of the territorial system of ecological stability (ÚSES) (LBC 1a, LBK3, LBK2a, LBC5a).

The nearest notable tree is situated in the cadastral area of Litoradlice (small-leaved linden, ID 103113), at a distance of approx. 3 km west of the boundary of the territory affected by the construction.

The impact of the Project on VKP Dvorčický brook and on the water regime of the fishponds, which as both areas of ÚSES, and VKPs, are assessed as part of the environmental impact assessment documentation.

D.I.7.4. Effect on the Territorial System of Ecological Stability

The Project shows territorial conflict with components of the territorial system of ecological stability at local level (LBC 1a, LBK3, LBK2a, LBC5a). There will be a more detailed assessment (effect on permeability, spatial demands, quality of the biotopes of individual components ÚSES) in the environmental impact assessment documentation in accordance with the conclusions of the biological assessment.

D.I.7.5. Effects on Flora and Fauna and on Natural Habitat

The biotopes of all sub-areas intended for construction and operation of the Project are biologically relatively poor and do not contain any special habitat, which would not be common in an agricultural landscape corresponding to the geographical region and height above sea level. In individual areas there are larger and smaller areas of self/seeding woody plants, mostly of relatively young age. In places there are belts of planted woody plants, but also of young age and the stands are not very rich in undergrowth.

The Dvorčice fishpond and wetland meadows on its northern edge located close to the affected areas (area for the construction of SMR and H area for construction site equipment), represent biotopes of a number of specially protected species. One of the potential indirect effects is the change of the drainage of surface and ground waters from sub-areas intended for the construction of SMR Temelín NPP in the direction of the wetland and the Dvorčice fishpond. The effect of local changes of hydrological conditions, possible changing the extent of the infiltration territory to the water regime of the location and method of compensating losses is verified and the results will be presented in the environmental impact assessment documentation.

The botanical survey did not detect any occurrence of specially protected plant species in the investigated territory. These are mostly biotopes of agricultural land (part of the SMR area, part of the area of the offsite power transmission corridor, F1 area, H area) with the introduction of common ruderal representatives. The occurrence of specially protected plant species is tied to the location of the Dvorčice fishpond. These are the broad-leaved marsh orchid (*Dactylorhiza majalis*) and the Siberian iris (*Iris sibirica*). Both species are considered potentially secondarily affected.

The zoological survey, supplemented by data from previous surveys (which also takes into account the Dvorčice fishpond location) including the Agency for Nature Conservation and Landscape Protection of the Czech Republic (AOPK) species occurrence database (NDOP), detected/recorded the occurrence of 37 animal species classified by Decree No. 395/1992 Coll. among specially protected species, highly endangered and endangered category. Of this number, 2 represent species of insects, 10 amphibians, 4 reptiles, 12 birds and 9 mammals. These are the following:

- bumblebee *(Bombus sp.)*, endangered species,
- European red wood ant *(Formica sp.)*, endangered species,
- smooth newt *(Lissotriton vulgaris)*, highly endangered species,
- northern crested newt *(Triturus cristatus)*, highly endangered species,
- Alpine newt *(Ichthyosaura alpestris)*, highly endangered species,
- common spadefoot toad *(Pelobates fuscus)*, highly endangered species,
- European fire-bellied toad *(Bombina bombina)*, highly endangered species,
- common toad *(Bufo bufo)*, endangered species,
- European tree frog *(Hyla arborea)*, highly endangered species,
- edible frog *(Pelophylax esculentus)*, highly endangered species,
- agile frog *(Rana dalmatina)*, highly endangered species,
- pool frog *(Pelophylax lessonae)*, highly endangered species,
- sand lizard *(Lacerta agilis)*, highly endangered species,
- viviparous lizard *(Zootoca vivipara)*, highly endangered species,
- slow worm *(Anguis fragilis)*, highly endangered species,
- grass snake *(Natrix natrix)*, endangered species,
- whinchat *(Saxicola rubetra)*, endangered species,
- garganey *(Anas querquedula)*, highly endangered species,
- western yellow wagtail *(Motacilla flava)*, highly endangered species,
- sparrowhawk *(Accipiter nisus)*, highly endangered species,
- common quail *(Coturnix coturnix)*, highly endangered species,
- common kingfisher *(Alcedo atthis)*, highly endangered species,
- western marsh harrier *(Circus aeruginosus)*, endangered species,
- little grebe *(Tachybaptus ruficollis)*, endangered species,
- great reed warbler *(Acrocephalus arundinaceus)*, highly endangered species,
- red-backed shrike *(Lanius collurio)*, endangered species,
- Eurasian golden oriole *(Oriolus oriolus)*, endangered species,
- grey partridge *(Perdix perdix)*, endangered species,
- noctule bat *(Nyctalus noctula)*, highly endangered species,
- Nathusius' pipistrelle *(Pipistrellus nathusii)*, highly endangered species,
- brown long-eared bat *(Plecotus auritus)*, highly endangered species,
- serotine bat *(Eptesicus serotinus)*, highly endangered species,
- Daubenton's bat *(Myotis daubentonii)*, highly endangered species,
- northern bat *(Eptesicus nilssonii)*, highly endangered species,

- grey long-eared bat *(Plecotus austriacus)*, highly endangered species,
- Natterer's bat *(Myotis nattereri)*, highly endangered species,
- soprano pipistrelle *(Pipistrellus pygmaeus)*, highly endangered species.

The list may be modified based on currently established facts as part of the biological assessment according to Section 67 of Act No. 114/1992 Coll., as amended.

The construction of the Project will result in territory requisition, topsoil overburden, felling of forest stands and non-forest greenery. These activities may result in the destruction of biotopes of some species of invertebrates, amphibians and reptiles, small mammals and possibly some ground-nesting birds. Species residing in the near vicinity to the Project or access routes, or species which have a significant part of the biotope, hunting or food area can be characterised as potentially temporarily affected by disturbance. A possible negative effect is the risk of injury to birds colliding with power lines during the operation of the Project. Mitigation measures will be proposed to minimise the effect of the Project on fauna.

This is only a only a preliminary assessment, a detailed impact assessment will be presented as part of the biological assessment (assessment of the impact of interference with the interests of nature conservation) according to Section 67 of Act No. 114/1992 Coll., which will be documented in the environmental impact assessment.

D.I.7.6. Effects during Construction or Termination of Operation

Areas for temporary construction site equipment are located in the near vicinity or will marginally interfere with the following components of ÚSES:

- IP14b - delineated in western area of the area considered for the extension of the H construction site hinterland,
- LBK 3 - delineated between the territorial construction of SMR Temelín NPP and the area considered for the extension of the H construction site hinterland,
- LBK25 - delineated alongside the eastern edge of the area considered for the extension of the G construction site hinterland,
- LBK26 - delineated alongside the northern edge of the area for the F2 construction site equipment,
- LBC1a - delineated for the north-western border of the area considered for the extension of the H construction site hinterland,

The areas for the construction of the Project that concern these VKPs by law are:

- the forest unit in the area of the F2 construction site equipment - due to the temporary construction site equipment, the young forest stand will be felled which is currently beginning to meet its function and will partly block the view of the existing power plant, nevertheless in case of the use of this area for the purposes of the construction site equipment and subsequent recultivation of the territory, the return to the existing status will be possible in a time horizon of several decades; in the past this area served as construction site equipment for the construction of Temelín NP 1,2,
- nameless tributary of the Hůrecký fishpond, crossing the north part of the area considered for extending the G construction site hinterland - this is an artificial bed, dry at the time of the field investigation (May 2024), with accompanying stands of shrubs in which prunus predominates.

Once construction is completed, the affected territory will be restored, recultivated and provided with space for natural regeneration and migration of organisms from the vicinity.

Because of the long-term outlook of incorporating the recultivated forest stands of the F2 area into the existing form, it is recommended prioritising the G and H spaces for installing temporary construction site equipment and leaving the F2 area in reserve, nevertheless the impact of the construction on the local ÚSES and VKPs within the G and H areas will be assessed in detail and such measures will be taken which will minimise the effects on these areas, particularly with regard to the water regime of fishponds and possible driving of construction technology.

The F2 area (together with the F1 area) is part of the migration corridor taking into account the permeability of the landscape for specially protected species of large mammals.

D.I.8. Effects on the Landscape

D.I.8.1. Effects on the Landscape

The Project is located at the south-eastern edge of the Temelín NPP site and in terms of volume represents a building extension of the existing power plant site. The resulting appearance of the Project will be a technical structure of a similar nature to the existing objects. The dominant object of the Project will be the wet cooling tower with a maximum height of approx. 130 metres and a base diameter of approx. 115 metres (if this method of cooling is selected, the mass solution of the forced draft cooling towers is less significant in terms of volume).

In view of the location of the Project, the effect the Project must be assessed in the context of the existing territory of the already existing structure of Temelín NPP 1,2, the planned construction of NJZ Temelín NPP and the object of the spent nuclear fuel storage structure (SVJP), in the current period with its prepared extension. Despite the expected maximum height of the highest/dominant structure, SMR Temelín NPP will not significantly change the surrounding landscape character, because the cooling towers of the operated Temelín NPP 1,2 units with a height of approx. 154 metres are already located at a distance of several hundred metres and even higher towers are being considered as part of NJZ Temelín NPP. So the SMR Temelín Project will not represent a new (hitherto existing), or a dominant object at the Temelín NPP site. However, it will change the appearance of the existing and future Temelín NPP site in the landscape. The expected effects will be assessed in the context of this change.

The potential effects of the Project on the identified values of a landscape character in the affected landscape area are stated in the following overview with the extension for the forced draft cooling towers with a forced draft and the natural draft wet cooling towers.

Table D.4: Expected Effect of the Values of a Landscape Character

Value	Forced draft cooling towers	Natural draft wet cooling tower
Aesthetic values of a landscape character	The significant effect above all of the place of the construction and immediately connected areas of the landscape framework.	A significant effect at greater distances above all southwards in all assessed distances, slightly eastwards.
Natural values of a landscape character	The effect will be manifested by a slight enhancement of the disruptive picture of Temelín NPP against the visual application of the natural value in the landscape of the immediate landscape framework.	The effect will not be manifested until a slight enhancement of the disruptive picture of Temelín NPP against the visual application of the natural value in the landscape over greater distances in adjacent areas.
Significant landscape components	No effect is expected.	No effect is expected.
Specially protected areas	No effect is expected.	No effect is expected, except for views from the landscape of the Blaník protected landscape area (CHKO) southwards when the Project will be applied in the overall picture of Temelín NPP.
Cultural landscape dominants	The effect will be manifested in the context of the entire Temelín NPP site by a slight enhancement of its dominant application against the traditional dominants above all of churches in the immediate landscape framework of the construction.	The effect will be manifested in the context of the entire Temelín NPP site by the significant southward enhancement of the entire dominant application against the traditional dominants above all of churches in the wider landscape framework of the construction.
Harmonious landscape scale	The effect will be manifested in the context of the entire Temelín NPP site by a slight enhancement of the existing application of the scales of the site objects against the traditional buildings of the surrounding villages in the immediate landscape framework of the construction.	The effect will be manifested in the context of the entire Temelín NPP site above all eastwards and southwards by the significant enhancement of the existing application of the scales of site objects against the traditional buildings of villages and towns in the immediate landscape framework of the building and within the northern and western horizons against the traditional landscape scale and against the height division of the landscape relief.
Harmonious relations in the landscape	The effect is manifested in the context of the entire Temelín NPP site by the slight enhancement of the disruptive application of the site objects against the traditional harmonious relations in the rural landscape.	The effect is manifested in the context of the entire Temelín NPP site in places by the significant enhancement of the disruptive contrast of the existing application of the site against the overall picture of the landscape and in the visual horizon above all from the southern and eastern, partly the northern and western directions.
The territory of natural parks and heritage sites and reserves as areas of increased aesthetic and natural value of a landscape character.	No effect is expected.	No effect is expected.

As indicated in the stated assessment, the Project will have a lower impact on the landscape character in the alternative of forced draft cooling towers, in contrast the alternative of the natural draft wet cooling tower will have a more significant impact on the existing values of a landscape character. This is indicated by the geometric dimensions of both potential cooling tower alternatives. The effect of the Project in this context cannot be assessed separately from the existing situation of the Temelín NPP site and the further considered construction of NJZ Temelín NPP here and also the extended spent nuclear fuel storage object. Despite the expected maximum height of the highest/dominant structure, the SMR Project will not significantly change the surrounding landscape character, because the cooling towers of the existing operated Temelín NPP 1,2 units with a height of approx. 154 m are already located here and even higher towers are being considered as part of NJZ Temelín NPP. Therefore, the Project will only partly change the picture of the existing and future Temelín NPP site in the landscape, and the state effects are formulated in the context of this change.

The alternative to the Project will be selected and subsequently assessed in the next stage of the assessment (environmental impact assessment documentation), especially in terms of the method of cooling and the resulting solution for the cooling towers). The aim of the future assessment of the effect of the selected alternative on the landscape character will be the delineation of the extent of the area of the visual impact acquired by a visibility analysis of the Project' while taking into account its concealment above all of Temelín NPP 1,2 objects and considered NJZ Temelín NPP objects, and a detailed assessment of the individually affected places within the affected landscape area (DOKP) stating the changes arising from the possible implementation of the Project in relation to the values of a landscape character applied at the given site. The assessment will document the possible conflict with significant cultural and natural dominants in the landscape with an assessment of visual axes.

In the case of the selection of large cooling tower technology, it is recommended conducting an analysis and assessment of significant remote views from areas outside the scope of the delineated DOKP, above all from the landscape of Blanský Forest (from the northern part of the territory), Prachatice and Vodňany landscape from elevated positions allowing views of Temelín, from deforested areas t the edge of Šumava (Bohemian Forest) and elevated visual positions of the Písecká and Táborská highlands, to a distance of up to approx. 60 km.

D.I.8.2. Effects during Construction or Termination of Operation

The existing character of the territory, affected by the Project, described above, will continuously change during construction.

Individual objects will be gradually built up during construction in the area of the main construction site (SMR area) and construction will therefore be gradually more visible until it reaches the visual effect of the completed construction. Of course, during the construction, the urban and architectural “disorder” of the construction site area will be manifested as opposed to the target status - the area will change relatively dynamically, a number of machines of a significantly vertical nature (cranes) and other temporary equipment and objects will be installed at the construction site, the terrain will not be modified and the architectural modifications of the objects will not be completed. These additional effects will gradually subside with the completion of the construction and final modifications.

Basically the same can be said about the area of the construction site equipment (E1 area), the area of the temporary construction site equipment (F1) and areas considered for the extension of the construction site (G, H). However, no height-dominant objects will be located here, and the area will be recultivated and returned to its original purpose after completion of construction.

The area of the temporary F2 construction site deserves special mention, which is delineated in the territory of the existing young forest in the area of the former (today forest recultivated) Temelín NPP 1,2 construction site equipment, which is of the nature of mixed woody plant stands (with predominating pines and oaks) that block the visual effects of the existing Temelín NPP 1,2 all the year round. As a result of the installation of this construction site, the existing stand will be felled and the visual effect of the SMR Temelín construction site and the existing Temelín NPP 1,2 will be more visually noticeable from closer distances. This is a phenomenon, which will have an impact throughout the construction and subsequent introduction of new forest stands in the F2 area.

Additional effects during termination of operation cannot be expected, on the contrary a gradual decrease of the visual impact will occur (as a consequence of possible demolitions).

D.I.9. Effects on Movable Property and Cultural Heritage

D.I.9.1. Effects on Movable Property

The Project does not affect any movable property of third parties (buildings etc.). Most land parcels for the construction of SMR Temelín NPP are owned by an investor, some land parcels for the construction and construction site equipment are owned by third parties. Relationship to the affected land parcels is dealt with outside the environmental impact assessment process.

The surrounding roads are owned by the South Bohemian Region and will be used in accordance with Act No. 13/1997 Coll., on Roads, as amended.

D.I.9.2. Effects on Architectural and Historical Monuments

Immovable architectural or historical monuments will not be affected by the Project.

D.I.9.3. Effects on Archaeological Monuments

The location of the Project site lies in the territory of ÚAN III category. This is territory where the occurrence of archaeological sites is not currently expected, but it cannot be fully excluded. Some parts of the territory under consideration (north-eastern quadrant of the SMR Temelín site construction areas, north-western tip of the E1 area and the F1 and F2 area) are included in the ÚAN IV architectural site territorial category, i.e. in territory without archaeological sites in which the overlying layers with evidence of human activity in the past were excavated.

If archaeological structures are detected or disturbed during an overburden, excavation or other interference with the terrain, it will be necessary to ensure rescue archaeology in accordance with the provisions of Act No. 20/1987 Coll., on State Monument Conservation, as amended.

D.I.9.4. Effects during Construction or Termination of Operation

Other effects during construction than the above effects are not identified.

D.I.10. Effects on Transport and Other Infrastructure

D.I.10.1. Effects on Transport Infrastructure

The traffic intensity relating to the Project is very low in comparison with the background (existing) traffic intensity in the affected road network and its development trend. The share of the Project's traffic intensity in the total traffic intensity on most roads of the affected territory is quantified in the following table.

Table D.5: Comparison of Traffic Intensity of the SMR Temelín NPP Project with the Background Traffic Intensity, year 2040

Road	Cross section	Annual average of daily traffic intensity [vehicles/24 h], year 2040							
		Background intensity		Project intensity		Total intensity including the Project		Project share [%]	
		Heavy-duty	Total	Heavy-duty	Total	Heavy-duty	Total	Heavy-duty	Total
II/105	2-0640	1436	9003	50	250	1486	9253	3.4%	2.7%
	2-0656	1096	6586	50	250	1146	6836	4.4%	3.7%
	2-0657	1032	7014	50	250	1082	7264	4.6%	3.4%
	2-0650	1032	7014	80	380	1112	7394	7.2%	5.1%
	2-0660	1537	8640	80	380	1617	9020	4.9%	4.2%
II/138	2-4680	356	1217	130	630	486	1847	26.7%	34.1%

Note: Numbers of the cross sections and their map delineation, see Chapter C.II.10. Transport and Other Infrastructure (page 103 of this Notification).

The data indicate the following facts:

- The section most affected by the Project is the section of road II/138 (cross section 2-4680), which runs directly alongside the SMR Temelín NPP site and there will also be an entrance into the SMR Temelín NPP site. 100% of the Project's traffic will run through this section. The share of the Project's intensity in the total traffic intensity will range up to approx. 34%, with heavy traffic intensity of up to approx. 27%. This is due especially to the fact that the traffic load of this section is very low in the existing/background status. However, the section does not pass through any residential area and will basically comprise the main entrance into the SMR Temelín NPP site.
- On the further connected road network of the affected territory (road II/105), the share of the Project's intensity in the total traffic intensity will range up to approx. 5%, heavy traffic intensity of up to approx. 7%). These are very low values, the potential change here ranges in the zone of natural traffic variability and is virtually imperceptible either objectively (by counting) or subjectively.
- Then the project's traffic will break down into several directions on a wider road network and will therefore reduce the Project's share in traffic intensity. Thus, as a result of the project there will not be a significant change in the traffic load.

In general terms, the Project does not bring an unexpected traffic load to the affected territory. While depending on the road category, the expected normal change in traffic intensity on the road network of the affected territory between 2020 to 2040 is approx. +9% to +10% for passenger vehicles, approx. +12% to +14% for heavy-duty vehicles (see more in Chapter C.II.10. Transport and Other Infrastructure, page 103 of this Notification), the expected change in traffic intensity is well below the band of these expected values. Therefore, from this point of view, the Project does not require any special or additional measures and the road network of the affected territory is prepared for this change. This conclusion can also be generalised to include transport routes connected to another road network where the share of the Project's traffic intensity as a consequence of the further division of traffic into a wider area (i.e. into more and more directions) will be reduced further.

Considering the concurrent (cumulative) effect of other facilities at the site (Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP), the traffic balance is indicated in the following table. At the same time, the Temelín NPP 1,2 service transport is already part of the existing/background traffic intensity, so it does not represent an additional traffic demand/contribution.

Table D.6: Comparison of Traffic Intensity of the Prepared Projects (NJZ Temelín NPP+SMR Temelín NPP Projects) with the Background Traffic Intensity, year 2040

Road	Cross section	Annual average of daily traffic intensity [vehicles/24 h], year 2040							
		Background intensity		Project intensity		Total intensity including the Projects		Project share [%]	
		Heavy-duty	Total	Heavy-duty	Total	Heavy-duty	Total	Heavy-duty	Total
II/105	2-0640	1436	9003	150	750	1586	9753	9.5%	7.7%
	2-0656	1096	6586	150	750	1246	7336	12.0%	10.2%
	2-0657	1032	7014	210	1010	1242	8024	16.9%	12.6%
	2-0650	1032	7014	240	1140	1272	8154	19.3%	14.0%
	2-0660	1537	8640	240	1140	1777	9780	13.5%	11.7%
II/138	2-4680	356	1217	130	630	486	1847	26.7%	34.1%

Note: Numbers of the cross sections and their map delineation, see Chapter C.II.10. Transport and Other Infrastructure (page 103 of this Notification).

The data indicate the following facts:

- The share of the prepared facilities at the Temelín NPP site (i.e. NJZ Temelín NPP and SMR Temlín NPP) in the total traffic intensity on the road network of the affected territory (potentially the most affected section of road II/105) will be up to approx. 14%, heavy-duty traffic intensity up to approx. 19%. When considering the traffic of Temelín NPP 1,2, which is already part of the existing/background traffic intensity, the facilities at the Temelín NPP site (Temelín NPP 1,2+NJZ Temelín NPP+SMR Temelín NPP) will comprise approx. 23% of total traffic and up to approx. 30% of heavy-duty traffic.
- An exception in this case is the section of road II/138 (cross section 2-4680), however the data stated above apply for the SMR Temelín NPP Project, it is not significantly affected by the operation of Temelín NPP 1,2 and NJZ Temelín NPP and does not run through any residential area, so there is no further cumulative effect here.

In general terms, it is clear when considering the concurrent (cumulative) effect of the SMR Temelín NPP Project with other prepared (NJZ Temelín NPP) and existing (Temelín NPP 1,2) facilities at the site that the Temelín NPP site is and will be a significant destination/source of traffic. This is due to the transport importance of this extensive industrial site or its transport demands as well as the low attractiveness of the territory for other transport. The transport demands of the Temelín NPP, as opposed to the existing/background status, will increase by the transport demands of other prepared projects at the site, i.e. NJZ Temelín NPP and SMR Temelín NPP (subject of the Project). The potential change of traffic intensity ranges directly in the affected territory in the order of tens of percent, which is an acceptable value purely in traffic terms, without an effect on the capacity of the roads and their construction and technical condition. In terms of Act No. 13/1997 Coll., on Roads (the Road Act), as amended, this is general use, i.e. free use in the usual way and for purposes for which roads are intended. The effect of this traffic intensity on individual environmental elements (noise, air) will be assessed as part of the applicable spheres of assessment.

As far as railway transport is concerned, the effect of use of railway transport can be identified as insignificant, the site railway connection has a capacity reserve that is more than sufficient. There are virtually no effects on other transport infrastructure of the affected territory (water, air, cycling etc.).

D.I.10.2. Effects on Other Infrastructure

Apart from the networks required for the operation of the Project (offsite power transmission into the National Grid, back-up supply, water supply system, wastewater drainage system), which are systems managed either by the Project developer (ČEZ Group) or other managers of the energy infrastructure (ČEPS, EG.D), the implementation of the Project will not have any further effect on the territory's infrastructure. Possible changes of the affected infrastructure network will be restored to the original condition or the condition required by their owners or managers. Offtake points will continue being supplied during the implementation of the Project by electrical power and other utilities (water, gas, etc.).

D.I.10.3. Effects during Construction or Termination of Operation

The highest percentage increase of the road network load during the construction of SMR Temelín NPP is expected in the near vicinity to the construction site at the above mentioned cross sections of roads in the Temelín NPP site (roads no. II/105 and II/138). The total construction traffic intensity of SMR Temelín NPP, i.e. total arrivals and departures, will be up to approx. 880 vehicles/day, of this approx. 480 heavy-duty (lorries and buses). This traffic will be divided on road II/105 into two directions, the intensity in one direction should not conservatively exceed approx. 600 vehicles/day, of this approx. 300 heavy-duty. In view of the relatively low required intensity on road II/105, this will obviously be a relatively high percentage increase especially of heavy-duty traffic (up to approx. 30%). In terms of capacity of roads, no significant change in monitored characteristics (driving speed, density, comfort, etc.) is expected, sufficient capacity reserves of roads are available, the effect of an increased intensity is mitigated by the fact that the construction traffic of SMR NPP site will not be substantially concentrated in day traffic peaks.

In this respect, the fundamental fact is that the construction traffic of SMR Temelín NPP will be coordinated in relation to construction traffic of NJZ Temelín NPP so that there is no overlapping of peak construction works (see Chapter B.I.6.4.2. Schedule of Operation and Decommissioning of Nuclear Installations at the Site, page 58 of this Notification). Thus, the total intensity of destination construction traffic assessed in the NJZ Temelín NPP EIA will not be exceeded. This is a total of arrivals and departures of approx. 1780 vehicles/day (of this 980 heavy-duty). Given the expected construction schedule of SMR Temelín NPP (which precedes the main phase of construction of NJZ Temelín NPP), approx. half of this number is intended for the construction of SMR Temelín NPP, the remaining half for the preparatory phase of construction of NJZ Temelín NPP. Therefore, there will be no change in the already earlier assess traffic effects of construction works of NJZ Temelín NPP[1]. This also concerns construction traffic of the extension of the storage capacity of SVJP Temelín NPP, which in view of the relatively small extent of this Project, is very low (in the order of single numbers, tens at short-term peaks, lorries/day) and virtually does not change the traffic balance of the construction of new nuclear sources. However, regardless of these facts, the effects of construction traffic on individual environmental elements (noise, air) will be assessed as part of the applicable spheres of assessment.

Ensuring the repair of road sections, on which an increase of traffic could result in deterioration of their quality, is assumed in accordance with the requirements of Act No. 13/1997 Coll., in Roads (the Road Act), as amended, before commencement as well as after completion of construction. The precise scope of proposed repairs will be determined before the implementation of SMR Temelín NPP itself based on the road condition mapping and road structure diagnostics.

In case of the use of railway transport, the railway network capacity is not a limiting factor, therefore the effect of the use of railway transport during construction can be considered to be insignificant.

Transport of oversized parts and components will represent specific individual cases, which will not statistically contribute to traffic intensity induced by standard construction. A combined water and road route is taken into account for transport of oversized and heavy components to the construction site. It will then be necessary to take a number of local technical measures or construction modifications on the selected route to ensure passability. These modifications are currently being prepared for the NJZ Temelín NPP Project and could be used for the SMR Temelín

[1] New nuclear source at the Temelín NPP Site including the offsite power transmission to the Kočín substation MŽP favourable opinion ref. no.: 2561/ENV/13, 2562/ENV/13 of 18 January 2013, extension of the validity of MŽP opinion ref. no.: MŽP/2019/710/10492 of 16 December 2020.

NPP Project without further consequences. Considering the assumed volume of transported oversized components (in single units per year), these effects can be considered to be insignificant.

A similar system for ensuring transport (i.e. also comparable or lower effects) can be expected during termination of operation as during operation or construction.

D.I.11. Other Environmental Effects

D.II.11.1. Effects on the Rock Environment

The implementation of the Project realisation has a minimum effect on the rock environment. The direct effect consists of the interference with top layers of bedrock, i.e., above all Quaternary and Neocene sediments, partially weathered mantle, up to sufficiently well-bearing moderately-weathered bedrock. The effect is limited only to the construction area without other accompanying effects outside the Project site. The integrity and quality of the rock environment will not be affected during operation.

Considering the nature of underlying rocks, hydrogeological conditions on the construction site, assumed modifications to the footing bottoms, and designs for the foundation of the decisive civil objects, there is no danger of stability loss or material liquefaction in the construction site area and the near vicinity.

Stability and security of artificial excavations (inclinations of slopes, planking and strutting) will be individually specified according to geotechnical calculations during design preparation of the foundations.

D.II.11.2. Effects on Old Environmental Burdens

No old environmental burdens are detected or recorded in the area of the Project and its nearest vicinity.

D.II.11.3. Effects on Mining Subsidence Area

The Project has no effect on any mining subsidence area due to its absence.

D.II.11.4. Effects on Other Characteristics of the Environment

No other significant effects not described above are expected,.

D.II.

EXTENT OF THE EFFECTS

2. Extent of the Effects With Regard to the Affected Territory and Population

The extent of the effects will mostly be local, due to the extent of areas for the location of the Project and its nearest vicinity. A wider extent of the effects can only occur through the Project outputs into the environment (typically radioactive as well as non-radioactive effluents into the atmosphere and watercourses, noise or other factors) and visual effects.

Regarding radioactive effluents and their very low level, the existing effects of radioactive effluents from the other existing and prepared nuclear facilities at the Temelín site as well as the generally insignificant nuclear power share of the population's exposure to radiation (see Chapter C.II.3.2. Ionising Radiation, page 79 of this Notification), the Project's negative effects on the population are not expected, even when concurrent (cumulative) effects of the other nuclear facilities at the site are taken into account. 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 (well within permissible limits) and subject to regular monitoring and checking.

In terms of other factors, the site is spatially dimensioned to location of the new source. The distance separating the site of the Project and its individual components from residential areas or other protected areas (such as specially protected natural areas) is sufficient to exclude any adverse effects. No significant change in the existing quality of the environment can therefore be expected as a consequence of the Project. As far as the extent of the effects is concerned, a visual effect (i.e. effect on the landscape) has to be considered to be a significant factor. The Project will comprise spatially dominant civil objects. In contrast, this effect is currently already present at the site as a consequence of the visual effects of Temelín NPP 1,2, also the prepared NJZ Temelín NPP, whose civil objects are of significantly greater dimensions. The extent of the visually affected area will increase only insignificantly as a consequence of the SMR Temelín NPP Project, and will correspond in quality to the existing situation.

The above data indicates that no facts were identified within the framework of compiling this Notification that would show evidence of possible significant adverse effects of the Project on the environment, exceeding respective legal limits or (if limits have not been prescribed) an unacceptable effect, in all the monitored areas (population and public health, air and climate, noise, radiation and other physical or biological characteristics, ground and surface waters, land, rock environment and natural resources, fauna, flora and ecosystems, movable property and cultural monuments, transport infrastructure, and others). However, in any case, all relevant effects will be assessed in detail in the environmental impact assessment documentation.

The above facts also apply to requirements for ensuring nuclear safety, radiation protection, safety of nuclear equipment and nuclear material and requirements for managing abnormal radiation occurrences, which arise from the starting points and requirements of the Atomic Act and related regulations, and will be taken into account in the SMR Temelín NPP Project (this is an essential condition). For more on these facts see Chapter B.III.6. Accident Risks (page 69 of this Notification).

The Project is (or will be) proposed in accordance with the respective regulations, especially the requirements of the Atomic Act and related regulations. These also take into account the respective climatic parameters (temperature, precipitation, snowfalls and snow loads, frost, hailstones, lightning, flooding, or exceptional occurrence of meteorological phenomena including a combination of them) and other design parameters (e.g. seismicity of the territory). This way the Project is prepared for the respective climatic and other loads. The Project therefore complies with recommendations, specified in the document Guidelines to the Incorporation of Climatic Changes and Biodiversity into the Environmental Impact Assessment (EU, 2013). This generally requires that “no net loss” principle of biodiversity is assured. The Project will not result in the degradation of ecosystem services, loss or degradation of natural habitats, loss of species diversity or loss of genetic diversity.

The data indicates that the extent of the direct effects of the Project is limited to the Project area and its vicinity, there is no significant effect on the wider territory and population.

D.III.

DATA OF POSSIBLE TRANSBOUNDARY EFFECTS

3. Data of Possible Significant Unfavourable Transboundary Effects

All the legal and other requirements for the protection of the environment and public health for the SMR Temelín NPP Project, are related to the affected territory and population groups in close contact with it. The affected territory (i.e. in accordance with the Act on Environmental Impact Assessment “territory whose environment and population could be seriously affected by the implementation of the Project”) and the representative person (i.e. in accordance with the Atomic Act “an individual from the population representing a model group of natural persons that are most exposed to the given source and given pathway”) is located in the immediate vicinity of the Project’s site location. The distance of the nearest residential areas of the surrounding municipalities is in the order of first units of kilometres. All requirements for environmental protection and public health must be observed in this nearest area, including the requirements for ensuring nuclear safety, radiation protection, safety of nuclear equipment and nuclear material, and requirements for managing abnormal radiation occurrences.

A distance of the Project from the state boundaries of adjacent states is in the order of tens to hundreds of kilometres and is the following:

- Republic of Austria 49 km,
- Federal Republic of Germany 59 km,
- Republic of Poland 191 km,
- Slovak Republic 198 km.

The occurrence of significant transboundary impacts is virtually excluded in this context, if the requirements of the environmental protection and public health is ensured in the nearest affected territory.

However, regardless of this fact, the Project environmental impact documentation will include analyses of radiation effects for the transboundary areas of the nearest adjacent states, i.e., both for normal operation of the Project and (in particular) for a representative conservative case of a basic design accident and a major accident in the extended design conditions.

D.IV.

CHARACTERISTICS OF MEASURES FOR PREVENTION, EXCLUSION AND REDUCTION OF NEGATIVE EFFECTS, DESCRIPTION OF COMPENSATION

4. Characteristics of measures to prevent, exclude and reduce all the significant unfavourable environmental impacts and description of compensation, if possible with regard to the Project

The basic measure is to observe general binding legal regulations and standards in the scope of the Atomic Act and in environmental protection and public health. These create a clear and controllable framework for the preparation, implementation and operation of the Project, including requirements for the monitoring of effect on the environment and requirements for the preparedness for an extraordinary situation. At the same time, the declaration itself for compliance with legal requirements cannot be considered a measure for the prevention, exclusion and reduction or compensation of negative effects on the environment. This is an obligation which does not have to be subject to additional measures.

The basic design measures for prevention, exclusion, reduction or compensation of unfavourable effects consist of these spheres:

- location of the Project outside the specially protected areas, with sufficient distance from residential areas and in an area with well accessible infrastructure,
- use of the best available technologies of generation III+ reactors,
- assurance of nuclear safety, radiation protection, physical protection and emergency preparedness in accordance with requirements of valid legislative regulations, IAEA and WENRA standards or other technical standards,
- minimisation of radiation effects on population or employees in accordance with the ALARA principle,
- minimisation of demands for environmental sources and outputs into the environment,
- observance of all the legal regulations and standards in the sphere of the environment and public health.

Furthermore, a result of the environmental impact assessment can be a number of justified measures focused on protection of individual elements of the environment and public health. These measures will become part of the conditions of follow-up administrative proceedings and will be observed during preparation, construction as well as operation of the Project.

D.V.

CHARACTERISTICS OF USED METHODS OF FORECASTING AND INITIAL PRECONDITIONS IN IMPACT ASSESSMENT

5. Characteristics of Forecasting Methods and Initial Preconditions, and Evidence for Finding and Assessment of Significant Effects on the Environment

The Notification compiled in the cope of Annex No. 3 of Act No. 100/2001 Coll., on Environmental Impact Assessment, as amended. As stated in the introduction of this Notification, the Notification is not an assessing, but an informative document serving as the basis for conducting in investigation process. Therefore, its purpose is not to provide detailed and/or comprehensive information on the Project's environmental effects but to present the Project, the affected territory, the environmental state in the affected territory, and identify possible effects of the Project on the environment and public health, including potential concurrent effects. The detailed environmental impact assessment will be included in further follow-up documents being compiled in the course of the environmental impact assessment process, in particular the Project's environmental impact documentation.

The data of possible effects of the SMR Temelín NPP Project on the environment and public health stated in this Notification are in this context preliminary and are based on the following methods and initial preconditions for impact assessment:

- knowledge of the technical and technological solution of the Project at the level of its general properties, legislative and other requirements (especially the requirements of the Atomic Act and subsequent and related regulations), envelope-defined inputs and outputs, including tender design solution of reference suppliers,
- knowledge of the technical and technological solution of further existing and prepared nuclear equipment at the location, including their inputs and outputs, regulatory requirements, monitoring programs and data from their environmental impact assessment (EIA),
- knowledge of the state of the affected territory in all its elements based on long-term ongoing monitoring programs of various sponsors, both from its own findings and previously carried out work at the location,
- knowledge of the methods and legislative requirements for the assessment of effects on individual elements of the environment.

To determine the state of the territory and possible effects of the Project, internal background studies were secured, as part of the compiling of the Notification, to determine the current state of the environment and public health in the affected territory just as a preliminary evaluation of potential effects of the Project and determining the conditions and priorities for subsequent detailed impact assessments.

One of the basic methodological approaches in the sphere of the environmental impact assessment, even in the nuclear sphere, is the focus on assessment safety. The subsequent impact assessment which will be conducted in the environmental impact assessment documentation, i.e. will be consistently subject to a conservative (i.e. safe) approach. For this purpose, several tools will be applied:

- taking into account the conservative environmental parameters of the Project,
- taking into account all concurrent effects,
- taking into account all phases of the Project's life cycle,
- taking into account all spheres of the environment,
- taking into account non-standard situations or extraordinary events and
- taking into account transboundary effects.

Only in this case is it guaranteed that assessment processes will include all effects at their potential maximum.

D.VI.

CHARACTERISTICS OF DIFFICULTIES WHICH OCCURRED IN COMPILING THE NOTIFICATION

6. Characteristics of all difficulties (technical deficiencies or deficiencies in knowledge) encountered during the compiling of the Notification and main uncertainties ensuing from them

No such deficiencies in knowledge or uncertainties that would make it impossible to clearly specify possible effects of the Project on the environment and public health occurred in the compiling of the Notice.

The environmental properties of nuclear sources with light water reactors (PWR or BWR) are generally well known, data of environmentally significant parameters of facilities of individual reference designs are available. Likewise, the environmental properties are known of other nuclear facilities at the Temelín NPP site, both the existing Temelín NPP 1.2 and spent nuclear fuel storage (SVJP) (verified operational experience and monitoring programs), the prepared NJZ Temelín NPP and extension of storage capacity of SVJP (gained from their environmental impact assessment).

The state of the environment in the affected territory is known and monitored on a long-term basis (radiation monitoring program, non-radiation monitoring program, Temelín NPP monitoring and impact assessment program). The technical and technological solution, which is the basis for compiling the Notification, provides all the relevant data of the Project necessary for compiling the Notification and specifying possible effects on the environment and public health. Likewise, clear legislative requirements were determined for the Project, especially the requirements of the Atomic Act and related regulations which regulate the decisive environmental parameters of the Project.

A specific supplier of the Project has not been selected at the time of the compiling of this Notification. This fact does not prevent the performance of the environmental impact assessment. The environmental and safety requirements are clear, the same for all potential suppliers and the effects are considered in their potential maximum (envelope of environmental parameters). In this regard, it is the environmental parameters of a facility that are decisive and not a specific type of facility of specific manufacturers or their trademarks. Thus, the subsequent selection of a supplier cannot be to the detriment of environmental protection.

E.

(COMPARISON OF THE PROJECT SOLUTION OPTIONS)

E. COMPARISON OF THE PROJECT SOLUTION OPTIONS (if submitted)

The Project is not submitted in more options.

F.

(SUPPLEMENTARY DATA)

F. SUPPLEMENTARY DATA

F.I.

MAPS AND OTHER DOCUMENTATION

1. Maps and Other Documentation Related to Notification Data

The map documentation is found in the Annex Part of this Notification. All the necessary documents can be found there as well.

F.II.

OTHER SUBSTANTIAL INFORMATION

2. Other Substantial Information of the Developer

Not stated.

G.

(SUMMARY OF NON-TECHNICAL NATURE)

G. GENERALLY COMPREHENSIBLE SUMMARY OF NON-TECHNICAL NATURE

The summary of the non-technical nature includes the Project data in a brief and comprehensible form, and furthermore conclusions of individual partial spheres of assessments of the Project's possible environmental effects. Those who are interested in more detailed data are therefore recommended to study corresponding chapters of the Notification.

Basic Project Data

The Project of the new nuclear source involving the construction and operation of a small modular reactor (SMR Temelín NPP) is being prepared in the area adjacent to the Temelín Nuclear Power Plant site (Temelín NPP site).

The reason for the implementation of the Project is the necessity to ensure reliable generation and supply of electrical power in the Czech Republic while taking into account the departure from fossil sources of electrical power (especially the complete termination of the use of coal for the generation of electricity by 2033) and the transition to renewable energy sources and nuclear sources. The Temelín site offers the appropriate spatial conditions and the additional capacity connection to the necessary infrastructure, particularly the supply of process water, drainage of wastewaters and offsite power transmission to the electricity network of the Czech Republic for the location of the SMR. The Project fully complies with the objectives of the prepared update of the State Energy Policy, with the National Action Plan for the Development of Nuclear Power in the Czech Republic and the existing update of the National Energy and Climate Plan.

Project Location

The SMR Temelín NPP Project will be located in the area following on from the existing Temelín power plant site. The areas for the location of the Project, i.e. the area for locating the power unit, areas of the temporary construction site equipment and the power supply corridor can be clear seen in the following figures.

Fig. G.1: Extended Layout of Project Location

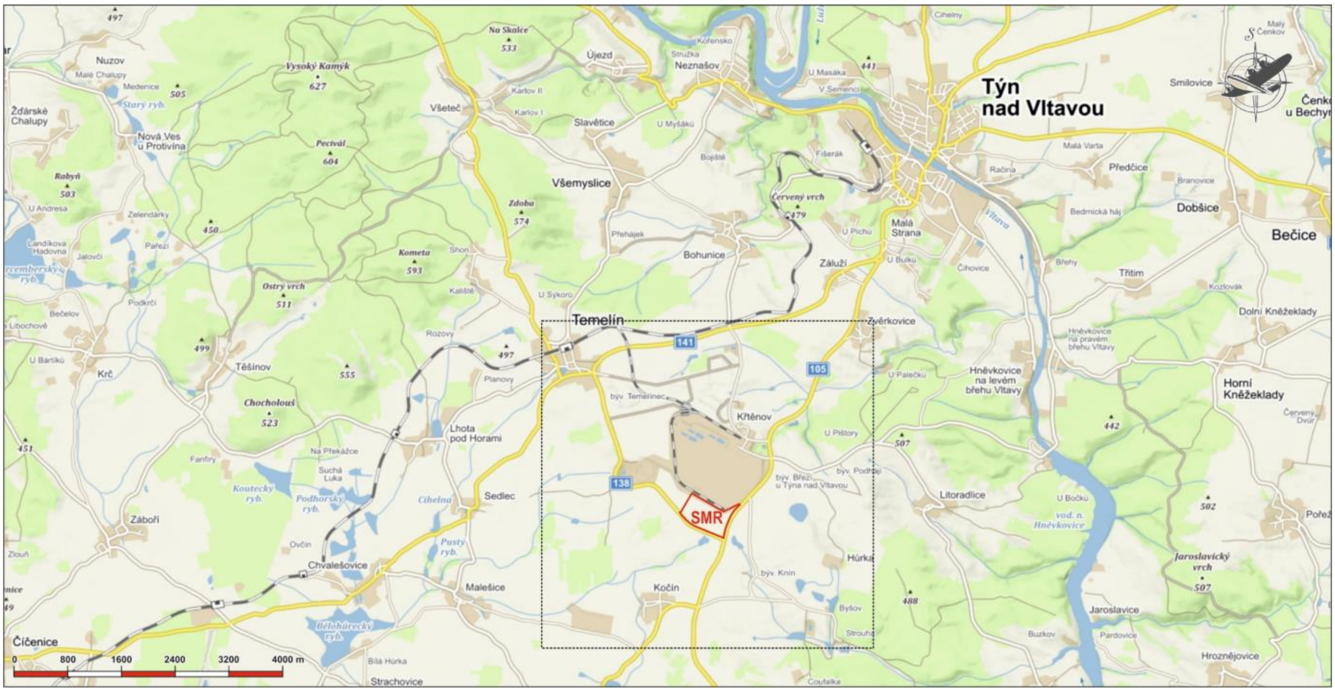
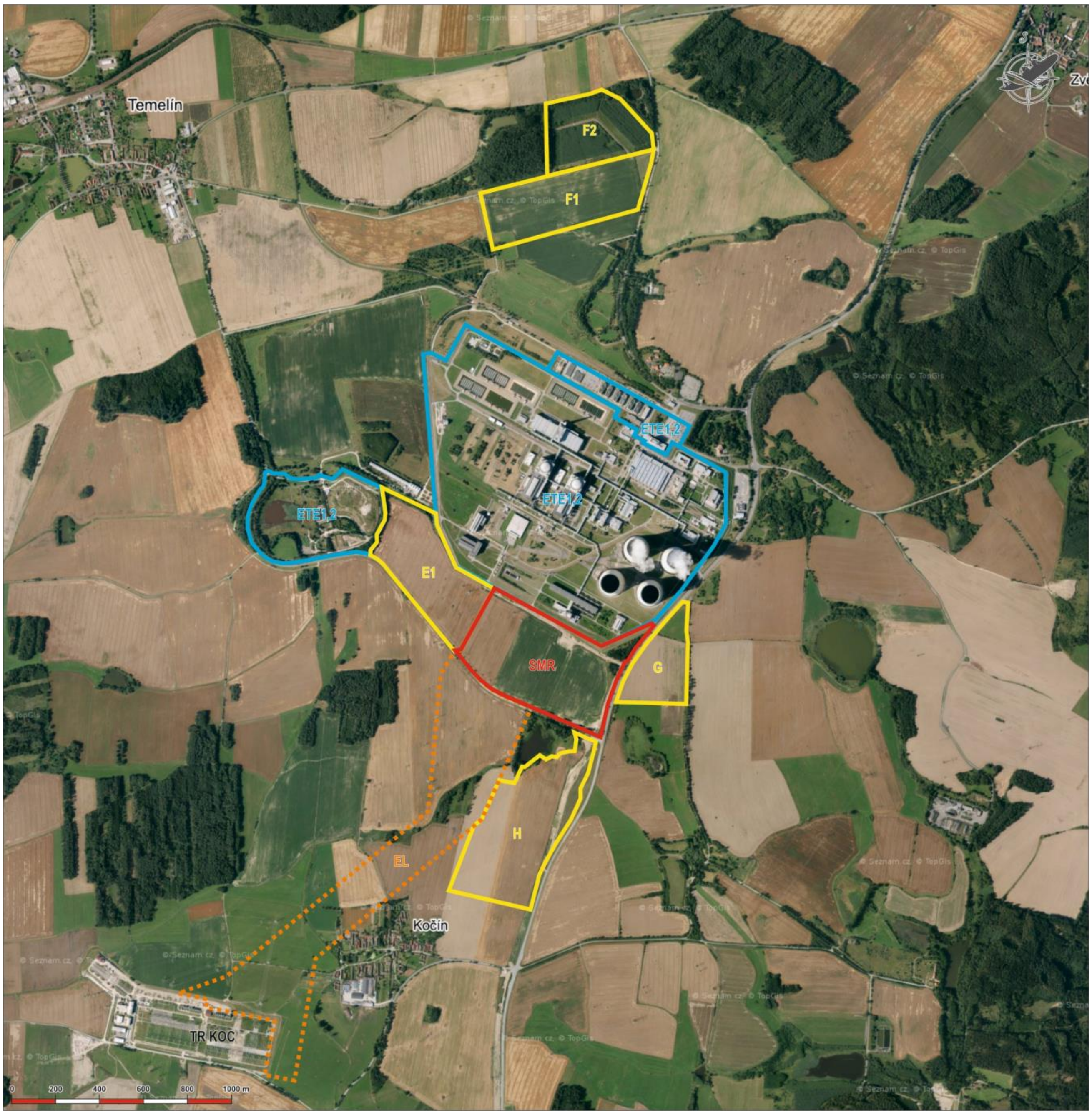


Fig. G.2: Clear Layout of the Project Location



Legend:	SMR	area for location of SMR Temelín NPP, main construction site
	EL	offsite power transmission corridor
	E1	construction site equipment area
	F1, F2	temporary construction site equipment areas
	G, H	areas considered for extending the construction site equipment
	Temelín NPP 1,2	area of the existing Temelín Nuclear Power Plant
	TR KOC	existing Kočín transformer station

Technical and Technological Solution of the Project

The subject of the Project is the construction and operation of the new nuclear source of SMR at the Temelín site (SMR Temelín NPP), including a power unit consisting of all related civil objects and technological systems (technological equipment), used for power generation and offsite power transmission and assurance of the safe operation of the nuclear facility. The Project will be performed independently of the existing nuclear facilities at the site so it does not restrict their operation and does not affect the level of assurance of their nuclear safety, radiation protection, assurance and management of abnormal radiation occurrences.

The Project includes these elements:

Power unit:	number of units:	one unit (consisting of one or two nuclear reactors)
	type:	light water reactor (LWR)
	generation:	III+ with a high degree of passive safety elements
	net electrical power:	up to 500 MW_e
	design lifetime:	60 - 80 years
	A part of the power unit are all necessary civil objects and technological equipment of the primary circuit, secondary circuit (if used), tertiary (cooling) circuit, auxiliary objects and operations including all related and induced investments for the construction and operation of the Project. Available SMR units will be used while none of the available designs is excluded in advance.	
Electrical connection:	electrical power transmission:	400 kV overhead or underground power lines
	offsite power reserve:	110 kV above ground and underground power lines
	Electrical connection includes all the elements required for the Project construction, operation and connection to the electricity network of the Czech Republic. The Project offsite power transmission is considered to the Kočín transformer station, an offsite power reserve will be assured from the Kočín transformer station.	
Water system connection:	water supply:	underground pipe mains
	wastewater discharge:	underground pipe mains
	precipitation water discharge:	underground pipe mains, 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 wastewaters and discharge of precipitation water. The raw water will be supplied through the existing raw water supply system of Temelín NPP from the Hněvkovice water reservoir on the Vltava River. Potable water will be supplied by a connection to the existing potable water supply system. Cleaned sewage and process wastewaters will be discharged by a connection to the existing Temelín power plant infrastructure (including the ultimate discharge of wastewaters into the Kořensko waterworks) into the Vltava River. Precipitation water will be discharged by a connection to the existing network of precipitation sewerage discharging precipitation water from the Temelín power plant site into the Strouha recipient stream and then to the Vltava River.	

The Project also includes areas and construction equipment, i.e. the main construction site and construction site equipment including areas considered for the extension of the construction site hinterland and area of temporary construction site equipment, including all elements necessary for the Project supplier during building, construction works, if any, (outside the public infrastructure).

The design shall meet all the applicable safety standards, i.e., currently valid as well as those that will occur any time in the course of the life cycle of the power plant.

Data of Possible Environmental Effects

Effects of the new source of SMR Temelín NPP will qualitatively as well as quantitatively correspond to the effects of the existing power plant. This is being operated on a long-term basis at the Temelín site, its effects are continuously monitored and assessed, and no facts have been identified that would show evidence of significant negative effects on individual elements of the environment and public health. Therefore, it can be reasonably assumed that this situation will continue, and the acceptable extent of effects will not be exceeded even after implementation of the new source of SMR Temelín NPP.

A detailed environmental impact assessment of the new nuclear source on the environment and public health will be performed in the next stage of environmental impact assessment (i.e., in the Project’s environmental impact documentation) within the following scope:

- assessment of the population’s health state, health risks and effects on public health,
- assessment of effects on atmosphere and climate,
- assessment of noise effects,
- assessment of effects of radioactive effluents discharged into the atmosphere and watercourses,
- assessment of radiological effects of a design accident and a major accident of the new nuclear source,
- assessment of water offtake assurance,
- assessment of wastewater discharging effects,
- assessment of effects on flora, fauna and protected areas at national and European level,
- assessment of effects on landscape.

Assessment will be based on the envelope of design properties of all potential suppliers (e.g., maximum radioactive effluents, maximum water offtake, maximum dimension, etc.), i.e., so that all the effects are assessed at their potential maximum. Likewise, the assessment will take into account the concurrent effects of all facilities at the location, i.e. the existing power plant (Temelín NPP 1,2), prepared new nuclear source (NJZ Temelín NPP) and extension of the capacity of the existing spent nuclear fuel storage of the Temelín power plant (SVJP) and the existing state of the environment. The assessment will also involve potential transboundary effects.

Other Recommendations

This Notification is the first document compiled in the course of the new nuclear source of SMR Temelín NPP environmental impact assessment process. Its purpose is not to provide detailed information on environmental effects but to provide data necessary for the implementation of the investigation process. It means to introduce the new source Project, delineate the affected territory, characterise the state of the environment in the affected territory involved and identify possible effects of the Project on the environment and public health, i.e., including concurrent (cumulative) effects with other facilities or projects at the site.

The investigation process aims, among other things, to specify information which is appropriate for being included in the Project's environmental impact assessment documentation. The subsequent environmental impact assessment process will then bring both more detailed information on the Project and more detailed determination of the extent of effects on all the affected environmental elements and population.

In case of requirements for specific content in the assessment of the effects on the environment and population, we therefore recommend readers of this Notification to submit a written statement to the Notification to the respective authority. This statement will be taken into account in the conclusions of the investigation process and subsequently also in the documentation of the Project's effects on the environment and public health.

H.

(ANNEXES)

H. ANNEX
Statement of the Competent Land Planning Authority Regarding the Project in Terms of Land Planning Documentation
Standpoint of the nature conservation body if required according to Section 45i (1) of the Act on Nature and Landscape Conservation

Annexes can be found after the main text of this Notification.

List of annexes:

Annex 1 (Maps and Layout Annexes)
- 1.1 Layout of the Project Location, Ecological Relationships in the Territory

Annex 2 (Documents)
- 2.1 Statements of Nature Protection Authority according to Section 45i of Act No. 114/1992 Coll.

END OF THE MAIN TEXT OF THE NOTIFICATION

The date of the compiling of the Notification, name, surname, address and telephone number of the author of the Notification and persons who contributed to compiling the Notification and a description of the author of the Notification is found in the introduction to the Notification.