

Site Safety Analysis Report

TECHNICAL SPECIFICATIONS

Label: TS-SP-2022-003

Revision: 1

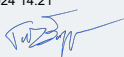
Prepared by :


Podpisnik: Kaja Zupančič
Izdajatelj: GEN-E Enterprise CA01
Številka certifikata: 710000157684DC6C64544756A2000100001576
Potek veljavnosti: 27. 10. 2024
Čas podpisa: 23. 02. 2024 14:20



Reviewed by :


Podpisnik: Tomaž Žagar
Izdajatelj: GEN-E Enterprise CA01
Številka certifikata: 71000016CB08856EF686D7D1DC0001000016CB
Potek veljavnosti: 14. 02. 2025
Čas podpisa: 23. 02. 2024 14:21



Approved by :


Podpisnik: BRUNO GLASER
Izdajatelj: SIGEN-CA G2
Številka certifikata: 00EAC8BC100000000057257600
Potek veljavnosti: 10. 12. 2025
Čas podpisa: 25. 02. 2024 18:46



	TECHNICAL SPECIFICATIONS	Specification number:	
	Site Safety Analysis Report	TS-SP-2022-003	
TS		Date: 23.02.2024	Page: 2/49

Content

List of Terms and Abbreviations	3
1 Introduction.....	5
2 Purpose of Activities	5
3 Scope of Work	5
3.1 Identification of Phases and Deliverables	5
3.2 Applicable Legislation	6
3.3 Phase I – Preparation of Deliverables rev0	12
3.3.1 Content of Site Safety Analysis Report.....	12
3.3.2 Content of Report on Mutual and Collective Impact of JEK2 and NEK	31
3.4 Phase II – Preparation of Deliverables rev1	38
3.5 Phase III – Preparation of Deliverables rev2	38
3.6 Phase IV – Preparation of Deliverables rev3	38
4 Input data and Assumptions.....	39
5 Use of Standards and Regulations.....	39
6 Quality Assurance (QA).....	39
6.1 Alignment with Rules and Standards.....	39
6.2 Development of a Project-Specific QA Plan	40
6.3 QA Elements	40
6.4 Stakeholder Engagement and Reporting.....	40
7 Work Control	40
8 Schedule Management.....	40
9 Status Reports	42
10 Deliverable Documentation Technical Requirements.....	43
11 Organizational Contact.....	44
11.1 Project Management.....	44
11.2 Steering Committee.....	44
12 Access to Information.....	44
13 Proprietary Information	45
14 References	46

	TECHNICAL SPECIFICATIONS	Specification number:	
	Site Safety Analysis Report	TS-SP-2022-003	
TS		Date: 23.02.2024	Page: 3/49

List of Terms and Abbreviations

ARAO	Agencija za ravnanje z radioaktivnimi odpadki (Agency For Radwaste Management)
ASCE	American Society of Civil Engineers
CDF	Core Damage Frequency
EDF	Électricité de France
EU	European Union
EUR	European Utility Requirements
FSAR	Final Site Safety Analysis Report
GEN	GEN energija
GG&S	Geotechnical, Geological and Seismological
GMPE	Ground Motion Prediction Equations
IAEA	International Atomic Energy Agency
JEK2	Jedrska elektrarna Krško 2 (The Second Nuclear Power Plant at Krško)
JV5	Pravilnik o dejavnih sevalne in jedrske varnosti (Rules on Radiation and Nuclear Safety Factors)
KHNP	Korea Hydro Nuclear Power
LERF	Large Early Release Frequency
LILW	Low and Intermediate Level Radioactive Waste
MASW	Multichannel Analysis of Surface Waves
MCR	Main Control Room
NEK	Nuklearna elektrarna Krško (Krško NPP)
NPP	Nuclear Power Plant
NSP	National Spatial Plan
NUID	Načrt Ukrepanja ob Izrednem Dogodku (Emergency Response Plan)
OdSUKND	Ordinance On State Assets Management Strategy
PISO	Prostorski informacijski sistem občin (Spatial Information System of Municipalities)
PMF	Probable Maximum Flood
PSA	Probabilistic Safety Assessment
PSAR	Preliminary Site Safety Analysis Report
PSHA	Probabilistic Seismic Hazard Analysis
QA	Quality Assurance
RfVID	Request for Vendor Information Document
RMCI	Report on Mutual and Collective Impact of JEK2 and NEK
SAR	Safety Analyses Report
SEA	Strategic Environmental Impact Assessment
SNSA	Slovenian Nuclear Safety Administration (Uprava Republike Slovenije za Jedrsko Varnost (URSJV))
SPA	Spatial Planning Authorities
SSAR	Site Safety Analysis Report
SSC	Structures, Systems and Components
SURS	Statistični urad Republike Slovenije (Statistical Office of the Republic of Slovenia)
TEDE	Total Effective Dose Equivalent
Tnsp	Time of beginning of Proposal of National Spatial Plan preparation

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 4/49
TS			

Tspg	Time of receipt of all spatial planning guidelines from SPA
Tsv	Time of beginning of Study of Variants preparation
UHS	Ultimate Heat Sink
URSVS	Uprava Republike Slovenije za Varstvo pred Sevanji (Slovenian Radiation Protection Administration)
US NRC	U.S. Nuclear Regulatory Commission
USAR	Updated Safety Analysis Report
UV3	Uredba o območjih omejene rabe prostora zaradi jedrskega objekta in o pogojih gradnje objektov na teh območjih (Decree on areas of restricted use due to nuclear facilities and on the conditions for construction in these areas)
WEC	Westinghouse Electric Company
X-Q	Dilution factors
ZVISJV-1	Zakon o varstvu pred ionizirajočimi sevanji in jedrski varnosti (Ionising Radiation Protection and Nuclear Safety Act)

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 5/49
TS			

1 Introduction

GEN energija d.o.o. (GEN) is in accordance with the Ordinance On State Assets Management Strategy (OdSUKND) tasked with initiation of the planned investment in the second Nuclear Power Plant at Krško (JEK2), which will be of strategic importance for the long-term and reliable supply of Slovenia with electricity and for the transition to a low-carbon society in the future. The OdSUKND also stipulates that all necessary analyses must be undertaken before making a final decision on the investment in the JEK2 project.

The project JEK2 is in the stage of spatial planning preparation. Throughout the spatial planning process and obtaining the construction permit, numerous studies and analyses will be undertaken. Additionally, licensing will be conducted by the Slovenian Nuclear Safety Administration (SNSA). The following analyses will be undertaken during the licensing process:

- Site Safety Analysis Report (SSAR) (scope of this tender)
- Preliminary Safety Analysis Report (PSAR) (out of scope of this tender)
- Final Safety Analysis Report (FSAR) (out of scope of this tender)

2 Purpose of Activities

The purpose of these activities is to prepare a Site Safety Analysis Report (SSAR) and Report on Mutual and Collective Impact of JEK2 and NEK (RMCI). The envelope approach is employed, covering potential types of power plants (APR1000, AP1000, EPR1200, EU-APR1400, EPR), as well as the twin unit (2xAPR1000, 2xAP1000, 2xEPR1200). The SSAR needs to be prepared considering the nuclear power plant which includes the reactor itself with fuel, the spent fuel pool, and the dry storage facility. The preparation of the SSAR follows the guidance of the International Atomic Energy Agency (IAEA) document SSR-1 Site Evaluations for Nuclear Installations [5]. The SNSA will provide guidelines, which will be considered in the preparation of the National Spatial Plan (NSP) and SSAR. The basis for the preparation of guidelines is Article 95 of the Ionizing Radiation Protection and Nuclear Safety Act (ZVISJV-1) [1]. The guidelines will be developed based on the IAEA standard for site evaluation [5], and they will also incorporate requirements from the Decree on Areas of Restricted Use Due to Nuclear Facilities and on the Conditions for Construction in These Areas (UV3) [2] and Rules on Radiation and Nuclear Safety Factors (JV5) [3].

3 Scope of Work

3.1 Identification of Phases and Deliverables

The contractor shall develop a Project Execution Plan and Methodology for delivering the Scope of Work.

The task is divided into four phases, namely:

- I. Preparation of Project Execution Plan
Preparation of Methodology for delivering the Scope of Work
Preparation of deliverables rev0
The revision 0 of deliverables are prepared.
 - Site Safety Analyses Report (SSAR) Report rev0,

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 6/49
TS			

- Report on Mutual and Collective Impact of JEK2 and NEK (RMCI) rev0,
 - Presentation of SSAR and RMCI to GEN.
- II. Preparation of deliverables rev1
- The 1st revision of deliverables rev0 updated with guidelines from the spatial planning authorities (SPA) are prepared in this phase.
- SSAR rev1,
 - RMCI rev1,
 - Presentation of SSAR and RMCI to SPA.
- III. Preparation of deliverables rev2
- The 2nd revision of deliverables, rev1 updated within the preparation of the Study of Variants.
- SSAR rev2,
 - RMCI rev2,
 - Presentation of SSAR and RMCI.
- IV. Preparation of deliverables rev3
- The 3rd revision of deliverables, rev2 updated within the preparation of the Proposal of National Spatial Plan.
- SSAR rev3,
 - RMCI rev3,
 - Presentation of SSAR and RMCI.

A summary of SSAR is part of the environmental report, for which the SPA provides guidelines. The environmental report is part of the Comprehensive Environmental Impact Assessment (SEA) and transboundary environmental impact assessment. Therefore, changes to the environmental report related to nuclear safety and radiological safety will affect the SSAR.

3.2 Applicable Legislation

SSAR shall be prepared in accordance with Article 95 ZVISJV-1 [1].

Article 95 of the ZVISJV-1 (Placement of a nuclear facility)

- (1) A comprehensive assessment of the effects on the environment and the assessment of the effects on the environment shall be necessary for siting of a nuclear facility.*
- (2) For regional spatial plans, by which a nuclear facility is being planned, it shall be necessary to obtain the guidelines and the opinion of the authority competent for nuclear safety.*
- (4) For national spatial plans, by which a nuclear facility is being planned, or in the joint procedure established by the law governing spatial planning, it shall be necessary to obtain the guidelines and the opinion of the authority competent for nuclear safety.*

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 7/49
TS			

(6) The environmental report shall be evaluated in the part which refers to nuclear and radiation practice regarding:

- all the factors regarding the placement of the nuclear facility which could affect the nuclear and radiation safety of the facility during its operating period and decommissioning, and for the disposal facilities also the effects after the closure,*
- the effects due to operation or decommissioning of the facility on the population and the environment and for disposal facilities also the effects after closure.*

(7) To obtain an opinion of the authority competent for nuclear safety, the proposal of the national spatial plan or a study variant and the environmental report shall, in addition to the content prescribed by the law governing spatial planning, shall contain an expert opinion on the acceptability of the intended building from the view of radiation and nuclear safety and on the relevance of reporting on the effects on the environment and on the public during its operating period and decommissioning and, in the case for a disposal facility, also after its closure.

(8) To obtain an opinion of the authority competent for nuclear safety, on the proposal of the national spatial plan and environmental report in addition to the content provided by the law which governs spatial planning, an expert opinion on the acceptability of the planned building in terms of nuclear and radiation safety shall be added.

The SSAR will also incorporate requirements from the in UV3 [2] and JV5 [3]. The result of SSAR is presented in a document with the format and content as outlined in the following sections of this document.

SSAR shall take into account all requirements from IAEA document Site Evaluations for Nuclear Installations [5]. It shall include an analysis for each of the 29 main requirements and all sub-requirements listed in the document [5]. The correlation table shall be developed, to identify where each requirement and sub-requirement is considered. Only main requirements are listed here:

- **Requirement 1: Safety objective in site evaluation for nuclear installations**

The safety objective in site evaluation for nuclear installations shall be to characterize the natural and human induced external hazards that might affect the safety of the nuclear installation, in order to provide adequate input for demonstration of protection of people and the environment from harmful effects of ionizing radiation.

- **Requirement 2: Application of the management system for site evaluation**

Site evaluation shall be conducted in a comprehensive, systematic, planned and documented manner in accordance with a management system.

- **Requirement 3: Scope of the site evaluation for nuclear installations**

The scope of the site evaluation shall encompass factors relating to the site and factors relating to the interaction between the site and the installation, for all operational states and accident conditions, including accidents that could warrant emergency response actions.

- **Requirement 4: Site suitability**

The suitability of the site shall be assessed at an early stage of the site evaluation and shall be confirmed for the lifetime of the planned nuclear installation.

- **Requirement 5: Site and regional characteristics**

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 8/49
TS			

The site and the region shall be investigated with regard to the characteristics that could affect the safety of the nuclear installation and the potential radiological impact of the nuclear installation on people and the environment.

- **Requirement 6: Identification of site-specific hazards**

Potential external hazards associated with natural phenomena, human induced events and human activities that could affect the region shall be identified through a screening process.

- **Requirement 7: Evaluation of natural and human induced external hazards**

The impact of natural and human induced external hazards on the safety of the nuclear installation shall be evaluated over the lifetime of the nuclear installation.

- **Requirement 8: Measures for site protection**

If the projected design of the nuclear installation is not able to safely withstand the impact of natural and human induced external hazards, the need for site protection measures shall be evaluated.

- **Requirement 9: Site evaluation for multiple nuclear installations on the same site or on adjacent sites**

The site evaluation shall consider the potential for natural and human induced external hazards to affect multiple nuclear installations on the same site as well as on adjacent sites.

- **Requirement 10: Changes of hazards and site characteristics with time**

The external hazards and the site characteristics shall be assessed in terms of their potential for changing over time and the potential impact of these changes shall be evaluated.

- **Requirement 11: Special considerations for the ultimate heat sink for nuclear installations that require an ultimate heat sink**

The evaluation of site specific natural and human induced external hazards for nuclear installations that require an ultimate heat sink shall consider hazards that could affect the availability and reliability of the ultimate heat sink.

- **Requirement 12: Potential effects of the nuclear installation on people and the environment**

In determining the potential radiological impact of the nuclear installation on the region for operational states and accident conditions, including accidents that could warrant emergency response actions, appropriate estimates shall be made of the potential releases of radioactive material, with account taken of the design of the nuclear installation and its safety features.

- **Requirement 13: Feasibility of planning effective emergency response actions**

The feasibility of planning effective emergency response actions on the site and in the external zone shall be evaluated, with account taken of the characteristics of the site and the external zone as well as any external events that could hinder the establishment of complete emergency arrangements prior to operation.

- **Requirement 14: Data collection in site evaluation for nuclear installations**

The data necessary to perform an assessment of natural and human induced external hazards and to assess both the impact of the environment on the safety of the nuclear installation and the impact of the nuclear installation on people and the environment shall be collected.

- **Requirement 15: Evaluation of fault capability**

Geological faults larger than a certain size and within a certain distance of the site and that are significant to safety shall be evaluated to identify whether these faults are to be considered capable

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 9/49
TS			

faults. For capable faults, potential challenges to the safety of the nuclear installation in terms of ground motion and/or fault displacement hazards shall be evaluated.

- **Requirement 16: Evaluation of ground motion hazards**

An evaluation of ground motion hazards shall be conducted to provide the input needed for the seismic design or safety upgrading of the structures, systems, and components of the nuclear installation, as well as the input for performing the deterministic and/or probabilistic safety analyses necessary during the lifetime of the nuclear installation.

- **Requirement 17: Evaluation of volcanic hazards**

Hazards due to volcanic activity that have the potential to affect the safety of the nuclear installation shall be evaluated.

- **Requirement 18: Evaluation of extreme meteorological hazards**

Extreme meteorological hazards and their possible combinations that have the potential to affect the safety of the nuclear installation shall be evaluated.

- **Requirement 19: Evaluation of rare meteorological events**

The potential for the occurrence of rare meteorological events such as lightning, tornadoes and cyclones, including information on their severity and frequency, shall be evaluated.

- **Requirement 20: Evaluation of flooding hazards**

Hazards due to flooding, considering natural and human induced events including their possible combinations, shall be evaluated.

- **Requirement 21: Geotechnical characteristics and geological features of subsurface materials**

The geotechnical characteristics and geological features of subsurface materials shall be investigated, and a soil and rock profile for the site that considers the variability and uncertainty in subsurface materials shall be derived.

- **Requirement 22: Evaluation of geotechnical hazards and geological hazards**

Geotechnical hazards and geological hazards, including slope instability, collapse, subsidence or uplift, and soil liquefaction, and their effect on the safety of the nuclear installation, shall be evaluated.

- **Requirement 23: Evaluation of other natural hazards**

Other natural phenomena that are specific to the region and which have the potential to affect the safety of the nuclear installation shall be investigated.

- **Requirement 24: Evaluation of hazards associated with human induced events**

The hazards associated with human induced events on the site or in the region shall be evaluated.

- **Requirement 25: Dispersion of radioactive material**

The dispersion in air and water of radioactive material released from the nuclear installation in operational states and in accident conditions shall be assessed.

- **Requirement 26: Population distribution and public exposure**

The existing and projected population distribution within the region over the lifetime of the nuclear installation shall be determined and the potential impact of radioactive releases on the public, in both operational states and accident conditions, shall be evaluated and periodically updated.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 10/49
TS			

- *Requirement 27: Uses of land and water in the region*

The uses of land and water shall be characterized to assess the potential effects of the nuclear installation on the region.

- *Requirement 28: Monitoring of external hazards and site conditions*

All natural and human induced external hazards and site conditions that are relevant to the licensing and safe operation of the nuclear installation shall be monitored over the lifetime of the nuclear installation.

- *Requirement 29: Review of external hazards and site conditions*

All natural and human induced external hazards and site conditions shall be periodically reviewed by the operating organization as part of the periodic safety review and as appropriate throughout the lifetime of the nuclear installation, with due account taken of operating experience and new safety related information.

When creating SSAR, assume the placement of JEK2 west of NEK, and consider the following standard power plants or their envelope parameters:

- AP1000 (Westinghouse Electric Company (WEC)),
- APR1000 (Korea Hydro Nuclear Power (KHNP)),
- EPR1200 (Électricité de France (EDF)),
- EPR (EDF),
- APR1400 (KHNP).

The envelope parameters must also appropriately consider the twin unit (AP1000, APR1000, EPR1200). As part of the project task, a presentation must be prepared and performed upon completion of the task. The report should be prepared in English with extended summary in Slovenian language.

An example of a possible arrangement of nuclear facilities is shown in *Figure 1*.

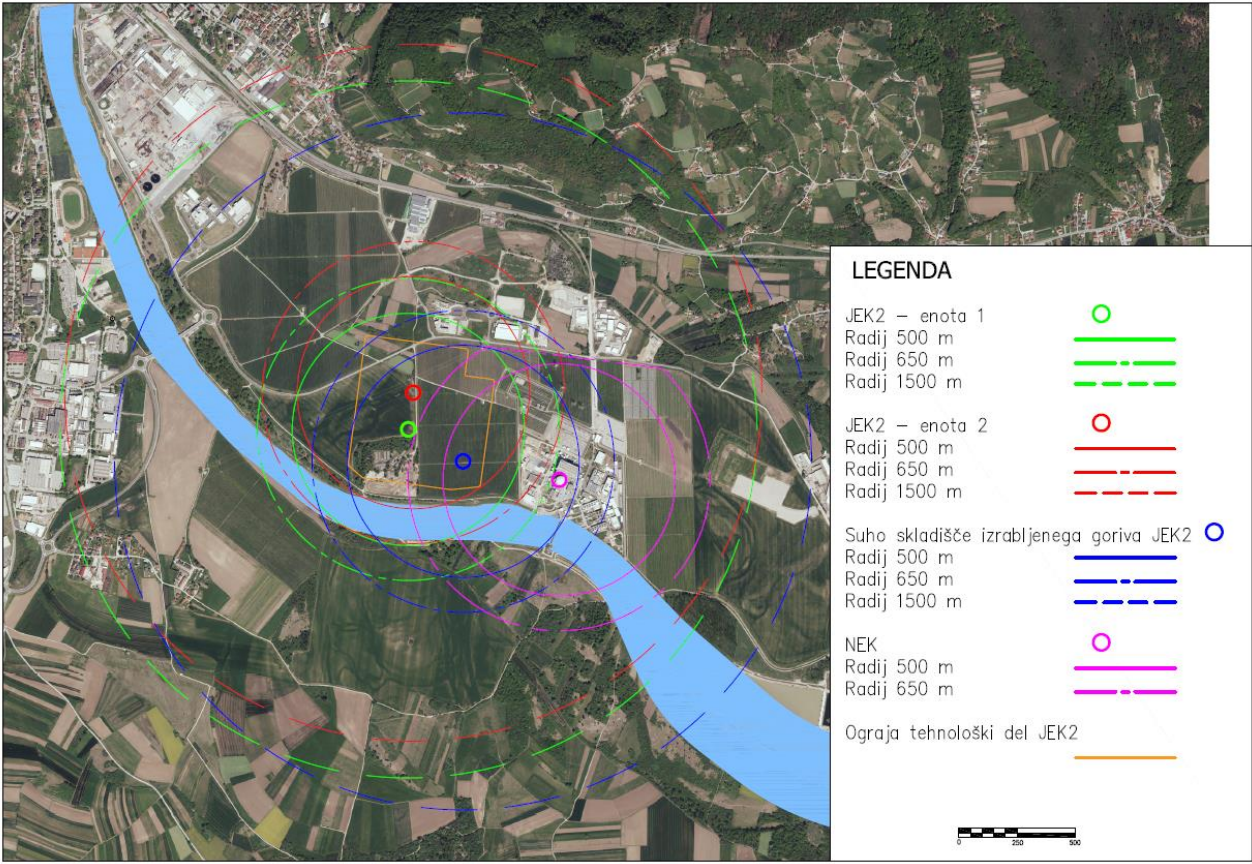


Figure 1: Possible arrangement of nuclear facilities at location

Legenda

JEK2 – enota 1

Radij 500 m

Radij 650 m

Radij 1500 m

JEK2 – enota 2

Radij 500 m

Radij 650 m

Radij 1500 m

Suho skladišče izrabljenega goriva JEK2

Radij 500 m

Radij 650 m

Radij 1500 m

NEK

Radij 500 m

Radij 650 m

Ograja tehnološki del JEK2

Legend

JEK2 – unit 1

Radius 500 m

Radius 650 m

Radius 1500 m

JEK2 – unit 2

Radius 500 m

Radius 650 m

Radius 1500 m

Dry storage of used fuel JEK2

Radius 500 m

Radius 650 m

Radius 1500 m

NEK

Radius 500 m

Radius 650 m

Fence technological part of JEK2

	TECHNICAL SPECIFICATIONS	Specification number:	
	Site Safety Analysis Report	TS-SP-2022-003	
TS		Date: 23.02.2024	Page: 12/49

There can be scope changes due to technology selection (decisions on omission of some technologies mentioned above, and decision on one or two units) in terms of reduction of power plants for envelope parameters. The scope changes result also in contract price, managed in annex to contract.

3.3 Phase I – Preparation of Deliverables rev0

The revision 0 of deliverables are prepared:

- Site Safety Analyses Report (SSAR) Report rev0,
- Report on Mutual and Collective Impact of JEK2 and NEK (RMCI) rev0,
- Presentation of SSAR and RMCI to GEN in English, in person or remotely.

3.3.1 Content of Site Safety Analysis Report

Below is a proposed content outline for SSAR, which the contractor shall properly complement. The most important input documents are:

- The latest revision of NEK Updated Safety Analyses Report (USAR) [60],
- Preliminary Safety Analysis for Decision Making Process, Rizzo [58]
- Vendor Information Package, described below,
- Preliminary Report on Environmental Impacts of Different Energy Technology Options for Slovenia, URS, ZVD [18],
- Environmental report for the comprehensive SEA procedure for JEK2, ZVD (available only in Slovenian) [19],
- Conceptual Design of JEK2, in preparation.

Vendor Information Package includes the following documents by potential vendors for JEK2 project:

- WEC:
 - Response to Request for Vendor Information from GEN energija - JEK2 Nuclear Power Plant, Part II: Technical Information, Westinghouse Electric Company LLC, January 20, 2023
 - Response to Request for Vendor Information from GEN energija - JEK2 Nuclear Power Plant, Part II: Technical Information, Westinghouse Electric Company LLC, October 16, 2023
 - Response to Request for Vendor Information from GEN energija - JEK2 Nuclear Power Plant, Revision 1 - Plot plans, Westinghouse Electric Company LLC, September 14, 2023
 - AP1000 Plant Design Description, Revision 0, Westinghouse Electric Company LLC, July 2022
 - AP1000 Design Control Document, Revision 19, Westinghouse Electric Company LLC
- KHNP:
 - Vendor Information Package (VIP) Part II - Technical Information, January 2023

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 13/49
TS			

- Vendor Information Package (VIP) Part II - Technical Information (APR1400 x 1 Unit), October 2023
- Vendor Information Package (VIP) Part II - Technical Information (APR1000 x 2 Units), KHNP, October 2023
- Site Layout for JEK2, KHNP Power point presentation, September 2023
- Preliminary site layout for 1 unit of APR1400, KHNP
- EDF:
 - EDF response to the Request for Vendor Information of GEN energija, Executive summary, January 2023
 - EDF response to the Request for Vendor Information of GEN energija, January 2023
 - EDF response to the Request for Vendor Information of GEN energija, March 2023
 - Request for vendor information document, Executive summary, Response EDF to GEN energija, November 2023
 - EDF's response to the Request for Vendor Information of GEN energija EPR configuration, November 2023
 - EDF's response to the Request for Vendor Information of GEN energija 2 x EPR1200 configuration, November 2023
 - EDF response to the Request for Vendor Information of GEN energija EPR configuration, September 2023
 - EDF response to the Request for Vendor Information of GEN energija EPR1200 twin configuration, September 2023
 - EDF response to the Request for Vendor Information of GEN energija EPR configuration, October 2023
 - EDF response to the Request for Vendor Information of GEN energija 2 x EPR1200 configuration, October 2023
 - Plot plan – 1 EPR Krško site
 - Plot plan – 2 EPR Krško site

The contractor shall perform gap analysis to identify gap between existing data (information, analyses) for specific sections of SSAR and data (information, analyses) requested by IAEA SSR-1 [5], references [1], [3] and practice. The gap analysis shall identify in which phase (phase I-IV, PSAR, or FSAR) the missing data shall be provided.

The content of SSAR follows the USAR structure known from NEK [60] or U.S. regulation RG 1.206 [8].

It is expected that Site Safety Analysis Report will have about 650 pages, including only chapters which are in scope of contractor preparation.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 14/49
TS			

Content of Site Safety Analysis Report

Table of Contents

List of Figures

List of Tables

List of Abbreviations

0. INTRODUCTION TO SSAR

The content of this chapter will be developed by contractor.

0.1. USED LEGISLATION AND GUIDELINES

Description of the applicable legislation and guidelines. It includes: ZVISJV-1 [1], UV3 [2], JV5 [3], IAEA SSG-61 [6], IAEA SSR-1 [5], RG 1.206 [8].

0.2. APPROACH TO SSAR

Description of the approach to the SSAR. The SSAR follows the chapters of the NEK USAR, with fewer details which are currently unknown since the technology has not yet been selected.

0.3. SPECIFIC REQUIREMENTS AND COMPLIANCE WITH REQUIREMENTS

Description of specific requirements from the IAEA SSR-1 [5] and a summary of compliance with these requirements, with a reference to the chapter in the SSAR where a more detailed description is provided.

1. INTRODUCTION AND GENERAL DESCRIPTION

The content of this chapter will be developed by contractor.

1.1. INTRODUCTION

Introduction to the chapter, a brief description of the content of this chapter.

1.2. GENERAL DESCRIPTION OF THE LOCATION

1.2.1. Safety Objectives in the Evaluation of the Location

Requirement 1: Safety objective in site evaluation for nuclear installations

Description of safety objectives in the evaluation of the power plant. The objective is to characterize natural and human-induced hazards that can threaten the safety of the nuclear power plant. The purpose of such characterization is to provide accurate input data for demonstrating the protection of people and the environment from the effects of ionizing radiation.

1.2.2. Scope of the site evaluation for nuclear installations

Requirement 3: Scope of the site evaluation for nuclear installations

Describe the scope of the site assessment, including the interaction between the location and the nuclear power plant for all operating conditions and accident scenarios, including severe accidents requiring the activation of the emergency response plan.

1.2.3. Power plant location

General description of the power plant location, based on Initiative for spatial planning.

1.2.4. Site suitability

Requirement 4: Site suitability

Description of the suitability of the location for the nuclear power plant throughout its operational life. Summarize all natural and human events in the region that could

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 15/49
TS			

affect the location, from chapter 2 SSAR. Describe population density and impact on possible evacuation. Characteristics of the location and surroundings that could affect the transfer of radioactive material release.

1.3. ENVELOPE POWER PLANT

1.3.1. Overview of reactor types for the development of the envelope power plant.

Overview of reactor types for the development of the envelope power plant (AP1000, APR1000, APR1400, EPR1200 in EPR) as one or two units (AP1000, APR1000, EPR1200) on location. Description of reactor types shall be based on vendor information.

1.3.2. Envelope power plant

Description of the envelope power plant and preparation of tables with plant parameter envelope data (AP1000, APR1000, APR1400, EPR1200 in EPR). Double units are appropriately considered. (AP1000, APR1000, EPR1200). Summary of envelope power plant, which is defined as a power plant with the greatest impacts for each individual impact. Description should be also based on Conceptual design (IDR).

1.4. INVESTOR IDENTIFICATION

Description of the investor GEN energija, based on GEN annual reports. Developed in cooperation with the investor.

1.5. REFERENCE DOCUMENTS

List of reference documents and technology vendors.

1.6. COMPLIANCE WITH SNSA REGULATIONS AND GUIDELINES

Determination of compliance with ZVISJV-1 [1], UV3 [2] and JV5 [3].

1.7. REFERENCES

2. SITE CHARACTERISTICS

The content of this chapter will be developed by contractor.

Requirement 5: Site and regional characteristics

An examination of the site and region is made for features that could affect the safety of the nuclear power plant and the potential radiological impact of the nuclear power plant on people and the environment.

Requirement 14: Data collection in site evaluation for nuclear installations

Requirement 28: Monitoring of external hazards and site conditions

Requirement 29: Review of external hazards and site conditions

To fulfil Requirement 29, one must use references [5], [6].

2.1. GEOGRAPHY AND DEMOGRAPHY

Requirement 10: Changes of hazards and site characteristics with time

Description of geography and demography based on new statistical data and planned urban development, collected by contractor from local municipality and Statistical Office of the Republic of Slovenia (SURS).

2.1.1. Site Location

Detailed description of the location and placement of the nuclear power plant within the site. Map of the location area, shall be included, based on IDR.

2.1.2. Site Description

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 16/49
TS			

Description of authority and control over the exclusion zone, description of the exclusion zone, description of roads within the exclusion zone.

2.1.3. Population and Population Distribution

Requirement 26: Population distribution and public exposure

Characterize the number of residents in specific areas (exclusion area boundary, low population zone, emergency planning zone) and sections in the vicinity of the nuclear power plant. Characterize the number of temporary residents. Describe nearby cities and population density. Describe the anticipated future population until the end of the power plant's operational life (60+20 years). Also consider staff of NEK, where number of personnel increases a lot during outage. The data shall be collected by contractor from local municipality and SURS and Državni zavod za statistiku Republike Hrvatske, considering Regijski načrt zaštite in reševanja ob jedrski ali radiološki nesreči v Posavju [61].

2.1.4. Use of Adjacent Lands and Waters

Requirement 27: Uses of land and water in the region

Describe the land use near the power plant, particularly in terms of its use for growing food for humans and feed for animals. The data shall be collected by contractor from local municipality and SURS and spatial information system of municipalities (PISO).

2.1.5. References

2.2. NEARBY INDUSTRIAL, TRANSPORTATION AND MILITARY FACILITIES

Description of nearby industrial, transportation and military facilities, based on NEK USAR [60] and new data developed in this project.

2.2.1. Locations and Routes

Description of national, major, and local roads (bridge on Sava River), as well as airports in the vicinity. Description of railway lines, gas pipeline network, water supply, sewage system, and communication lines, nearby. Description of the anticipated growth of these linear facilities. The data shall be collected by contractor from local municipality and SURS and PISO.

2.2.2. Nearby Objects

Description of nearby airports. Description of the electrical network in the vicinity. Description of other industrial facilities nearby (NEK, Low and Intermediate Level Radioactive Waste Repository (LILW), Sinteza Krka, etc.). Description of military facilities nearby. Description of the anticipated growth of these facilities. Description of pipelines nearby. The data shall be collected by contractor from local municipality and SURS and PISO. Summary of Chapter 3 Impact of NEK on JEK2 and identification of conditions for JEK2, from RMCI, shall be written.

2.2.3. Assessment of Potential Human Induced External Hazards

Requirement 6: Identification of site-specific hazards

Requirement 7: Evaluation of natural and human induced external hazards

Requirement 8: Measures for site protection

Requirement 9: Site evaluation for multiple nuclear installations on the same site or on adjacent sites

Requirement 10: Changes of hazards and site characteristics with time

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 17/49
TS			

Requirement 11: Special considerations for the ultimate heat sink for nuclear installations that require an ultimate heat sink

Requirement 24: Evaluation of hazards associated with human induced events

Requirement 9 should consider NEK and radwaste repository (LILW repository).

Potential hazards include explosions, flammable gas clouds, toxic chemicals, fires, aircraft accidents, vehicle collisions, and liquid spills in nearby objects. The risk of hazards shall be described.

2.2.4. Determination of Potential Human Induced Hazards

Determination of potential human-induced design basis hazards, its quantity, nature, distance, intensity, and frequency shall be described.

2.2.5. Effects of Potential Human Induced Hazards

Effects of potential human-induced design-basis hazards shall be described.

2.2.6. Reference

2.3. METEOROLOGY

Description of meteorology, based on NEK USAR [60], Analiza meteoroloških podatkov [23], Analiza vplivov izpustov hladilnih stolpov JEK2 na okolico [24] and GEN Request for Vendor Information Document [57] summary.

The representative regional weather monitoring stations and data sources shall be described.

For the entire Section 2.3, the SSAR contractor prepares only a summary of existing completed studies or the specified references [60], [23], [24] and [57].

Requirement 10: Changes of hazards and site characteristics with time

Requirement 11: Special considerations for the ultimate heat sink for nuclear installations that require an ultimate heat sink.

Requirement 18: Evaluation of extreme meteorological hazards

The development of meteorology (including extreme weather conditions) is considered throughout the operational life of the nuclear power plant (including decommissioning) due to climate change. Description of meteorology, based on NEK USAR and new data developed in this project. The input information considering atmospheric temperature, dry bulb temperature and humidity for different return periods can be taken from a finished completed study Analiza meteoroloških podatkov [23].

2.3.1. Regional Climatology

Description of general climatic conditions, based on NEK USAR [60], Analiza meteoroloških podatkov [23] and GEN Request for Vendor Information Document [57] summary.

2.3.2. Regional Weather Conditions for Design Basis and Operating Basis

Description of air quality, summary based on NEK USAR [60], Analiza meteoroloških podatkov [23] and GEN Request for Vendor Information Document [57] summary.

2.3.3. Local Meteorology

Description of normal and extreme values of meteorological parameters, such as maximum and minimum temperature, hourly, monthly, and annual averages, wet-bulb temperature, wind rose, atmospheric stability class, based on NEK USAR [60], Analiza meteoroloških podatkov [23] and GEN Request for Vendor Information Document (RfVID) [57] summary.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 18/49
TS			

Description of potential impact of the power plant and its structures on local meteorology, focusing on the impact of water vapor emissions from cooling towers. A study of the influence of cooling towers on the local weather has already been carried out for a 1100 MW power plant [24].

Description of local weather conditions for design basis and operating basis.

2.3.4. Onsite Meteorological Measurement Program

Description of a pre-operational meteorological program (NEK monitoring, and existing nearby monitoring locations) and a meteorological program during operation. The pre-operational meteorological program is based on NEK USAR [60] and Analiza meteoroloških podatkov [23] summary. The meteorological program during operation shall be developed by contractor. Description of measurement instruments and the processing of meteorological data.

2.3.5. Short-term Diffusion Estimates

Requirement 25: Dispersion of radioactive material

Description of dispersion factor values for short-term (2h) releases of radioactive substances and the method of calculating it up to a distance of 200 km. The short-term diffusion estimates will be developed in separate project (Analysis of JEK2 radiological impact, ongoing). Here only summary shall be provided.

2.3.6. Long-term Diffusion Estimates

Requirement 25: Dispersion of radioactive material

Description of dispersion factor values for long-term (30 days) releases of radioactive substances and the method of calculating it up to a distance of 200 km. Description of model, including input data and deposition. The long-term diffusion estimates will be developed in separate project (Analysis of JEK2 radiological impact, ongoing). Here only summary shall be provided.

2.3.7. Rare Meteorological Phenomena

Description of extreme storms, sleet, snow, lightning, tornadoes, cyclones, and frost. Descriptions of extreme temperatures, drought, and floods are covered in other chapters. The potential of occurrence, severity and frequency shall be evaluated, based on NEK USAR [60] summary.

2.3.8. Reference

2.4. HYDROLOGY

Requirement 6: Identification of site-specific hazards

Requirement 7: Evaluation of natural and human induced external hazards

Requirement 8: Measures for site protection

Requirement 10: Changes of hazards and site characteristics with time

Requirement 11: Special considerations for the ultimate heat sink for nuclear installations that require an ultimate heat sink

Requirement 20: Evaluation of flooding hazards

Description of hydrology, based on NEK USAR [60] summary. Identification of additional hydraulic analyses shall be performed.

For the entire Section 2.4, the SSAR contractor prepares only a summary of NEK USAR [60].

2.4.1. Hydrological Description

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 19/49
TS			

Description of the location and structures, particularly from the perspective of flood safety. Description of the hydrosphere, description of the impact of planned structures on local hydraulic conditions. Description of the current state of flood protection in the wider JEK2 area.

2.4.2. River Flooding

Description of floods caused by the river Sava and its tributaries with various flow rates of the Sava considering associated probabilities. Description of recent flood events. Description of expected conditions during the passage of flood waves.

2.4.3. Flooding Due to Precipitation at the Location

Description of flooding due to heavy local rainfall.

2.4.4. Probable Maximum Flood (PMF) on Rivers and Its Tributaries

Description of the PMF on the river Sava and its tributaries. Description of the PMF as a result of precipitation and snow cover. Description of the impact of retention areas on PMF flows.

2.4.5. Dam Failure Analysis (Seismic Origin)

Description of maximum flood waves due to the failure of upstream dams.

2.4.6. PMF Caused by Waving and Seiches

Description of the PMF wave and seiche.

2.4.7. PMF caused by Tsunami or High Tide

Description of the maximum probable tsunami, and high tide. Site is not near to sea, tsunami is not the potential external event for site.

2.4.8. Floods Caused by of Ice

Description of floods caused by ice and their impact on the nuclear power plant.

2.4.9. Canals and Storable Basins Cooling Water

Description of channels, relevant for nuclear safety, which will be used for water transport or water reservoirs serving as water supply.

2.4.10. Circulation Canals

Description of circulation and drainage canals designed to protect JEK2 from floods if they are envisaged. Description of drainage canals to protect from Potočnica and drainage canals of NEK and HE Brežice.

2.4.11. Protection from Floods

Description of existing flood protection in the form of embankments along the Sava River and Potočnica stream. Description of the necessary upgrades to flood protection and regular inspections and maintenance.

2.4.12. Consideration of Low Waters

Description of the value of low waters in the Sava River and the probability thereof. Impact on the safety of JEK2 due to the provision of water for the ultimate heat sink (UHS). Alternative water source shall be described.

2.4.13. Groundwater

Description of groundwater salinity and its impact on nuclear safety due to providing water for the UHS. Description of the Quaternary sandy gravel fill at Vrbina. Description of groundwater levels and the direction of its flow. Flood protection of JEK2 underground facilities due to groundwater and the possibility of leak penetrations or walls below the surface level.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 20/49
TS			

2.4.14. Accidental Release of Liquids into Groundwater and Surface Waters

Requirement 25: Dispersion of radioactive material

Description of accidental releases of liquids from JEK2 with increased radioactivity into groundwater and surface waters.

2.4.15. Water Usage

Requirement 27: Uses of land and water in the region

The main water usage is for irrigation.

2.4.16. References

2.5. GEOLOGY AND SEISMOLOGY

For the entire Chapter 2.5 it is encouraged that SSAR contractor includes summary defined in NEK USAR [60].

The Contractor shall, while performing the task, use and consider the latest national Slovenian nuclear rules, IAEA, European Utility Requirements (EUR), U.S. Nuclear Regulatory Commission (US NRC), and American Society of Civil Engineers (ASCE) guidelines and standards. Standards and requirements applied to Chapter 2.5 should be specific and up-to date.

General comment for contractor is to consider that referenced Reports include summary and that additional Appendices as well as References to these reports that are not defined are available upon request for a better insight.

Reports are divided into appropriate subchapters; however, it should be noted that reports cover different segments and could be used in a small portion of data in another subchapter.

Description of geology and seismology, based on summary of NEK USAR and new data developed in separate project Probabilistic Seismic Hazard Analysis (PSHA), Geotechnical, Geological and Seismological (GG&S) Evaluation of the new Nuclear Power Plant (NPP) Krško, and others.

Requirement 6: Identification of site specific hazards

Requirement 7: Evaluation of natural and human induced external hazards

Requirement 8: Measures for site protection

Referenced documents in the provided reports can be submitted to contractor upon request to GEN. Consider references [25], [26], [48], [49].

Design response spectra for JEK2 in preparation can be submitted in a later phase (in preparation).

Requirement 11: Special considerations for the ultimate heat sink for nuclear installations that require an ultimate heat sink

2.5.1. Basic Geological and Seismological Information

Description of basic geological and seismological information and studies. Description of the broader regional geology (320 km), including: physical geography, regional tectonic environment, regional tectonic terrains, Neogene and post-Neogene structural development, and stress environment. Description of the geology in the narrower region and near the power plant, including stratigraphy, seismic reflection surveys, gravity data, geophysical measurements in wells, and other geophysical data. It also includes surface geology (folds and faults within 5 km) and Quaternary deformation. Description of geodetic research, levelling measurements, and GPS measurements. Description of the seismotectonic model of the Krško Basin and in wider region.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 21/49
TS			

See also references in subchapter 2.5.3. Surface faulting.

Consider references [27], [28], [50], [51], [52], [53], [54], [59].

2.5.2. Vibratory Ground Motion

Requirement 16: Evaluation of ground motion hazards

Description of the earthquake catalogue and seismicity, seismic source model, ground motion prediction equations (GMPE), and results PSHA. The IAEA SSG-9 rev.1 is applied to this section.

Consider references [25] and [55].

Design response spectra for JEK2 is in preparation and will be included in a later phase (in preparation).

2.5.3. Surface Faulting

Requirement 15: Evaluation of fault capability

Description of geological conditions leading to surface faults and evidence of surface faults or fissures. Description of active/capable faults near the power plant, including the definition of an active/capable fault and an assessment of its impact on the safety of the nuclear power plant.

Consider references [29], [30], [31], [32], [33], [34], [56].

2.5.4. Stability of Subsurface Materials

Requirement 21: Geotechnical characteristics and geological features of subsurface materials

Description of the stability of subsurface materials and characteristics of the foundation soil with a description of geological features. Description of potential excavations and backfills. Description of groundwater conditions. Description of liquefaction potential and seismic design basis. Description of static analysis on soil stability. Description of measurement tools and project methods. IAEA NS-G-3.6 is applied to this section.

Consider references [35], [36], [37], [38], [39], [40], [41], [42], [43], [44].

In addition to above specified report, geotechnical reports developed in the First Phase of the Geological, Geotechnical and Seismological investigations for building New NPP at the Krško site project shall be included (including borehole logs, drilling diaries, water injection tests, dilatometer report, downhole and multichannel analysis of surface waves (MASW), levelling network, hydrological general review).

2.5.5. Slope Stability

Requirement 22: Evaluation of geotechnical hazards and geological hazards

Description of slope stability at the site and its impact on nuclear safety, including the identification of any hazards present at the location. IAEA NS-G-3.6 is applied to this section.

Consider reference [45].

2.5.6. Volcanos

Requirement 17: Evaluation of volcanic hazards

Description of evidence of volcano absence. There are no expected volcanos in the region.

2.5.7. References

2.6. OTHER NATURAL HAZARDS

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 22/49
TS			

Requirement 23: Evaluation of other natural hazards

The SSAR contractor prepares a summary of NEK USAR [60] for natural hazards, such as wildfires, sleet, ice, snow avalanches, and biological hazards (algae, small animals, shellfish).

Due to the increased frequency and intensity, NEK conducted additional analyses of hail and lightning strikes. The necessary data regarding hail and lightning strikes will be provided by GEN.

2.7. EVALUATION OF HAZARDS ON SITE

Requirement 29: Review of external hazards and site conditions

Evaluation of all external hazards at the site that will be considered in the project basis, with project values taking into account the time development of values throughout the nuclear power plant's lifecycle. Relevant combinations, such as Flood + Earthquake, and others relevant, including combination of human-induced and natural hazards must also be addressed. It is necessary to define screening criteria and conduct a screening assessment. The identification of target values is necessary, and hazards should be screened accordingly. The basis for this is SSG-61 [6] section 3.2.10 to 3.2.17. Evaluation to be performed by contractor. The RHWG Guidance [13] should be taken into account.

2.8. ACTIVITIES ON THE LOCATION WITH THE POSSIBILITY OF AFFECTING THE SAFETY OF THE NPP

Activities at the power plant that could impact nuclear safety in case of execution errors include movements of vehicles on-site, etc. The effect of nearby industry including NEK and LILW repository. Measures to mitigate accidents, such as embankments, need to be described. The basis for this information is SSG-61 [6], sections 3.2.20 to 3.2.21. Evaluation to be performed by contractor. Construction of Unit 2 of JEK2 and its impact on Unit 1 shall be evaluated.

2.9. LOCATION CHARACTERISTICS AND POTENTIAL IMPACTS OF THE NPP IN THE REGION

Description of the characteristics of the power plant and its surroundings that significantly influence the spread of radionuclides in water, air, and soil. State the requirements for evaluating the dispersion of radionuclides. Describe the impact on the NEK and the LILW repository. The basis for this information is SSG-61 [6], section 3.2.32. Separate radiological analysis will be performed in separate project outside this contract for impact on NEK (Analysis of JEK2 radiological impact, ongoing). Summary of radiological analysis, which will be provided to the contractor, shall be included in this chapter. The impact on LILW repository shall be evaluated, however the specific calculations are not envisaged.

2.10. RADIOLOGICAL CONDITIONS DUE TO EXTERNAL INFLUENCES

Description of the radiological condition at the location and in the vicinity of the power plant due to the accident in NEK or LILW repository or one of two units of JEK2. Description of existing radiation meters in the area, including mobile units. The basis is SSG-61 [6] section 3.2.33 to 3.2.34. Description of radiological conditions due to external influences are based on NEK USAR [60], LILW repository PSAR and result of separate project (Analysis of JEK2 radiological impact, ongoing)

3. DESIGN OF SSC

The content of this chapter will be developed by GEN. It will include short description of general design requirements of proposed NPPs. The contractor will review this chapter.

4. REACTOR

The content of this chapter will be developed by GEN. It will include short description of the specific reactors of proposed NPPs. The contractor will review this chapter.

5. REACTOR COOLANT SYSTEM AND CONNECTED SYSTEMS

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 23/49
TS			

The content of this chapter will be developed by GEN. It will include short description of the specific reactor coolant systems and connected systems of proposed NPPs. The contractor will review this chapter.

6. ENGINEERED SAFETY FEATURES

The content of this chapter will be developed by GEN. It will include short description of the engineered safety features of proposed NPPs. The contractor will review this chapter.

7. INSTRUMENTATION AND CONTROLS

The content of this chapter will be developed by GEN. It will include short description of the specific instrumentation and controls of proposed NPPs. The contractor will review this chapter.

8. ELECTRIC POWER

The content of this chapter will be developed by GEN. It will include short description of the specific electric power systems of proposed NPPs. The contractor will review this chapter.

9. AUXILIARY SYSTEMS

The content of this chapter will be developed by GEN. It will include short description of the specific auxiliary systems of proposed NPPs. The contractor will review this chapter.

10. STEAM AND POWER CONVERSION

The content of this chapter will be developed by GEN. It will include short description of the specific steam and power conversion of proposed NPPs. The contractor will review this chapter.

11. RADIOACTIVE WASTE MANAGEMENT

The content of this chapter will be developed by contractor. Description of the origin and characteristics of radioactive material: fission, activation, and corrosion products. Description of alpha, beta, gamma emitters. Description of short lived and long-lived emitters. Description of radioactive waste management shall be based on vendor information package and practice in Slovenia (LILW repository, Agency For Radwaste Management (ARAO), NEK).

11.1. LIQUID WASTE MANAGEMENT SYSTEM

11.1.1. System Description

A general description of the systems and subsystems and corresponding design basis for managing liquid waste in the envelope power plant.

11.1.2. Commitments of Potential Technology Vendors

Description of liquid release concentrations from the envelope power plant, or commitments of potential technology vendors. Description of the dilution factors used.

Description of mutual influences with NEK and the summation of the impacts of both facilities in comparison to the regulatory limits (especially H-3 and C-14), and necessary updates to regulatory limits specifically documented for NEK requirements. Topic is specifically analyzed in another project (Analysis of JEK2 radiological impact, ongoing).

11.2. GASEOUS WASTE MANAGEMENT SYSTEM

11.2.1. System Description

A general description of the systems and subsystems for managing gaseous waste and corresponding design basis in the envelope power plant.

11.2.2. Commitments of Potential Technology Vendors

Description of gaseous release concentrations from the envelope power plant, or commitments of potential technology vendors. Description of the dilution factors (X-

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 24/49
TS			

Q) used. Topic is specifically analyzed in another project (Analysis of JEK2 radiological impact, ongoing).

11.3. SOLID WASTE MANAGEMENT SYSTEM

11.3.1. System Description

A general description of the systems and subsystems for managing solid waste and corresponding design basis in the envelope power plant.

11.3.2. Commitments of Potential Technology Vendors

Specify the duration of the solid waste storage facility in JEK2.

Description of pollution resulting from the management of solid waste in the envelope power plant, or commitments from potential technology vendors.

11.4. USED FUEL STORAGE

11.4.1. Wet storage

Description of wet storage, as a part of standard NPP design and dry warehouses for the entire lifespan. Description of warehouse capacity and ensuring basic safety functions. The wet storage shall be based on Vendor Information Package.

11.4.2. Dry storage

The dry storage shall be based on international practice and NEK dry storage.

11.4.2.1. Introduction and general description

Provide an overview and description of the dry storage system.

11.4.2.2. Site characteristics

Detail the specific characteristics of the site where the dry storage facility is located, including environmental considerations.

11.4.2.3. Main design criteria for the storage system

Outline the key design principles and criteria that govern the construction and functionality of the dry storage system.

11.4.2.4. Container storage installation

Describe the installation process and configuration of containers used for storing spent fuel in the dry storage facility.

11.4.2.5. Operations for the spent fuel storage

Specify the procedures and protocols for the routine operations related to the storage of spent fuel in the dry storage facility.

11.4.2.6. Radioactive waste management

Address the strategies and methods employed for managing radioactive waste generated during dry storage operations.

11.4.2.7. Radiation protection

Describe measures for protecting personnel and the environment from radiation exposure.

11.4.2.8. Accident analysis

Describe accidents that could occur during dry storage activities and address needed analysis.

11.4.2.9. Organization for the operation

Define the organizational structure responsible for overseeing and executing dry storage operations.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 25/49
TS			

11.4.2.10. Operation control and limits

Specify the parameters, controls, and limits governing the day-to-day operation of the dry storage facility.

11.4.2.11. Quality assurance (QA)

Description of a quality assurance program to ensure that all aspects of dry storage, from design to operation, meet specified standards and requirements.

11.5. PREOPERATIVE RADIOLOGICAL MONITORING

Describe the system of pre-operative radiological monitoring. The existing NEK radiological monitoring shall be described. Any additional preoperative monitoring shall be identified.

11.6. PROCESS AND EFFLUENT RADIOLOGICAL MONITORING SYSTEM

Describe the system of process and effluent radiological monitoring in the power plant and its operation in case of releases during normal operation and releases during accidents. Includes emissions in water and atmosphere. The information shall be based on Vendor Information Package. Consider reference [3].

Describe dispersion of radionuclides in environment during normal operation and design basis accidents.

Requirement 25: Dispersion of radioactive material

11.7. OFFSITE RADIOLOGICAL MONITORING PROGRAM

Describe the radiological monitoring system outside the power plant and its operation during normal operation emissions and emissions during accidents. The existing national monitoring program shall be described, based on SNSA and Slovenian Radiation Protection Administration (URSVS).

11.7.1. Main Regulations

Provide an overview of the primary regulations and legal frameworks governing offsite radiological monitoring.

11.7.2. Implementation

Describe the practical implementation of the offsite radiological monitoring program, including the methodologies, technologies, and procedures used to carry out monitoring activities during both normal operation emissions and potential emissions during accidents.

11.8. DECOMMISSIONING

Short description of the decommissioning program for the envelope power plant, based on international practice and Vendor Information Package.

11.8.1. Introduction

Summarize the key components of the decommissioning program that shall be developed in later phases.

11.8.2. System decontamination general description

Outline the overall strategy and methodologies employed for system decontamination, emphasizing the specific approaches and techniques used in the decommissioning process.

11.8.3. System discharges

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 26/49
TS			

Describe the outline of procedures and management of discharges from the decommissioning activities, highlighting potential radiological impacts and ensuring compliance with established protocols.

11.8.4. Radioactive characterization of the NPP

Provide a description of the methods and processes that will be used for the radioactive characterization of the entire nuclear power plant.

11.8.5. Risk elimination

Describe possible strategies and measures aimed at eliminating risks associated with decommissioning activities, ensuring a safe and controlled decommissioning process.

11.8.6. Conventional dismantling

Describe the procedures and techniques involved in conventional dismantling.

11.8.7. Systems and auxiliary installations

Describe analysis of decommissioning processes specific to systems and auxiliary installations that shall be conducted in later phases.

11.9. REFERENCES

List specific references.

12. RADIATION PROTECTION

The content of this chapter will be developed by contractor. General requirements for radiation protection, based on Chapter 12, of SSG-61 [6]. This chapter shall include requirements for optimization of protection and safety, describe sources of radiation, design features for radiation protection, dose constraints and dose assessment and radiation protection program. Description of radiation protection shall be based on vendor information package and practice in Slovenia (NEK, LILW repository, ARAO) based on NEK USAR [60] and in accordance with Slovenian rules of [1], [2] and [3].

12.1. ALARA

The assurance that occupational radiation exposure doses are as low as reasonably achievable shall be described.

12.2. RADIATION SOURCES

The confined sources and sources of environmental radioactivity shall be described.

12.3. DESIGN FEATURES

Design features for radiation protection shall be described.

12.4. DOSE ANALYSIS

Dose analysis, that is exposures inside the plant and exposures outside the plant buildings shall be described.

12.5. RADIATION PROTECTION PROGRAM

The radiation protection program shall be described.

13. CONDUCT OF OPERATION

The content of this chapter will be developed by GEN. It will include description of the conduct of operation. The contractor will review this chapter.

13.1. INVESTOR ORGANIZATIONAL STRUCTURE

Description of the current organizational structure of the investor and further development. Description of staff training. Description of programs and procedures. Development of a target skills matrix, identifying what kind of works are performed in each phase of an NPP

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 27/49
TS			

new build project, from site evaluation to decommissioning and the skills required to perform these tasks. Identification of the relevant macro processes essential for the project development organization. It should be considered the resources allocation, including mobilization, demobilization, peaks, retirement plan, training plan. Identification of other stakeholders. The investor organizational structure shall be based on GEN organizational structure and its development, provided by GEN.

13.2. EMERGENCY PLANNING

Requirement 13: Feasibility of planning effective emergency response actions

This chapter describes the intervention in case of an extraordinary event and coordination with the local environment, as well as planning of activities and measures for an extraordinary event at JEK2. It is assumed that the same procedures will be used in JEK2 as in NEK, so this chapter provides the updated procedures of NEK. It also considers an extraordinary event in NEK, LILW repository, and the nearby Krka company. The existing emergency response plan (NUID) shall be referenced with identification of needed updates.

13.2.1. Objectives

13.2.2. Emergency Planning

13.2.3. Emergency Classification

Consider reference NEI 99-01 [12] in emergency classification.

13.2.4. Emergency Response Organization (ERO)

Organization within the operating shift, within the technical support center, operational support center, external support center, and additional support outside the power plant.

13.2.5. Communications During Emergencies

Description of official notification to authorities, communication during emergencies, public notification, power plant recovery, or termination of an emergency event. Description of notifications of NEK shift supervisor.

13.2.6. Plant Recovery

14. INITIAL TEST PROGRAM

The content of this chapter will be developed by GEN. It will include short description of the initial test programs of proposed NPPs. The contractor will review this chapter.

15. ACCIDENT ANALYSIS

The content of this chapter will be developed by contractor. Description of general requirements for the content, methods, and criteria for safety analyses. Description of accident analyses shall be based on vendor information package and summary of another project (Radiological impact of JEK2, ongoing), which is not part of this contract.

15.1. SELECTION OF ACCIDENTS

Scenarios of typical accidents forming the envelope are presented (based on NEK USAR chapters 15 and 20 and others possible, and SAR of potential NPPs). The possible conditions of the power plant which lead to different kinds of accidents, physical boundaries of the power plant, and systems crucial for nuclear safety are described. In addition to reactor accidents, accidents in the spent fuel pool and dry storage facility are also addressed. The results of analyses are only briefly described, where available.

15.1.1. Safety barriers 1 and 2 – fuel rod and fuel pellet

15.1.2. Safety barrier 3 – pressure boundary of reactor coolant

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 28/49
TS			

15.1.3. Safety barrier 4 – containment structure and its safety systems

15.1.4. Spent fuel pit

15.1.5. Dry storage

15.2. EVALUATION METHODOLOGY

The methodology of assessment and the conditions of the power plant are described. It may consist of: cause identification, sequence of events and system operations, impact of the core, effect on the barrier, radiological consequences. The relevant computer code programs are listed.

15.3. SOURCE TERM

15.3.1. Anticipated content of radioactive nuclides in the core

Description of the anticipated content of radionuclides in the core of the envelope power plant or potential power plants.

Description of the anticipated content of radionuclides in the spent fuel pool. It is assumed that fuel melting in the pool is prevented, it is necessary to consider only the release of the content of the slot between the fuel pellets and the cladding.

15.4. RADIOLOGICAL CONSEQUENCES

Requirement 12: Potential effects of the nuclear installation on people and the environment

Description of possible effects throughout the lifecycle of the nuclear facility on people and the environment. Radiological impacts on the surrounding population, including residents and workers, as well as potential ecological consequences should be considered. The objective is to identify potential hazards, ensuring the safety of individuals and the protection of the environment.

Requirement 25: Dispersion of radioactive material

Description of the calculation and results of the analysis of radiological consequences of accidents in standard potential power plants. The analyses must be carried out with a comparable methodology to ensure the comparability of results. Consider the impact on the neighboring NEK and LILW repository. Radiological impact is analyzed in separate study ("Radiological impact of JEK2", not part of this services, ongoing). Summary of applicable sections of "Radiological impact of JEK2" shall be written in following sections. The impact of JEK2 covers NPP and dry storage of spent fuel.

The general parameters of the accidents, calculation model of the off-site radiological consequences and radiological consequences in the main control room (MCR) shall be described.

15.5. REFERENCES

16. TECHNICAL SPECIFICATIONS

The content of this chapter will be developed by GEN. It will include short description of technical specifications of proposed NPPs. The contractor will review this chapter.

17. MANAGEMENT AND QA SYSTEM

Requirement 2: Application of the management system for site evaluation

Requirement 29: Review of external hazards and site conditions

The content of this chapter will be developed by GEN. It will include description of the management and QA system. The contractor will review this chapter.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 29/49
TS			

General requirements for the management and QA system shall be described. The management system in the current phase is presented, along with its further development. The GEN's management and QA system shall be described with its development plans.

17.1. SCOPE

Expanded description of the management system scope, including its application to all phases of site evaluation and development.

Inclusion of a lifecycle approach to quality management, from design through decommissioning.

17.2. REFERENCES

Internal references (GENDOK-1-1068-Poslovnik, QMD-2.0.0-Quality Manual).

External References: SNSA JV 5[3], ISO 9001:2015 (Quality Management Systems), IAEA GSR-Part2 (Leadership and Management for Safety), ISO 14001 (Environmental Management Systems), ISO 31000:2018 (Risk management), ISO 45001:2018 (Occupational health and safety), EUR Ch.2.15 (European Utility Requirements, QA), ANSI-ASME NQA-1 (QA Requirements for Nuclear Facility Applications) and other relevant codes and standards.

17.3. TERMS AND DEFINITIONS

Enhanced glossary of terms and definitions used in this chapter, ensuring alignment with IAEA and ISO standards.

17.4. MANAGEMENT SYSTEM

Detailed description of the current management system with a roadmap for future enhancements. Description of integration of risk-informed decision-making processes. Emphasis on digital transformation and data management.

17.5. RESPONSIBILITY OF MANAGEMENT

Description of the obligations of leadership in maintaining and promoting a robust safety culture. Establishment of a framework for active engagement and effective communication with customers, stakeholders, and other relevant parties. Articulation of the organization's safety and quality policies, including the processes for setting and reviewing safety and quality objectives and further how these policies are communicated within the organization and to external stakeholders. Description of the quality planning processes, detailing how these plans align with the facility's safety and operational goals, and how they are implemented and monitored for effectiveness. Outline of the specific responsibilities and authorities at various management levels, including mechanisms for internal and external communication related to safety and quality matters. Description of the processes for both self-assessment and independent assessment of the management system, focusing on continuous evaluation and improvement of safety and quality standards. Explanation of the management review processes, highlighting how these reviews contribute to continual improvement and adaptation in safety and quality performance. Development and implementation of strategies aimed at continuous improvement in safety and quality performance, including establishing metrics for evaluation and regularly reviewing and adjusting these strategies to meet or exceed safety and quality objectives.

17.6. RESOURCE MANAGEMENT

Explanation of the human resource strategies in place, emphasizing training programs and competency development in line with IAEA GSR-Part2 (Leadership and Management for Safety). Description of the approach to resource provision, particularly in terms of human resources. This encompasses recruitment strategies, employee development, performance management, and ensuring a workforce capable of meeting the facility's operational

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 30/49
TS			

demands. Emphasis on the innovation and sustainability in infrastructure management. Description of the work environment, focusing on creating a safe, healthy, and motivating atmosphere for all employees including measures for ensuring physical safety, as well as initiatives for promoting mental and emotional well-being. Outline of the communication strategies within the organization and with external partners, including technology vendors, ensuring clarity, efficiency, and alignment with safety and quality objectives. Description of the quality management requirements and standards that are expected from technology vendors and partners, including the processes for selecting vendors, monitoring their performance, and ensuring that they adhere to the facility's safety and quality standards.

17.7. IMPLEMENTATION

Detailed description of the methodologies used for optimizing project execution processes, including the application of lean management principles to streamline workflows, minimize waste, and enhance efficiency in all project-related activities. Elaboration on the planning phase of project execution, detailing how projects are conceptualized, scheduled, and managed, highlighting the strategic approach to managing resources, timelines, and milestones for successful project completion. Description of the procedures and practices in place for managing customer-related processes, including customer communication, requirement gathering, feedback mechanisms, and ensuring customer satisfaction through effective service delivery. Outline of the QA protocols that govern design, development, procurement, and service delivery. Detailed overview of the quality systems and standards applied during the design and development phases of projects including processes for ensuring design integrity, compliance with regulatory requirements, and incorporation of safety principles from the outset. Explanation of the procurement process, focusing on how suppliers are selected and managed, and how quality and safety standards are maintained in the procurement of materials and services. Description of the processes and controls in place to ensure the quality of production and services, including monitoring and evaluation methods to continually assess and improve the quality of outputs.

17.8. MEASUREMENT, ANALYSIS, AND IMPROVEMENTS

Description of the advanced metrics and analytical tools used to measure various aspects of performance, including how data is collected, analyzed, and interpreted to assess efficiency, safety, and quality. Outline of the continuous improvement mechanisms in place, which include regular reviews of processes and outcomes, as well as benchmarking against industry standards. Explanation of the processes for identifying, documenting, and addressing nonconformities in products or processes, including the steps taken to prevent recurrence and mitigate any potential impacts. Details on how nonconforming products are controlled and managed, providing abstracts on the procedures for isolating and rectifying nonconforming products to prevent unintended usage or delivery. Description of how the results from measurements and analyses are used to drive improvements, with identifying trends, potential areas of improvement, and implementing targeted actions to enhance performance and compliance. Explanation of how feedback from various sources, including internal assessments and external audits, is incorporated into the improvement process.

17.9. ADDITIONAL CONSIDERATIONS

Incorporating principles of environmental management in line with global standards and practices. Establishing frameworks for regular communication and collaboration with stakeholders, including local communities, regulatory bodies, and industry partners. Embracing emerging technologies for enhanced efficiency, safety, and performance. Ensuring that the management and QA system is adaptable to evolving regulatory

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 31/49
TS			

requirements and international best practices. Integrating emergency management and response planning into the QA system.

18. HUMAN FACTOR ENGINEERING

The content of this chapter will be developed by GEN. It will include short description of the specific human factor engineering of proposed NPPs. The contractor will review this chapter.

19. PROBABILISTIC SAFETY ASSESSMENT AND SEVERE ACCIDENT EVALUATION

The content of this chapter will be developed by contractor. Description of general requirements for probabilistic safety assessments and severe accident evaluation. The main elements of probabilistic safety assessment and severe accident evaluation for the envelope power plant and standard power plants of potential technology vendors, along with their results (core damage frequency (CDF), large early release frequency (LERF), distribution of event groups), are also outlined. Description requirements of Probabilistic Safety Assessment (PSA) for internal and external initial events for level 1, 2 & 3 shall be described. The requirements for full power and shutdown PSA shall be described. Categories of initial events shall be described. The severe accidents analyses and radiological consequences of envelope NPP shall be described. Description of severe accident analyses shall be based on vendor information and results of other projects such as *Pregled verjetnostnih varnostnih analiz novih jedrskih elektrarn* [46] and *Obvladovanje resnih nezgod v potencialnih reaktorjih za JEK 2* [47].

3.3.2 Content of Report on Mutual and Collective Impact of JEK2 and NEK

It is expected that Report on mutual and collective impact of JEK2 and NEK will have about 250 pages. The content of this report will be developed by contractor.

Content of Report on Mutual and Collective Impact of JEK2 and NEK

1. INTRODUCTION

1.1. USED LEGISLATION AND GUIDELINES

Description of the applicable legislation and guidelines.

1.2. REVIEW OF MULTIUNIT SITES

Review of initiating events that were used for existing or planned multiunit NPPs / multiunit sites. Review of operating experiences reports from multiunit NPPs / multiunit sites and assessment of reported experience on NEK and JEK2.

1.3. DESCRIPTION OF SHARED INFRASTRUCTURE BETWEEN NEK AND JEK2

Description of all shared infrastructure (road, electric switchyard, external support: police, fire brigade, etc.).

2. IMPACT OF JEK2 ON NEK AND IDENTIFICATION OF MODIFIED CONDITIONS FOR NEK

Identification of modified conditions and impact of JEK2 on NEK shall be described. The need for additional analyses shall be identified.

2.1. Impact on NEK during construction of JEK2 and identification of modified conditions for NEK

Identification of modified conditions and impact during construction of JEK2 on NEK shall be described.

2.1.1. Sava River

Due to dam in Brežice, the Sava acts as an artificial lake. All spills could stay in artificial lake. The impact of potential releases of hazardous substances during construction at the NPP shall be assessed. There shall be no significant effects on NEK. The impact

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 32/49
TS			

of water usage for construction purposes from Sava River shall be assessed. The possibility of construction emissions to Sava River shall be described (waste, suspensions, technological waste water). The impact on NEK (on essential service water intake, condensate water) shall be evaluated. The sediment deposition in NEK intake channels shall be estimated. The degradation of pumps shall be prevented. The prevention measures for effect of such emissions shall be described.

2.1.2. Fire Risk

Risks in NEK due to fire in JEK2 during construction shall be described.

2.1.3. Faults at the switchyard

Due to construction or operation of JEK2 there can be faults at the switchyard that could have an impact on NEK. These impacts and probability of such faults shall be described.

2.1.4. Evacuation routes and accessibility of the NEK

Impacts on evacuation routes and accessibility of NEK during construction of JEK2 shall be described. The impact of increased traffic in JEK2 construction site during the NEK outage shall be assessed.

2.1.5. NEK emergency preparedness

Impact on emergency preparedness of NEK and emergency plan due to construction of JEK2 shall be assessed.

2.1.6. Flood safety of the NEK

JEK2 shall not reduce the flood evacuation area on right bank of Sava River. The flood protection with upstream dykes from NEK shall maintain their function. The possible changes in flood safety shall be described.

2.1.7. Soil stability

The possible impact on soil stability on NEK location due to construction of JEK2 shall be described. Soil stability on NEK location shall be maintained during construction of JEK2.

2.1.8. Physical security of the NEK

Effect on physical security of NEK during construction shall be described.

2.1.9. Other impacts during construction

The impacts due to vibrations, dust, noise and the possible fall of the crane, or undesired load transfer over the NEK site, as well as other impacts like explosions or accidental missiles from construction site, shall be described. The NEK SSC and operable radiation monitoring system within the vicinity of NEK shall not be endangered.

2.2. Impact on NEK during operation of JEK2 and identification of modified conditions for NEK
Identification of modified conditions and impacts during operation of JEK2 on NEK shall be described.

2.2.1. Radiological impact

Radiological impact is analyzed in separate study ("Analysis of JEK2 radiological impact", not part of this services, ongoing). Summary of applicable sections of "Analysis of JEK2 radiological impact" shall be written in following sections. The impact of JEK2 covers NPP and dry storage of spent fuel.

2.2.1.1. Definition of location of most exposed worker

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 33/49
TS			

The location is on NEK fence nearest to the JEK2. The details about location and worker shall be described.

2.2.1.2. During normal operation

The normal operation is defined as expected operation without accidents. Impact on monitoring of gaseous effluents shall be described. Impact on most exposed workers (including operators in MCR) shall be described. There shall be no significant effects on operators in NEK MCR. The liquid effluents shall have no effect on NEK, the release point shall be downstream of NEK intake points. Discharge limit of NEK for tritium does not allow much more tritium activity to be released, so there is no margin for additional tritium releases from JEK2. This is most limiting radioactivity release restriction, and some alternative solution must be provided. The releases of liquid tritium shall be performed only during normal or high Sava River flow. Adequate tanks shall allow to postpone releases during low Sava River flow.

2.2.1.3. During design bases accidents

Calculation of doses on thyroid and TEDE for most exposed workers and operators in MCR. There shall be no significant effects on operators in MCR.

2.2.1.4. During severe accidents

Calculation of doses on thyroid and TEDE for most exposed workers (operators in MCR, intervention staff (fireman, etc.). Doses during evacuation shall be presented.

2.2.2. Sava River

The Sava River will be heated due to the purge flow in the cooling towers for normal operation and ESW. The purge flow shall be released downstream Sava River. It is also necessary to describe the chemical impact in case water loaded with impurities is released. It is necessary to consider the case of low Sava flow and possible thermal short circuit contact. There shall be no significant effect of JEK2 on Sava River upstream of NEK. The cooling tower purge outflow shall be located downstream of NEK. The damaged or broken JEK2 components or parts of components, induced waves due to falling objects into the Sava River or objects torn off due to the Sava River flow must not endanger NEK safety SSC. The water consumption for cooling towers of JEK2 shall not endanger the UHS of NEK, that is Sava River. The purge flow of JEK2 cooling towers shall not endanger the UHS of NEK – Sava River. The effect of JEK2 on Sava River level shall be described.

2.2.3. Possible spills of non-radioactive substances into the Sava River

Due to dam in Brežice, the Sava acts as an artificial lake. All spills could stay in artificial lake. The effect of such spills (oil, diesel, ...) on NEK shall be described. There shall be no effects on NEK.

2.2.4. Fire Risk

Risks in NEK due to fire in JEK2 during operation and construction shall be described. Simultaneous fire in NEK and in JEK2 shall also be described from the point of view of providing adequate firefighting capacities to both sites at once.

2.2.5. Faults at the switchyard

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 34/49
TS			

Due to construction or operation of JEK2 there can be faults at the switchyard that could have an impact on NEK. These impacts and probability of such faults shall be described.

2.2.6. Evacuation routes and accessibility of the NEK

Impacts on evacuation routes and accessibility of NEK during operation and outages of JEK2, including accidents and outage shall be described. Impact on road congestions and migration of workers as well as domestic population around NEK shall be described.

2.2.7. Emergency preparedness

Impact on emergency preparedness of NEK and emergency plan due to operation and outages of JEK2, as well as design-basis accidents and severe accidents shall be described.

2.2.8. Flood safety of NEK site

JEK2 reduces the drainage area where water can spill in the event of heavy rainfall on the site, which shall be investigated. Impact on flood protection and integrity of riverbank embankments shall be assessed. Penetration (collapse) of dykes (embankments) is not permitted by dykes' design requirements. The siphon pipelines, or concrete fortified pipelines through dykes shall be installed with special care to integrity of dykes. The impact of JEK2 on flood safety of NEK site shall be described.

2.2.9. Probabilistic and deterministic safety analyses of NEK

Impact on NEK probabilistic safety analyses, level 1 & 2 shall be described. Impact on NEK deterministic safety analyses shall be described. Consideration shall be taken of possible new events or events with a common cause [11], [8]. Consideration shall be put on new external events due to immediate vicinity of the new unit as well as change to already analyzed existing external events of their severity.

2.2.10. Decommissioning plan of NEK

The impact of JEK2 on the NEK decommissioning program shall be described.

2.2.11. Physical security of the NEK

Effect on physical security of NEK during operation, design basis accidents and severe accidents in JEK2 shall be described.

2.2.12. Availability of skilled workers

The impact on the availability of qualified workers in the NEK shall be assessed. The availability of domestic technical support organizations for activities regarding the outage and modification preparation and implementation process in NEK because of the project JEK2 shall also be assessed.

2.2.13. Microclimate of NEK and JEK2 location

The impact of JEK2 cooling towers on microclimate of NEK shall be assessed. The assessment shall be based on the study: Study of emissions of cooling towers of JEK2 on environment [24].

2.2.14. Groundwater on NEK and JEK2 location

The impact of JEK2 on level of groundwater shall be assessed.

2.2.15. JEK2 turbine missiles

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 35/49
TS			

The impact of missiles generated due to JEK2 turbine faults on NEK safety shall be described. The layout of turbine building is parallel to the NEK and limits the missile damage.

2.2.16. Impacts on licenses

The impact of JEK2 on NEK environmental permit, water permit, NEK-HESS agreement shall be described. The review of SNSA requirements about simultaneous operation of NEK and JEK2, based on ZVISJV-1 [1], JV5 [3] and other legislation shall be identified and considered.

3. IMPACT OF NEK ON JEK2 AND IDENTIFICATION OF CONDITIONS FOR JEK2

Identification of conditions and impact of NEK on JEK2 shall be described. The design conditions for JEK2 that are affected by NEK shall be identified and described. The need for additional analyses shall be identified.

3.1. Impact on construction of JEK2 during operation of NEK

Description of considerations that are crucial during the JEK2 construction because of NEK phase shall be described.

3.2. Impact on operation of JEK2 during operation of NEK

3.2.1. Radiological impact

Radiological impact is analyzed in separate study ("Analysis of JEK2 radiological impact", not part of this services, ongoing). Summary of applicable sections of "Analysis of JEK2 radiological impact" shall be written in following sections. The impact of NEK covers NPP and dry storage of spent fuel.

3.2.1.1. Definition of location of most exposed worker

The location is on JEK2 fence nearest to the NEK. The details about location and worker shall be described.

3.2.1.2. During normal operation

Impact on monitoring of JEK2 shall be described. Possibility of detection of source (JEK2 or NEK) shall be described. Definition of normal operation shall be given.

3.2.1.3. During design-basis accidents

Calculation of doses on thyroid and TEDE for most exposed workers and operators in MCR in JEK2 shall be described.

3.2.1.4. During severe accidents

Calculation of doses on thyroid and TEDE for most exposed workers and operators in MCR in JEK2 shall be described.

3.2.2. Water discharges into the Sava

It is necessary to describe the possibility of low Sava flow and alternative water sources, beside Sava River (wells, underground water, etc.).

3.2.3. Possible spills of substances into the Sava River

Due to dam in Brežice, the Sava acts as an artificial lake. The impact of thermal loads, during thermal contact and during the low flow of the Sava shall be described.

3.2.4. Fire Risk

Risks in JEK2 (construction, operation) due to fire in NEK during operation, outage and decommissioning shall be described.

3.2.5. Faults on the switchyard

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 36/49
TS			

The impacts of faults in NEK switchyard shall be described.

3.2.6. Evacuation routes of JEK2

Any impacts on evacuation routes and accessibility of JEK2 during NEK operation, outage and decommissioning shall be described.

3.2.7. JEK2 probabilistic safety analyses

The impact of NEK operation, outage and decommissioning on JEK2 probabilistic safety analyses shall be listed. Consider changes from NEK operation to NEK permanent shutdown and decommissioning. Consider also the spent fuel dry storage on NEK site which will operate much longer even after NEK shutdown.

3.2.8. Impact of NEK outage on JEK2

The impact of increased traffic during the outage of the NEK on the construction of JEK2 shall be described.

3.2.9. Impact of NEK decommissioning on JEK2

The impact of NEK decommissioning on JEK2 shall be described.

3.2.10. Impact of NEK dry storage on JEK2

The impact of NEK dry storage shall be described, during whole lifetime of NEK dry storage, that is longer than NEK NPP.

3.3. Impact on operation of JEK2 during decommissioning of NEK

Description of possible impact of NEK decommissioning on operation of JEK2.

4. JOINT IMPACTS OF JEK2 AND NEK

Joint impact during operation of JEK2 and NEK shall be identified and described. The need for additional analyses shall be identified.

4.1. Radiological impact during normal operation

Radiological impact is analyzed in separate study ("Analysis of JEK2 radiological impact", not part of this services, ongoing). Summary of applicable sections of "Analysis of JEK2 radiological impact" shall be written in following sections.

The radiological monitoring shall be performed in line with IAEA SRS-64 [7]. Total emissions shall be calculated, and new limit values shall be proposed.

Total emissions from JEK2 and NEK are evaluated with regards to the legislative emissions limit. Possible simultaneous releases from JEK2 and NEK into the atmosphere and water shall not exceed the currently allowed impact on the environment and the population for NEK.

4.1.1. Limitation of tritium (H-3) in water discharges

Total emissions shall be calculated. A new emission limit shall be proposed, as the current one for tritium does not allow a new nuclear power plant to emit any tritium releases to the environment.

4.1.2. Limitation of iodine emissions into atmosphere

Total emissions shall be calculated. If applicable, a new emission limit shall be proposed.

4.1.3. Limitation of C-14 releases into atmosphere

Total emissions shall be calculated. If applicable, a new emission limit shall be proposed.

4.2. Radiological impacts during design-basis accidents

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 37/49
TS			

The doses to the thyroid and TEDE at 500 and 1500 m shall be listed during simultaneous or delayed accidents in JEK2 and NEK. The probability of a simultaneous accident in NEK and JEK2 caused by a common cause and different cause shall be calculated. Earthquake, flood and/or other common cause shall be considered as possible common cause.

4.3. Radiological impacts during severe accidents

The doses to the thyroid and TEDE up to 200 km from the site caused by a severe accident in NEK and JEK2 shall be listed. The probability of a simultaneous severe accident in both power plants and the initial events and development of the accident leading to a severe accident shall be calculated.

4.4. Sava River

The impact on the total heating of the Sava River by JEK2 and NEK and other impacts shall be assessed.

5. EFFECTS OF ADDITIONAL UNITS AT KRŠKO SITE

There is an option to build JEK2 as a two-unit NPP. With this option there will be three NPPs at site: NEK, JEK2 – unit 1, JEK2 – unit 2. The impact of unit 1 of JEK2 on unit 2 of JEK2 and vice versa shall be assessed. Location of JEK2 unit 2 shall be determined or assumed within several proposals (i.e.. In vicinity or distanced from of JEK2 unit 1, NEK, etc.).

Environmental monitoring related to multiple sources might be required when authorized discharges from more than one facility may affect the same environment. Nevertheless, a situation may exist where two or more facilities make non-negligible contributions to the exposure of the representative person.

The common infrastructure of systems and structures for unit 1 and unit 2 shall be predicted.

The need for additional analyses shall be identified.

5.1. Impact of construction of Unit 2 JEK2 on operation of Unit 1 JEK2

The impact of construction of unit 2 of JEK2 on unit 1 of JEK2 shall be assessed. The impact of unit 2 of JEK2 under construction on unit 1 of JEK2 in terms of physical security shall be assessed.

5.2. Impact of operation of one-unit JEK2 on operation of another unit JEK2

5.2.1. Radiological effects

The radiological impact of unit 1 of JEK2 on unit 2 of JEK2 and vice versa shall be assessed. It may be predicted that the radiological impact of unit 1 of JEK2 on unit 2 is the same as unit 2 on unit 2. Similar may be predicted for unit 1.

5.2.2. Fire Risk

The impact fire on unit 1 of JEK2 on unit 2 of JEK2 shall be assessed.

5.2.3. Defects in the switchyard

The impact of unit 1 of JEK2 to the switchyard and effect on unit 2 of JEK2 and vice versa shall be assessed.

5.2.4. Impact on evacuation routes and accessibility of the power plant

The impact of unit 1 of JEK2 on unit 2 of JEK2 evacuation routes and accessibility of the power plant and vice versa shall be assessed.

5.2.5. Impact on probabilistic safety analyses

The impact of unit 1 of JEK2 on unit 2 of JEK2 safety analyses and vice versa shall be assessed.

6. PROPOSED MITIGATION MEASURES

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 38/49
TS			

The mitigation measures to mitigate undesired effects shall be described. This chapter may consider establishment of mechanisms for communications, interactions, and coordination to manage the impact of the construction activities and safety and security interface (including emergency programs) between new license applicant and operating unit licensee.

3.4 Phase II – Preparation of Deliverables rev1

The 1st revision of deliverables with guidelines from the spatial planning authorities (SPA) are prepared in this phase:

- SSAR rev1,
- RMCI rev1,
- Presentation of SSAR and RMCI to SPA in English in person in Slovenia.

3.5 Phase III – Preparation of Deliverables rev2

The 2nd revision of deliverables, based on the opinion of the SPA are prepared in this phase:

- SSAR rev2,
- RMCI rev2,
- Presentation of SSAR and RMCI to SPA in English in person.

Deliver presentations and present of SSAR and RMCI for the public hearings in the comprehensive SEA and cross-border assessment:

- Multiple presentations in Slovenia.
- Multiple presentations in Hungary, Austria, Italy and Croatia and other interested EU countries.

3.6 Phase IV – Preparation of Deliverables rev3

The 3rd revision of deliverables, after finished comprehensive SEA and cross-border assessment are prepared as well as presentation to GEN:

- SSAR rev3,
- RMCI rev3,
- Presentation of SSAR and RMCI to SPA.

Deliver presentations and present of SSAR and RMCI for the public hearings in the comprehensive SEA and cross-border assessment:

- Multiple presentations in Slovenia,
- Multiple presentations in Hungary, Austria, Italy and Croatia and other interested EU countries.

	TECHNICAL SPECIFICATIONS	Specification number:	
	Site Safety Analysis Report	TS-SP-2022-003	
TS		Date: 23.02.2024	Page: 39/49

4 Input data and Assumptions

GEN commits to providing the contractor, as needed, with all available input data for specific parts of the task that are necessary for the smooth performance of analyses or other activities related to the task.

GEN is not required to provide data that is freely and publicly accessible. Vendors and JEK2 Input Data will be provided at Kick-Off Meeting.

In the development of the project task, it is necessary to meaningfully include:

1. AP1000 DCD documentation [62],
2. AP1000 documentation, provided by GEN,
3. EPR1200 documentation, provided by GEN,
4. APR1000 documentation, provided by GEN,
5. EU APR1400 documentation, provided by GEN,
6. EPR documentation, provided by GEN,
7. Studies conducted for the project JEK2 [14]-[59],
8. USAR NEK [60]

5 Use of Standards and Regulations

The contractor shall use contemporary standards and regulations in the execution of the task, preferably domestic but also foreign, provided they are not in conflict with good engineering practice and domestic legislation.

SSAR shall be prepared in accordance with Article 95 ZVISJV-1 [1]. The SSAR will also incorporate requirements from the in UV3 [2] and JV5 [3]. SSAR shall consider all requirements from IAEA document Site Evaluations for Nuclear Installations [5].

6 Quality Assurance (QA)

All services shall be executed in strict adherence to the provisions outlined in the contractor's project-specific QA Plan, which constitutes a crucial element of their bid.

6.1 Alignment with Rules and Standards

The contractor's QA program should ideally be aligned with at least one of the following rules and standards:

1. ISO 9001:2015 (Quality Management Systems),
2. US NRC 10CFR50 Appendix B,
3. ANSI-ASME NQA-1 (QA Requirements for Nuclear Facility Applications).

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 40/49
TS			

In cases where the contractor's QA program does not directly align with these standards, they must demonstrate to GEN how their program satisfactorily meets the requirements for efficient and error-free execution of the task.

6.2 Development of a Project-Specific QA Plan

The contractor is required to develop a project-specific QA plan that addresses the unique aspects of the SSAR and RMCI. The QA plan should encompass all elements of the SSAR and RMCI. The plan must align with IAEA SSR-1 guidelines, SNSA guidelines, and relevant national legislation and decrees, ensuring a thorough and compliant evaluation process.

6.3 QA Elements

The contractor shall control and review of all documentation to ensure accuracy, consistency, and compliance with regulatory and standard requirements.

6.4 Stakeholder Engagement and Reporting

The contractor should provide regular updates and reports to GEN on the status and compliance of the QA activities or activities, timely defined within Chapters 8 and 9 of this document.

Effective communication channels should be established with all stakeholders, to ensure transparency and collaboration throughout the SSAR and RMCI preparation process. Effectiveness should be monitored and promptly reported to GEN.

7 Work Control

The contractor must, in accordance with the QA plan, conduct product control and work supervision. Additional review of task results may be conducted by GEN or its contractual partner according to the agreed-upon schedule. The contractor is obliged to provide GEN with all assumptions, input data, literature, and other references used in the completion of the task.

8 Schedule Management

The contractor will prepare a detailed timeline with individual project activities. The timeline should be in weekly units.

The anticipated project duration is estimated to be 70 weeks from the signing of the contract.

The timeline for task execution is divided into four (4) phases, namely:

- I. Preparation of deliverables rev0

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 41/49
TS			

The estimated duration for preparing the report rev0 is 50 weeks from the signing of the contract. This includes activities related to preparing the final report and presenting it to GEN.

II. Preparation of deliverables rev1

The anticipated preparation time is 8 weeks from the receipt of all spatial planning guidelines from SPA. When all SPA provides guidelines, the counting for Phase II begins (Tspg=0).

III. Preparation of deliverables rev2

The counting for Phase III begins with GEN's notification to the contractor that Study of Variants preparation started (Tsv=0). The anticipated preparation time is 6 weeks.

IV. Preparation of deliverables rev3

The anticipated preparation time is 6 weeks from the start of preparation of Proposal of National Spatial Plan (Tnsp=0).

	TECHNICAL SPECIFICATIONS		Specification number:	
	Site Safety Analysis Report		TS-SP-2022-003	
TS			Date: 23.02.2024	Page: 42/49

Phase	Activity	Activity Duration (Duration in weeks)	Completion of Activity After Contract Signing (Sequential week)
I	Preparation of deliverables rev0.	50	50
I.1	Preparation of a SSAR and RMCI detailed content proposal and characterization of necessary information. Preparation of Project Execution Plan and Methodology for delivering the Scope of Work. Preparation of project QA plan.	6	6
I.2	GEN comments on SSAR and RMCI detailed content proposal and provides available information; if not available GEN requests technology vendors.	3	9
I.3	Submission of the preliminary SSAR and RMCI, rev0. (The reports are submitted in phases by chapters; this is the deadline for submitting the entire reports.)	31	40
I.4	GEN comments on the preliminary reports.	4	44
I.5	Submission of the final reports SSAR and RMCI, rev0.	4	48
I.6	GEN comments on the reports or confirmation.	1	49
I.7	Delivery of the report SSAR rev0 and RMCI rev0 and presentation.	1	50
II	Preparation of deliverables rev1.	8	Tspg+8
III	Preparation of deliverables rev2.	6	Tsv+6
IV	Preparation of deliverables rev3.	6	Tnsp+6

Time changes are possible due to temporal uncertainties in obtaining information from technology vendors, obtaining guidelines during the state spatial planning process, stakeholder proposals, cross-border environmental impact assessments, and public displays and consultations, or input documents and data. In case the SPA guidelines are available before the completion of phase I, the schedule will be adjusted accordingly. There can be delays due to delays in information provided from technology vendors, Tspg, Tsv, public hearings, trans-border hearings, and Tnsp. All these delays are out of GENs and SSAR providers control and are reason for prolongation of contract.

9 Status Reports

The contractor is obliged to promptly inform GEN in the event of any ambiguity or other unresolved issues that would require input or instructions from GEN for the successful completion and content of the task.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 43/49
TS			

Upon the handover of the final documentation, and if necessary, during the execution of the project activity, the contractor is required to prepare a presentation of the completed activities and the results of the task.

The contractor is obligated to prepare and provide minutes for each meeting no later than 2 working days after the meeting.

During the period of implementing the project task, the contractor is required to report their progress in writing once a month and present intermediate results and the progress of the task at a meeting once every 2 months in person or remotely.

10 Deliverable Documentation Technical Requirements

The contractor will submit documentation based on the scope of work defined in Chapter 3. The textual part of the study must be in MS Word format and Acrobat Reader format. Tables, graphs, and schemes must be in their original format (not as images). Scanned texts, images, and tables from reference documentation can be in MS Office format or another commonly known and available format that does not distort data. The contractor will deliver all electronic documentation via an FTP server or a similar server, on a USB drive, or through email.

The project task may be stored in separate files, organized by the main chapters of the project task. However, regardless of the organization, the contractor must save the entire project task in a unified file.

Submitted Documents	Type	Copies
Interim Reports	electronic	.pdf, .docx, and source files
Final Report	electronic	.pdf, .docx, and source files
	paper	1 copy
Presentation	electronic	.pptx

Reports must be submitted (written) using an editor within the following criteria:

Editor: Microsoft Word, MS Excel, MS Office PowerPoint

Paper size: A4

Language: English

The contractor will adhere to all the requirements stated above unless otherwise mutually and explicitly agreed.

The contractor is obligated to submit all original documentation that forms the basis for the final report, including analyses, calculations, images, graphs, tables, drawings, and other reference documents crucial for the completion of the task, unless protected by copyright or generally available on the market (e.g., standards), or unless otherwise mutually agreed upon by the contracting parties.

	TECHNICAL SPECIFICATIONS	Specification number:	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 44/49
TS			

11 Organizational Contact

11.1 Project Management

The contractor coordinates the task with the responsible project manager and can also obtain all technical and other information from the project engineer.

Responsible Project Manager	Dr. Tomaž Žagar
	<i>Head of Analyses</i>
	tomaz.zagar@gen-energija.si
	+3867 4910 220

Project Engineer	Dr. Luka Štrubelj
	<i>Analysis Lead Engineer</i>
	Luka.strubelj@gen-energija.si
	+3867 4910 240

11.2 Steering Committee

Steering committee is formed to supervise execution of the project. Steering committee shall meet quarterly. All larger non-conformances shall be raised to steering committee no later than 5 working days after identification. The contractor shall name its steering committee member.

GEN steering committee member	Dr. Bruno Glaser
	<i>Head of Nuclear New Build Sector</i>
	Bruno.glaser@gen-energija.si
	+3867 4910 200

12 Access to Information

The contractor must provide unrestricted access to information that will be used in the completion of the task. They must ensure GEN has insight and control over all references and relevant information.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 45/49
TS			

13 Proprietary Information

All data obtained by GEN and the contractor regarding the execution of the project task are treated as proprietary information and intellectual property.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 46/49
TS			

14 References

Slovenian legislation:

- [1] Zakon o varstvu pred ionizirajočimi sevanji in jedrski varnosti (ZVISJV-1), Uradni list RS 76/17, 26/19 in 172/21, English: *Ionising Radiation Protection and Nuclear Safety Act (ZVISJV-1), Official Gazette RS 76/17, 26/19 and 172/21.*
- [2] Uredba o območjih omejene rabe prostora zaradi jedrskega objekta in o pogojih gradnje objektov na teh območjih (UV3), Uradni list RS 78/19, English: *Decree on areas of restricted use due to nuclear facilities and on the conditions for construction in these areas (UV3), Official Gazette RS 78/19.*
- [3] Pravilnik o dejavnikih sevalne in jedrske varnosti (JV5), Uradni list RS 74/16 in 76/17, English: *Rules on radiation and nuclear safety factors (JV5), Official Gazette RS, 74/16 and 76/17.*
- [4] Pravilnik o monitoringu radioaktivnosti (JV10), Uradni list RS 27/18, English: *Rules on monitoring radioactivity (JV10), Official Gazette RS 27/18.*

International legislation, regulations, standards, and guidance:

- [5] IAEA, Safety Standards, Site Evaluations for Nuclear Installations, Specific Safety Requirements No. SSR-1, IAEA, 2019, available: [P1837 web.pdf \(iaea.org\)](#).
- [6] IAEA, Safety Standards, Format and Content of the Safety Analysis Report for Nuclear Power Plants, Specific Safety Guide No. SSG-61, 2021, available: [20-02648E PUB1884 Body 02.09.2021-Print-PDF.indd \(iaea.org\)](#).
- [7] IAEA, Safety Reports Series No. 64, Programmes and Systems for Source and Environmental Radiation Monitoring, IAEA, 2010.
- [8] IAEA, Safety Report Series, SRS-110, Multi-Unit Probabilistic Safety Assessment, 2023, available: [22-01206E PUB1974 body 07 09 2023-Print-PDF.indd \(iaea.org\)](#).
- [9] US NRC, Regulatory Guide 1.206, Combined License Applications for Nuclear Power Plants, 2007, [Regulatory Guide 1.206 - Combined License Applications For Nuclear Power Plants | NRC.gov](#).
- [10] US NRC, NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition, 2023, available: [NUREG-0800 | NRC.gov](#).
- [11] ORNL, ORNL/TM-2014/533, Initiating Events for Multi-Reactor Plant Sites, September 2014, available: [Pub52423.pdf \(ornl.gov\)](#).
- [12] NEI, NEI 99-01, revision 6, Development of Emergency Action Levels for Non-Passive Reactors, November 2012 ,available: [NEI 99-01 Revision 6, Development of Emergency Action Levels for Non-Passive Reactors. \(nrc.gov\)](#)

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 47/49
TS			

[13] RHWG, Guidance Document Issue Issue TU: External Hazards, WENRA 2020, available: https://www.wenra.eu/sites/default/files/publications/wenra_guidance_on_issue_tu_head_document-2020-06-01.pdf.

Studies for JEK2 project:

- [14] IBE, Predinvesticijska zasnova: Jedrska elektrarna Krško 2, 2019 (available only in Slovenian).
- [15] IJS, Opis varnostnih karakteristik sedmih potencialnih reaktorjev za JEK2, 2018 (available only in Slovenian).
- [16] IJS, Ocena vzdržnosti za razvoj energetike v Sloveniji do leta 2030 s pudarkom na jedrski tehnologiji, 2014 (available only in Slovenian).
- [17] BRGM, Geotechnical, Geological and Seismological (GG&S) Evaluation of the New Nuclear Power Plant at the Krško site: Phase 1 Summary Report, 2010.
- [18] URS, ZVD, Preliminary Report on Environmental Impacts of Different Energy Technology Options for Slovenia, 2009.
- [19] ZVD, Okoljsko poročilo za postopek celostne presoje vplivov na okolje nove JEK2 na planskem nivoju za nov nacionalni energetski program, 2010 (available only in Slovenian).
- [20] Rizzo, Final Technical Report, Sensitivity Analysis, Probabilistic Fault Displacement Hazard Analysis Krško East and West sites proposed Krško 2 Nuclear Power Plant, 2013.
- [21] IBE, Savaprojekt, Gradivo za pobudo za DPN, revizija 1, projekt JEK2, 2023 (available only in Slovenian).
- [22] Rizzo, Nuclear Power Plant Krško 2 Seismic Hazard Analysis Report, 2018.
- [23] MEIS, Analiza meteoroloških podatkov, poročilo št.: MEIS-JEK2-METEO-3, December 2023 (available only in Slovenian).
- [24] MEIS, Analiza vplivov izpustov hladilnih stolpov JEK2 na okolico, poročilo št.: MEIS-JEK2-HS-3, November 2022 (available only in Slovenian).
- [25] Rizzo, Norman A. Abrahamson, GeoZS, Final Report; Probabilistic Seismic Hazard Analysis for Krško Nuclear Power Plant (NEK) and Krško Nuclear Power Plant 2 (JEK2), Preliminary report (draft), 2023.
- [26] Geo ZS, OGS, ARSO, Geostern, Task G Final Report; Summary Report; Project Characterization of the Drnovo Anomaly and the Gorjanci structure, Rev.0, April 2023.
- [27] BRGM, GeoZS, IRSN, ZAG, Geology – phase 1, project Geotechnical, Geological, and Seismological (GG&S) Evaluations for the New Nuclear Power Plant at the Krško Site (NPP Krško II), Rev.1, Ljubljana, October 2010 and appendices.
- [28] BRGM, GeoZS, IRSN, ZAG, Hydrogeological General Review Rev 1.0, project Geotechnical, Geological, and Seismological (GG&S) Evaluations for the New Nuclear Power Plant at the Krško Site (NPP Krško II), Ljubljana, October 2010.

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 48/49
TS			

- [29] Geo ZS, OGS, ARSO, Geostern, Task E Final Report; Fault Capability Assessment of the Gorjanci Structure; Project Characterization of the Drnovo Anomaly and the Gorjanci Structure; april 2023, Rev.0.
- [30] Rizzo, Final Technical Report, Sensitivity Analysis; Probabilistic Fault Displacement Hazard Analysis, Krško east and west sites, Proposed Krško 2 Nuclear Power Plant, Krško, Slovenia, Rev.1.
- [31] Rizzo, Technical Report, Probabilistic Fault Displacement Hazard Analysis; Krško east and west sites; Proposed Krško 2 Nuclear Power Plant, Krško, Slovenia, Rev. 1.
- [32] Geo ZS, Rizzo, Fault Capability Assessment for the proposed Krško 2 Nuclear Power Plant Slovenia, Project No. 14-5198, Rev.0., 14. September, 2018.
- [33] Rizzo, Final Report, Independent Technical Review Paleoseismological Trenches on the Libna Hill Report by BRGM, 31 January, 2012.
- [34] Rizzo, Final Report, Characterization of the Libna Feature; Proposed Krško 2 Nuclear Power Plant; Krško; Slovenia, Rev.0., 27 December, 2013.
- [35] BRGM, GeoZS, IRSN, ZAG, Final Geotechnical Report; Geotechnical, Geological and Seismological (GG&S) evaluations for the New Nuclear Power Plant at the Krško site (NPP Krško II), July 2013.
- [36] BRGM, GeoZS, IRSN, ZAG, Appendix 1: Liquefaction potential, 2013.
- [37] BRGM, GeoZS, IRSN, ZAG, Appendix 2: Determination of shear modulus and damping ration, 2013.
- [38] BRGM, GeoZS, IRSN, ZAG, Appendix 3: Review of the geotechnical model, 2013.
- [39] BRGM, GeoZS, IRSN, ZAG, Appendix 4: Stability Report, 2013.
- [40] BRGM, GeoZS, IRSN, ZAG, Appendix 5: Interpretation of geotechnical tests, 2013.
- [41] BRGM, GeoZS, IRSN, ZAG, Appendix 6: Compaction and consolidation, 2013.
- [42] BRGM, GeoZS, IRSN, ZAG, Appendix 7: Geophysical logging in the borehole WD-2-11, 2013.
- [43] BRGM, GeoZS, IRSN, ZAG, Appendix 8: Downhole-Western in the borehole WD-2-11, 2013.
- [44] ZAG, Report No. P 936/09 – 740 – 3 about the assessment of the liquefaction resistance on the location: “NEK II”, Ljubljana, July 2010.
- [45] BRGM, GeoZS, IRSN, ZAG; Final Geotechnical Report; Geotechnical, Geological and Seismological (GG&S) evaluations for the New Nuclear Power Plant at the Krško site (NPP Krško II), July 2013 and appendices.
- [46] UL FE, Pregled verjetnostnih varnostnih analiz novih jedrskih elektrarn glede ustrežanja upravnim zahtevam v Evropi, Ljubljana, December 2010 (available only in Slovenian).
- [47] IJS, Obvladovanje resnih nezgod v potencialnih reaktorjih za JEK 2, Ljubljana, August 2012 (available only in Slovenian).

	TECHNICAL SPECIFICATIONS	Specification number: TS-SP-2022-003	
	Site Safety Analysis Report	Date: 23.02.2024	Page: 49/49
TS			

- [48] Norman A. Abrahamson, FGG, Evaluation of Probabilistic Seismic Hazard Analysis and Engineering solutions for building new NPP JEK 2: Task 1D – Non-Ergodic Ground-Motion model for JEK 2 Final Report Revision 1, 30 April, 2021.
- [49] FGG, Review of Probabilistic Seismic Hazard Analysis and Engineering solutions for building new NPP JEK 2: Task 2A – Frequency-dependent site amplification factors Final Report Revision 0, 30 September 2021.
- [50] Rizzo, Final Report Reprocessing of High Resolution Seismic Data Krško II Nuclear Power Plant, Rev.0, 17 December 2010.
- [51] J. Douglas, P. Traversa, C. Martin, Peer Review of Non-Ergodic Ground Motion model for JEK2 (Task 1D): Final Report to GEN energija, d.o.o., 5 May, 2021.
- [52] Geo ZS, HRS and tectonic-geomorphological characterisation of Orlica and Artiče, Final Report, Rev. 0.1, June 2014.
- [53] Rizzo, Final Report Characterization of the Libna feature proposed Krško 2 Nuclear Power Plant Krško, Slovenia, Rev.0, 27 december, 2013.
- [54] Flycom, Tehnično poročilo: Projekt Lidar Orlica in Artiče, 2014 (available only in Slovenian).
- [55] ARSO, Zaključno poročilo projektne naloge Potresni katalog, Earthquake catalogue 2014, Rev. 1, 2014.
- [56] ZRMK, Final Independent Evaluation Report for the “Characterization of the Drnovo Anomaly and the Gorjanci Structure” project, Task F Final Report “Hazard Input Document (HID) for PSHA for JEK2 project implementation”, Document Identification: FIER CDAGS - Task F, Revision version: 1.0.
- [57] GEN, Request for Vendor Information Document, TS-TMA-2021 -126, Revision 1, July 2023.
- [58] Rizzo, Preliminary Safety Analysis for Decision Making Process, JEK2-GEN energija, revision 3, November 2010.
- [59] Geo ZS, OGS, ARSO, Geostern, Task D, Final Report, Data synthesis and characterization of the Drnovo Anomaly and the Gorjanci Structure, Rev.0, April 2023.

Other:

- [60] NEK, USAR, Updated Safety Analysis Report, Revision 30, Krško, 2023.
- [61] RS, Štab civilne zaščite za Posavje, regijski načrt zaščite in reševanja ob jedrskih ali radiološki nesreči v Posavju, verzija 3.0, 2012, (available only in Slovenian).
- [62] AP1000 DCD documentation <https://www.nrc.gov/docs/ML1117/ML11171A500.html>