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## DOCUMENT HISTORY

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## ABBREVIATIONS AND TERMS

ARAO – Agency for Radwaste Management

IDP – Preliminary Design

IDZ – Conceptual Design

LILW – low- and intermediate-level radioactive waste

osnVP – Draft Safety Analysis Report

PGD – project for acquisition of a construction permit

EIA – environmental impact assessment

RW – radioactive waste

SA.2: investment scenario with participation of Croatia (disposal of all waste from Krško NPP and Slovenian institutional waste)

SA.3: basic investment scenario (disposal of Slovenian part of waste from Krško NPP and Slovenian institutional waste)

SNSA – Slovenian Nuclear Safety Administration

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# 1 INTRODUCTION

## 1.1 Purpose of Draft Safety Analysis Report

The Draft Safety Analysis Report for the low- and intermediate-level radioactive waste (LILW) repository is a document drawn up as part of the Environmental Impact Assessment (EIA). In December 2011 preliminary information was obtained from ARSO regarding the content and scope of the environmental impact assessment, as facilitated by Article 52 of the ZVO-1 [1] (No. 35400-566/2011-17 of 27 December 2011). [2] The information contained the proposed content and scope, as provided by the Nuclear Safety Administration, in accordance with its powers (No. 3541-5/2011/2 of 21 December 2011). [3] The proposal states that the content of the EIA for the LILW repository, where it relates to nuclear and radiation safety, should be formulated as a separate document in accordance with the draft practical guideline No. PG 1.03, entitled Content of safety analysis report for the LILW repository, December 2011. The practical guideline was also issued officially in July 2012.

The content of the Draft Safety Analysis Report accords with the practical guideline and the guidelines, whereby content is provided that in this stage of the project is already known and important for the assessment of nuclear and radiation safety, while the emphasis is on content that is important in terms of impact on the population and the environment. The content which is not covered in this document is currently being compiled and will be included in the content of the Safety Analysis Report that will be compiled in order to obtain an approval for the construction of the LILW repository.

## 1.2 Description of legal status of repository

In a process that had taken place since November 2004 and in which the public has also been intensively involved, the location for the LILW repository was selected in December 2009, with the adoption of the Decree on National spatial plan for the LILW repository at the Vrbina site in the Municipality of Krško. [4]

A repository with a disposal unit in the form of a silo will be built at Vrbina in the Municipality of Krško.

The design documentation and other documentation has been in the drafting process since the site was approved. The design solutions are the input data for the majority of the documentation required for an assessment of the environmental impacts and for the obtaining of a construction permit. A Conceptual Design (IDZ) of the LILW repository was drawn up on the basis of the design of the project for acquisition of a construction permit (PGD), the coordination and optimisation of the design solutions and the guidelines of the architecture commission. The document is an appendix to the application for obtaining an environmental permit, and the project for acquisition of a construction permit (PGD) has already been drafted, and is currently in the revision phase.

The main field research confirmed the preliminary results and provided the necessary input data for the project design and the safety analyses. The majority of the primary research was carried out in the microlocation of the first disposal silo.

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Land has been purchased for the repository facilities, which is currently being administered by ARAO. The owner of the land is the Republic of Slovenia.

The security analyses were updated with regard to the development of the project solutions. The Design basis for the repository – environmental impact assessment phase [5] was drawn up as required by the Rules on Radiation and Nuclear Safety Factors. [6] The reference documents used for the Draft Safety Analysis Report were completed in accordance with the guidelines set out in the SNSA Practical Guidelines. [7]

The Environmental Impact Assessment (EIA) [8] together with the Draft Safety Analysis Report as an appendix and the Conceptual Design, constitute the materials for the procedure of assessment of environmental impacts, in relation to which the SNSA will issue a prior consent on radiation and nuclear safety.

A project for acquisition of a construction permit (PGD) for the LILW repository will be drafted, and will be completed on the basis of the revisions required pursuant to the ZVISJV.

### **1.3 Documents important to the approval procedure for the repository site**

During the time of the siting of the LILW repository, i.e. from 2004 to 2009, several documents were compiled in relation to the repository, and extensive fieldwork was conducted. The primary documents are listed and described below.

- The Preliminary comparative study [9] selected the three most favourable sites among twelve sites offered by the Slovenian municipalities with regard to their natural features, assessed on the basis of the existing data. This document served as the basis for the Slovenian Government Decision approving the potential sites, adopted in November 2005. [10]
  - The expert bases for the Variant Study, which presented the designs for three variant technical solutions for the repository which were later analysed in the variant study. The variants that were technically feasible at the proposed site were initially selected from among five variants: variant B – disposal in underground silos, variant D – disposal in tunnels and variant E – surface disposal. [11]
  - The initial fieldwork and follow-up initial fieldwork, which defined the characteristics of the proposed site in detail and served as the basis for the development of the models used in the safety analyses. [12], [13]
  - The Special Safety Analysis (SSA) addressed the repository's impact on the environment for all three disposal variants, pursuant to the Variant Study. The emphasis in the SSA was on the safety analyses and the nuclear and radiation safety assessments for the repository. [14]
  - The Variant Study, on the basis of which the most appropriate disposal method was selected with respect to the given site. Among the previously elaborated and selected variants for the LILW repository: variant B – disposal in underground silos, variant D – disposal in tunnels and variant E – surface disposal, the variant of disposal in underground silos was selected as the most optimal. [15]
  - The environmental report, the basis for the procedure of comprehensive assessment of environmental impacts within the process of siting the repository. [16]
  - The Design Basis for the conceptual design of the repository. [17]
  - Benchmark measurements for the site with respect to radiological parameters. [18]
  - Preliminary acceptance criteria. [19]
  - Functional analysis. [20], [21]
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#### **1.4 Data on the project designer, supplier, works contractor and repository operator**

The design documentation was compiled by IBE d.d., Ljubljana. The basis for the assessment of environmental impacts is the Conceptual Design for the Vrbina Krško LILW Repository, Rev. C, January 2016. The design solutions in the project for acquisition of a construction permit (PGD) will be identical. The document was appropriately revised in accordance with ARAO's internal procedures.

During the phase of assessment of environmental impacts, the suppliers and contractors for the construction of the LILW repository are not yet known, and will be selected pursuant to the Public Procurement Act.

The repository operator will be ARAO j.g.z., which carries out the duties of the compulsory national public utility service of radioactive waste management.

#### **1.5 Basic information on the compiling of the Safety Analysis Report and the drafter of the Safety Analysis Report**

The Draft Safety Analysis Report was compiled by ARAO j.g.z. The bases for the compiling of the report are the Conceptual Design of the Vrbina Krško LILW Repository, Rev. C, [22] Environmental Impact Report, Erico d.o.o., 2016 [8] and the Reference Documentation for the Compiling of the Draft Safety Analysis Report, IBE d.d. and ARAO j.g.z. The Draft Safety Analysis Report was revised in accordance with ARAO's internal rules and reviewed by an authorised radiation and nuclear safety expert – Elektroinštitut Milan Vidmar (EIMV). The Environmental Impact Assessment was compiled by Erico d.o.o. [8]

Pursuant to Article 65.b of the ZVISJV-D, [23] an expert opinion was obtained on the entire Environmental Impact Assessment from an authorised radiation and nuclear safety expert regarding the suitability of the documentation, particularly from the perspective of the safety of the population during the operating period and decommissioning, as well as after the closure of the repository.

Within the framework of the Investment Programme for the LILW Repository, [24] it was established that the SA.3 and SA.2 scenarios are the possible variants for disposal at the LILW repository. The key features of the scenarios are as follows:

- SA.3
    - only LILW disposal is conducted at the repository site; conditioning for disposal is conducted at Krško NPP,
    - half of the waste from Krško NPP and all Slovenian institutional waste will be disposed of at the repository site (one silo is required for the disposal of this waste),
    - in the determination of the quantity of waste, it was assumed that Krško NPP would operate until 2043.
  
  - SA.2
    - The same assumptions apply as for the SA.3 scenario, except that the Croatian half of the waste will also be disposed of at the repository site (two silos are required for the disposal of all the waste).
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In order to address both disposal scenarios, it was decided that an environmental impact assessment would be conducted that addresses the total quantity of disposed waste and the construction of two silos.

The project design for scenario SA.3 was elaborated in Rev. C of the IDZ. [22] The study Development potentials of the repository to be taken into account in elaboration of the EIA, which is part of the conceptual design, addresses the implementation of scenario SA.2, i.e. the disposal of all operating and decommissioning waste from Krško NPP and all other Slovenian LILW.

### **1.6 The safety analyses that serve as the basis for the Draft Safety Analysis Report address the disposal of the entire quantity of waste. Description of the content of the Draft Safety Analysis Report, the objectives and scope of its individual chapters and the envisaged connections between them**

The Draft Safety Analysis Report was compiled to the extent of the current scope of the reference documentation, and in a manner whereby the contents that are important to the assessment of radiation and nuclear safety and impacts on the population and the environment are elaborated in detail. The major emphasis is on the following chapters:

4. Assessment of the area of the repository site
5. Design basis
6. Description of systems and compliance with project
7. Safety analyses
11. Operational limits and conditions
15. Environmental aspects

The remaining chapters have been compiled to the degree that the reference documentation is currently elaborated.

### **1.7 Description of the process of compiling, amending, supplementing and organising the Safety Analysis Report**

The Draft Safety Analysis Report is a document that is compiled in the form of a Safety Analysis Report, but the first version of the Safety Analysis Report, pursuant to the ZVISJV, is compiled in order to obtain a construction approval from the SNSA and in order to obtain a construction permit. The procedure for the process of compiling, amending, supplementing and outlining the Safety Analysis Report will be determined by that time.

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## 1.8 REFERENCES

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  - [2] Letter – Preliminary information and submission of proposals obtained on the content of the environmental impact assessment (*Dopis Predhodna informacija in posredovanje pridobljenih predlogov o vsebini poročila o vplivih na okolje*), No. 35400-566/2011-17 of 27 December 2011. MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING, AGENCY FOR RADWASTE MANAGEMENT, 2011.
  - [3] Letter – LILW repository at the Vrbina Krško site – Proposal of content and scope of environmental impact assessment (*Dopis - Odlagališče NSRAO na lokaciji Vrbina v občini Krško - Predlog vsebine in obsega poročila o vplivih na okolje*), No. 3541-5/2011/2 of 21 December 2011. MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING, SLOVENIAN NUCLEAR SAFETY ADMINISTRATION, 2011.
  - [4] Decree on the detailed plan of national importance for a low- and intermediate-level radioactive waste repository at Vrbina, Municipality of Krško (*Uredba o državnem prostorskem načrtu za odlagališče nizko in srednje radioaktivnih odpadkov na lokaciji Vrbina v občini Krško*), Official Gazette of the RS, No. 114/2009 and 50/2012.
  - [5] Design basis for the Vrbina Krško LILW repository: environmental impact assessment phase (*Projektne osnove za odlagališče NSRAO Vrbina, Krško - faza presoje vplivov na okolje*), Revision 2, 02-08-011-002/NSRAO2-POR-013-01. ARAO, 2018.
  - [6] Rules on radiation and nuclear safety factors (*Pravilnik o dejavnih sevalne in jedrske varnosti*) (JV5). (Official Gazette of the RS, No. 74/16).
  - [7] PG 1.03 Practical Guidelines – Content of the safety analysis report for the low- and intermediate-level radioactive waste repository (*Praktične smernice – Vsebina varnostnega poročila za odlagališče nizko in srednje radioaktivnih odpadkov*). 2012.
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  - [10] Slovenian Government Decision approving the potential sites (*Sklep Vlade RS o potrditvi potencialnih lokacij*). 49<sup>th</sup> session of the Government of the Republic of Slovenia, 17 November 2005, 2005.
  - [11] Vrbina LILW repository in the Municipality of Krško, Background documents for Variant Study (*Odlagališče NSRAO Vrbina v občini Krško, Strokovne podlage za študijo variant*), Rev. C. IBE d.d., 2006.
  - [12] Initial field research of the geosphere and hydrosphere for the potential site at Vrbina in the Municipality of Krško, Final report, Group 1–8 (*Začetne terenske raziskave geosfere in hidrosfere za potencialno lokacijo Vrbina v občini Krško, Končno poročilo, sklop 1 - 8*), J-II 30\*b14-2/6, NSRAO-Vrb-ŠV/TR 02/06, T-2116, 02-01-069-008, Rev. 1, November 2006. ZAG, GeoZS, Geoinženiring, ZZVM.
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- [13] Report on supplementary initial field and laboratory geosphere and hydrosphere research for the potential Vrbina Krško site (*Poročilo o izvedbi programa dopolnilnih začetnih terenskih in laboratorijskih raziskav geosfere in hidrosfere za potencialno lokacijo Vrbina-Krško*), Rev. 1. J.V. GeoZS, ZAG, Geoinženiring, IRGO, ZZVMB, 2009.
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- [24] Vrbina LILW repository, Feasibility Study (*Odlagališče NSRAO Vrbina, Krško, Investicijski program*), Rev. C. IBE d.d., 2013.
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