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EIA FOR A NEW SOURCE OF NUCLEAR POWER ON THE VÄRÖ PENINSULA - SCOPING

Expert Statement – updated version based on the revised notification

ENVIRONMENTAL IMPACT ASSESSMENT FOR A NEW SOURCE OF NUCLEAR POWER ON THE VÄRÖ PENINSULA - SCOPING

Expert Statement – updated version based on the revised notification

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Agriculture and Forestry, Climate
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CONTENTS

1 SUMMARY

Sweden has notified Austria of a revised notification regarding the Environmental Impact Assessment (EIA) procedure under the Espoo Convention and the EU EIA Directive for the project "New source of nuclear power on the Värö Peninsula". Austria is taking part in the transboundary EIA. The Federal Ministry of Agriculture and Forestry, Climate and Environmental Protection, Regions and Water Management has tasked the Federal Environment Agency with preparing an expert opinion on the submitted documentation Vattenfall Basis for Scoping Consultation (10.02.2026) and Vattenfall Background to the Consultation on Transboundary Impacts (19.02.2025).

The documents for the "scoping" phase of the procedure are currently under review. In this phase, the content and level of detail that the project applicant must provide in the EIA report are being defined.

Austria's objective in participating in the EIA procedure is to minimise or prevent potentially significant adverse effects of the project on Austrian territory. The expert opinion on the scoping phase sets out the requirements that the EIA report must meet.

The project "New source of nuclear power on the Värö Peninsula" is at a very early planning stage; groundworks are expected to start later in this decade. The project developer, Vattenfall, has already launched preparatory activities, especially concerning the environmental impact assessment required under Swedish law. For this purpose, Vattenfall has established the company Videberg Kraft AB, which is intended to apply for the necessary operating permits and subsequently construct, own and operate the nuclear power plant.

The project concerns the construction of three to five modular reactors, with a combined electrical output of up to 1,500 MWe and a corresponding thermal output of 4,100–4,400 MWth. The developer refers to these modular reactors as SMRs, explaining that "small" relates to their lower thermal power compared with large-scale reactors. Each planned nuclear unit will consist of a reactor and turbine section. The reactors are intended to operate independently from one another but will share common services such as seawater intake, maintenance workshops and waste management. The reactors envisaged for the project will be based on light water technology.

Vattenfall has not yet specified which reactor designs will be constructed on the site, nor has it identified potential suppliers. The only information provided so far is that three to five modular reactors are planned, either

boiling water reactors (BWR) or pressurized water reactors (PWR), each with an output of approximately 300–500 MWe.

The lack of information regarding possible reactor types increases uncertainty regarding potential environmental impacts, licensing, construction, costs, and the timeline. Currently, there are no SMRs in operation worldwide. Furthermore, no operating licenses have been issued for SMRs within the specified power range. This means that the proposed SMRs would be the first of their kind to be built at this site, which poses a major challenge for the applicant and the regulatory authority.

The Expert Statement comes to the following conclusions and recommendations:

- Although the EU EIA Directive and Espoo Convention require initiating the environmental impact assessment early in decision-making, the developer's scoping document remains overly vague. This raises the question of when the operator and the authorities start the EIA procedure.
- The next step should narrow candidate reactor types and per-unit output targets. For any "black box" nuclear project, the EIA authority should demand far greater detail on the applicant's plans.
- For each prospective reactor verifiable evidence of severe accident control and compliance with Swedish regulations is essential. A maximum source term for dispersion calculations should be documented per reactor design.
- The EIA report should include an introduction to the regulations and radiation protection provisions so that the public is aware of the relevant rules and standards for the project approval.
- From an expert viewpoint, severe accident scenarios and radioactive dispersion are critical. Design details, including technical specifications and safety case are crucial for evaluating transboundary impacts.
- The scoping document only briefly addresses external events for accident analyses. Such hazards threaten multi-unit sites like Värö Peninsula, potentially affecting all plants; earthquake and tsunami risks merit deeper EIA scrutiny using the latest studies.
- Source terms must be calculated for every potential design, verifiable via accident analyses across all options. Risks cannot be reliably checked against a 100 TBq limit without proof that planned reactors will stay below it even in adverse conditions.
- Dispersion modelling should cover maximum source terms per reactor, plus deposition under worst-case weather irrespective of

distance. Beyond population doses, depositions over 750 Bq/m² should be shown, which under Austrian (and German/Czech) rules trigger mandatory protection measures, prompting environmental impact checks (especially for food production). It would therefore be highly desirable for the dispersion calculation to explicitly take potential depositions into account and to refer to the radiation protection regulations of the potentially affected countries.

- Operational radioactive waste volumes depend on reactor types and numbers. The EIA report should quantify these per planned unit and address spent fuel interim storage and clarify if and how it would occur on site.

2 ZUSAMMENFASSUNG

Schweden hat Österreich über eine überarbeitete Mitteilung des Umweltverträglichkeitsprüfungsverfahren (UVP) gemäß dem Espoo-Übereinkommen und der EU-UVP-Richtlinie für das Projekt „Neue Kernkraftquelle auf der Halbinsel Värö" informiert. Österreich beteiligt sich an der grenzüberschreitenden UVP. Das Bundesministerium für Land- und Forstwirtschaft, Klima- und Umweltschutz, Regionen und Wasserwirtschaft hat das Umweltbundesamt mit der Erstellung eines Gutachtens zu den vorgelegten Unterlagen Vattenfall Basis for Scoping Consultation (10.02.2026) and Vattenfall Background to the Consultation on Transboundary Impacts (19.02.2025) beauftragt.

Die Unterlagen für den Scoping-Teil des Verfahrens werden gegenständlich geprüft. Im Rahmen dieses Teils des Verfahrens wird diskutiert, welche Inhalte der Projektantragsteller im Umweltbericht vorlegen muss und wie detailliert diese sein müssen.

Ziel der Beteiligung Österreichs am UVP-Verfahren ist es, mögliche erhebliche nachteilige Auswirkungen des Projekts auf Österreich zu minimieren oder zu verhindern. In der Fachstellungnahme zum Scoping-Teil des Verfahrens werden die Anforderungen an den Umweltbericht festgelegt.

Das Projekt „Neue Kernkraftquelle auf der Halbinsel Värö" befindet sich noch in einem sehr frühen Planungsstadium, der Baubeginn ist für die zweite Hälfte der 2020er Jahre vorgesehen. Der Projektentwickler Vattenfall hat bereits mit den Aktivitäten begonnen, insbesondere im Zusammenhang mit der Umweltverträglichkeitsprüfung, die gemäß den gesetzlichen Bestimmungen in Schweden erforderlich ist. Vattenfall hat die Videberg Kraft AB gegründet, welche das angedachte Kernkraftwerk besitzen, um Betriebsgenehmigung ansuchen, bauen und betreiben soll.

Das Projekt selbst umfasst den Bau von drei bis fünf modularen Reaktoren mit einer Gesamtleistung von bis zu 1.500 MWe, was einer Wärmeleistung von maximal 4.100MWth- 4.400MWth entspricht. Der Projektentwickler bezeichnet diese modularen Reaktoren als SMR und erklärt, dass sich der Begriff „klein" auf ihre im Vergleich zu Großreaktoren geringere thermische Leistung bezieht. Jeder Kernreaktor wird aus einem Reaktor und einem Turbinenbereich bestehen. Die Kernreaktoren sollen voneinander unabhängig sein, aber gemeinsame Einrichtungen wie Seewasserentnahme, Wartungswerkstätten, Abfallentsorgung usw. nutzen. Die für den geplanten Betrieb in Betracht gezogenen Kernreaktoren werden auf Leichtwassertechnologie basieren.

Vattenfall gibt nicht an, welche Reaktoren an dem Standort gebaut werden sollen. In den Unterlagen werden keine potenziellen Lieferanten oder Reaktortypen genannt. Die einzigen Informationen zu den potenziellen Reaktoren sind die folgenden: Der Bau von drei bis fünf modularen Reaktoren vom Typ Siedewasserreaktor (BWR) oder Druckwasserreaktor (PWR) mit jeweils etwa 300 bis 500 MWe.

Das Fehlen von Angaben zu möglichen Reaktortypen erhöht die Unsicherheit hinsichtlich der potenziellen Umweltauswirkungen, der Genehmigung, des Baus, der Kosten und des Zeitplans. Derzeit gibt es weltweit keine SMR in Betrieb. Darüber hinaus wurden für SMR mit der angegebenen Leistungsbandbreite keine Betriebsgenehmigungen erteilt. Dies bedeutet, dass potenzielle SMR die ersten ihrer Art wären, die an diesem Standort gebaut werden sollen, was eine große Herausforderung für den Antragsteller und die Aufsichtsbehörde darstellt.

Die Expertenstellungnahme kommt zu folgenden Schlussfolgerungen und Empfehlungen:

- Obwohl die einschlägige EU-UVP-Richtlinie und die Espoo-Konvention vorsehen, dass ein Umweltverträglichkeitsprüfungsverfahren in einer frühen Phase des Entscheidungsprozesses beginnen sollte, erscheinen die Überlegungen des Betreibers Vattenfall im Scoping-Dokument nach wie vor sehr vage. Daher muss die Frage gestellt werden, zu welchem Zeitpunkt im Entscheidungsprozess ein Umweltverträglichkeitsprüfungsverfahren vom Betreiber und der zuständigen Behörde eingeleitet werden sollte.
- Der nächste Schritt sollte darin bestehen, die in Betracht gezogenen Reaktortypen und die angestrebte Leistung pro Block einzugrenzen. Bei einem Black-Box-Verfahren, das jede Art von Kernkraftwerk umfasst, sollte die zuständige UVP-Behörde vom Antragsteller verlangen, seine Projektabsichten wesentlich detaillierter darzulegen, als dies derzeit der Fall ist.
- Es wäre daher mehr als angemessen, für jeden der in Frage kommenden Reaktoren, unabhängig von ihrer Leistung, darzulegen, welche nachprüfbaren Nachweise für die Beherrschung schwerer Unfälle vorliegen und ob diese den Anforderungen der schwedischen Genehmigungsvorschriften für Kernanlagen entsprechen. Für jeden der geplanten Reaktoren sollte ein maximaler Quellterm dokumentiert werden, der für eine Ausbreitungsberechnung verwendet werden könnte.
- Der UVP-Bericht sollte eine Einführung in die Vorschriften und Strahlenschutzbestimmungen enthalten, damit die betroffene

Öffentlichkeit über die für die Genehmigung des Projekts maßgeblichen Normen informiert ist.

- Aus Sicht der Experten sind Informationen über schwere Unfälle und die Ausbreitung radioaktiver Emissionen infolge entsprechender Ereignisse von besonderem Interesse. Informationen über die zu realisierende Auslegung, einschließlich der relevanten technischen Spezifikationen und Sicherheitsnachweise, sind für die Möglichkeit einer umfassenden Bewertung der grenzüberschreitenden Auswirkungen des Projekts unerlässlich.
- Die externen Ereignisse, die in den Unfallanalysen berücksichtigt werden sollten, werden im Scoping-Dokument nur kurz beschrieben. Externe Ereignisse stellen eine besondere Gefahr für einen Standort wie die Värö-Halbinsel dar, an dem sich eine Vielzahl von kerntechnischen Anlagen befinden, da sie negative Auswirkungen auf die gesamte Anlage oder alle Anlagen am Standort haben könnten. Insbesondere die Frage des Erdbebenrisikos und/oder der daraus resultierenden Tsunamis sollte in der UVP unter Berücksichtigung der neuesten Erkenntnisse und laufenden Arbeiten näher behandelt werden.
- Es sollten für jeden in Frage kommenden Reaktor nachvollziehbare und dokumentierte Quellterme verwendet werden, welche auf Unfallanalysen beruhen. Das potenzielle Risiko kann unabhängig von der Entfernung nicht richtig eingeschätzt werden, wenn auf einen Grenzwert von 100 TBq verwiesen wird, solange nicht nachgewiesen ist, dass die geplanten Reaktoren diesen Grenzwert auch unter ungünstigen Umständen einhalten können und werden.
- Bei der Ausbreitungsberechnung sind neben den maximal denkbaren Quelltermen für jeden der geplanten Reaktoren auch die unter ungünstigsten Wetterbedingungen zu erwartenden Depositionen unabhängig von der Entfernung vom Standort zu ermitteln. Neben der Berücksichtigung der potenziellen Dosisbelastung der Bevölkerung ist auch die Deposition oberhalb eines Wertes von 750 Bq/m² nachzuweisen. Nach österreichischen Vorschriften (wie auch denen für Deutschland und die Tschechische Republik) sind oberhalb dieses Wertes von Amts wegen Schutzmaßnahmen zu ergreifen. Dies bedeutet zwar nicht zwangsläufig eine Beeinträchtigung der Umwelt, aber den Beginn von Aktivitäten zur Bewertung potenzieller nachteiliger Auswirkungen auf die Umwelt, insbesondere auf die Lebensmittelproduktion. Es wäre daher mehr als wünschenswert, wenn die Ausbreitungsberechnung potenzielle Depositionen ausdrücklich berücksichtigen und auf die Strahlenschutzvorschriften der potenziell betroffenen Länder verweisen würde.

- Die Menge der während des Betriebs der Anlagen anfallenden radioaktiven Abfälle hängt auch von der Art und Anzahl der zu bauenden Reaktoren ab. Im UVP-Bericht sollten daher für jeden der geplanten Reaktoren die entsprechenden Abfallmengen aus dem Betrieb angegeben werden. In diesem Zusammenhang ist auch die Frage der Zwischenlagerung abgebrannter Brennelemente zu klären. Dabei stellt sich die Frage, ob und in welcher Form eine Zwischenlagerung am Standort geplant ist.

3 INTRODUCTION AND OVERVIEW

Sweden has notified Austria of a revised notification regarding the Environmental Impact Assessment (EIA) procedure under the Espoo Convention and the EU EIA Directive for the project "New source of nuclear power on the Värö Peninsula". Austria is taking part in the transboundary EIA. The Federal Ministry of Agriculture and Forestry, Climate and Environmental Protection, Regions and Water Management has tasked the Federal Environment Agency with preparing an expert opinion on the submitted documentation. The relevant documents are Vattenfall's *Basis for Scoping Consultation* (10.02.2026), *Basis for the scoping consultation* (19.02.2025) and *Background to the Consultation on Transboundary Impacts* (19.02.2025).

The 2025 Expert Statement[1] on the Environmental Impact Assessment for a new nuclear power source on the Värö Peninsula—reviewing the documents *Vattenfall Basis for the Scoping Consultation* (19 February 2025) and *Vattenfall Background to the Consultation on Transboundary Impacts* (19 February 2025)—served as the basis for this expert opinion. Most of the recommendations from the 2025 statement remain relevant and therefore form the core of the present report. The documents for the "scoping" phase of the procedure are currently under review. In this phase, the content and level of detail that the project applicant must provide in the EIA report are being defined.

Austria's objective in participating in the EIA procedure is to minimise or prevent potentially significant adverse effects of the project on Austrian territory. The expert opinion on the scoping phase sets out the requirements that the EIA report must meet.

The project "New source of nuclear power on the Värö Peninsula" is at a very early planning stage; groundworks are expected to start later in this decade. The project developer, Vattenfall, has already launched preparatory activities, especially concerning the Environmental Impact Assessment required under Swedish law. For this purpose, Vattenfall has established the company Videberg Kraft AB, which is intended to apply for the necessary operating permits and subsequently construct, own and operate the nuclear power plant.

The notification document also serves to specify what information is suitable for inclusion in the project's environmental impact

[1] Meister, F.; Gufler, K.; Kühteubl, F. (2025): Environmental Impact Assessment for a new nuclear power source on the Värö Peninsula – Scoping, Umweltbundesamt, Wien

documentation. This notification was published in February 2026 and is open to public comment.

The permit application covers both the development and operation of the facility. Vattenfall's planned activities in Varberg require a permit under the Environmental Code (1998:808) for environmentally hazardous activities, as well as additional authorisations under other Swedish legislation.

The project area is situated on Sweden's southwestern coast on the Värö Peninsula in Varberg municipality, about 50 km south of Gothenburg. The site will be shared with the existing Ringhals nuclear power plant (NPP). Of the four units at Ringhals, two are still in operation and two are in the process of decommissioning.

The project concerns the construction of three to five modular reactors, with a combined electrical output of up to 1,500 MWe and a corresponding thermal output of 4,100–4,400 MWth. The developer refers to these modular reactors as SMRs, explaining that "small" relates to their lower thermal power compared with large-scale reactors.

Each planned nuclear unit will consist of a reactor and turbine section. The reactors are intended to operate independently from one another but will share common services such as seawater intake, maintenance workshops and waste management. The reactors envisaged for the project will be based on light water technology.

Vattenfall has not yet specified which reactor design will be constructed on the site, nor has it identified potential suppliers. The only information provided so far is that three to five modular reactors are planned, either boiling water reactors (BWR) or pressurized water reactors (PWR), each with an output of approximately 300–500 MWe.

The lack of detailed reactor design specifications introduces significant uncertainty concerning potential environmental impacts, licensing requirements, construction processes, costs, and timelines. Currently, no small modular reactors (SMRs) meeting the specification described in the document (BWR or PWR with an output of 300–500 MWe) are in operation worldwide, nor have operating licenses been issued for SMRs of this scale. Consequently, any SMRs constructed at the site would be first-of-a-kind units, imposing considerable responsibility on both the applicant and the regulatory authority

It is further noted that construction of the planned port facility and associated land preparation works are expected to begin in the late 2020s, assuming the necessary permits have been granted and investment decisions have been taken. Start-up of the first nuclear power reactor is scheduled for the mid-2030s once that unit is completed, even though construction will still be underway in other parts of the operating area.

4 PROCEDURAL ASPECTS OF THE EIA

While the EU EIA Directive and Espoo Convention require an Environmental Impact Assessment to start early in the decision-making process, Vattenfall's scoping document remains overly vague. This raises the question of when the developer and competent authority should initiate the EIA procedure.

The report envisages three to five modular reactors. Assessing their environmental impacts - during normal operations or severe accidents - hinges on the selected reactor types, their inventories, and proven accident mitigation measures, among other factors. Yet the scoping document offers no detailed account of the reactor selection process or the nuclear regulations it must satisfy.

The early stage of the decision-making process, combined with significant uncertainties in the details of the project, does therefore not allow for a proper assessment of the environmental impact of the envisioned project. This expert opinion reflects the vague information provided in the scoping documents. It would therefore be appropriate to show for each of the prospective reactors, what verifiable evidence is available for the control of severe accidents and whether the requirements according to the Swedish nuclear licensing regulations are met. A maximum source term per reactor for dispersion calculations should also be documented.

Austria has already participated in several nuclear-related procedures in the past. This has also provided knowledge of existing documents that have been made publicly available elsewhere (for example in Czech Republic, Slovakia and Poland) as part of an EIA scoping procedure. Even a brief comparison reveals that those developers provided far more detail on reactor types, clearly distinguishing between boiling water reactors (BWR) and pressurised water reactors (PWR).

As previously noted, the next step should narrow down reactor types and define the target output per unit. For any "black box" nuclear project, the EIA authority should demand much greater specificity from the applicant than shown here.

5 EXTERNAL EVENTS AND MULTIPLE UNITS ON SITE

The Värö Peninsula currently has two operational reactors, two in decommissioning, and plans for up to five new ones. Any accident analysis for the proposed reactor types must therefore account for potential adverse interactions between nuclear facilities on the site.

Multi-reactor or site-wide events cannot be dismissed, even if they represent extremely low-probability scenarios (barring external hazards like a Fukushima type event impacting all units simultaneously).

Given their potentially severe consequences, the EIA should at minimum include a qualitative overview of events that could jeopardise safe reactor operations or trigger multi-unit accidents.

External events should be described in a comprehensive manner, as they pose heightened risks to densely packed nuclear sites like the Värö Peninsula. The EIA should take into account earthquake and tsunami[2] risks using the latest research and studies, factoring in historical precedents.

IAEA's most recent guidance on external hazards, along with the latest WENRA report on new reactor safety requirements (RHWG 2013) should be taken into account.

The EIA should also reflect climate change's long-term impacts. Over the facility's projected lifespan, sea-level rise, warmer waters, and higher air temperatures could alter safety demands, requiring explicit analysis to maintain high standards throughout.

A comprehensive site assessment is vital to minimise severe accident risks with major environmental fallout. To that end, the EIA should cover at least:

- Findings from recent studies on earthquakes, flooding, and extreme weather.
- Methods for identifying key external events.
- List of external events to be considered (including justification) and their characteristics.
- Details on the combinations of external events evaluated.

[2] Mörner NA. Tsunamis in Sweden: Occurrence and Characteristics. Tsunami. InTech; 2016. Available from: http://dx.doi.org/10.5772/63956

- Design safety margins, especially against earthquakes and flooding.
- Interactions with existing site facilities and potential fallout (e.g., radiological releases from one unit affecting others, or events causing widespread damage).
- Interactions of operational modular reactors with modular reactors under construction with special emphasis on shared systems.

It is particularly important that accident scenarios described in the EIA comprehensively cover all possible reactor options.

6 SAFETY AND SEVERE ACCIDENTS

A comparison of scoping documents from comparable EIA procedures in other countries suggests presenting the rules and regulations for constructing and operating the planned facility to the public, rather than focusing solely on radiation protection provisions. The current scoping document, however, provides no such information. This may be due to the fact that the regulation is currently being reviewed, but nevertheless the rules and regulations should be addressed as they are the basis for licensing.

The EIA report should therefore feature an overview of these regulations and radiation protection standards, enabling the public to understand Sweden's approval criteria for the project.

Details on the planned design, including technical specifications and safety evidence, are crucial for fully evaluating the project's potential transboundary impacts.

The EIA report should therefore meet these content requirements:

- Systematically describe the basic design features and safety levels of the proposed designs (drawing from reference projects) in greater detail to better illustrate the individual alternatives.
- Provide expanded details on protections against external natural and man-made hazards, plus requirements for critical safety systems and components (including instrumentation and control).
- Offer comprehensive, up-to-date information on ongoing projects involving the listed reference reactor types, fully disclosing any encountered issues.

The Swedish competent authority should require the developer to specify, as precisely as possible, the number of reactors and their types (boiling water reactor or pressurized water reactor) when submitting the EIA report. The EIA documentation should include the following details for each envisaged reactor type:

1. Meaningful technical description of the entire plant
2. Development status achieved:
   a. Reference plants under construction or in operation, with comprehensive, up-to-date presentation
   b. Certifications available
   c. Approvals and reviews by licensing authorities in other countries and status of these reviews
3. Basic data on the operation of the plant:

   a. Operating life
   b. Fuel element replacement cycle
   c. Expected availability
   d. Burn-up
   e. Expected MOX content
4. Descriptions of the safety systems, including information on the degree of redundancy and spatial separation of the individual facilities, as well as requirements for important safety-relevant systems and components
5. Information on the use of diverse facilities, in particular in safety control technology. Description of approaches to avoid or control CCF computer-based safety control technology
6. Information on the reserves of the individual designs with regard to external natural and civilizational influences beyond the design level (e.g. with regard to different load-time diagrams in the event of an aircraft crash)
7. Description of design basis accidents
8. Description of the design extension conditions (DEC) considered
9. Presentation of project-specific methods for demonstrating the practical exclusion of early or large releases
10. Presentation of measures to control severe accidents or mitigate their consequences
11. Analysis whether the various reference solutions already comply with the relevant European and international standards, in particular the requirements of WENRA and the IAEA
12. Discussion of the differences between country-specific regulatory requirements with regard to the design of structures, systems and components
13. Conclusion and requirements for the EIA report

For Austria, analyses of possible incidents and accidents at the planned nuclear power plants are the most important part of the transboundary EIA procedure. However, the information on this subject in the scoping document is incomplete.

To assess transboundary impacts, the project developer should model atmospheric/hydrological dispersion using established calculation tools and using credible source terms for accident conditions. The (comprehensive) source terms to be used in the EIA should be verifiable on the basis of existing accident analyses for the possible reactor options. In any case, the EIA should contain a comprehensible justification for the source terms used. As a matter of principle, possible beyond-design-basis accidents should be presented in the EIA regardless of their probability of occurrence.

The EIA report should contain the following information in order to enable a comprehensible assessment of the possible impact on Austria:

- Results of PSA analyses (Levels 1, 2 and 3) for each possible reactor option:
  - Probabilities/frequencies of core damage (CDF) and severe accidents with (early) large releases (LRF or LERF), including probability distribution (quantiles);
  - Specification of the contributions of internal triggers, internal and external events, as well as the proportions from operation and shutdown and from severe accidents in the fuel element storage pool to CDF, LRF and LERF;
  - Specification of the most important accident scenarios, including accidents in the fuel element storage pool;
  - Detailed description of measures to control severe accidents and mitigate their consequences;
  - Source terms for the most important release categories, including possible releases from the fuel element storage pool.
- A comprehensible description of the dispersion calculations and the determination of radiation doses for malfunctions and accidents:
  - Specification of the methods and programmes selected for the dispersion calculations;
  - Specification of the input parameters used in the dispersion calculation (source term, release height and duration, meteorological data) and their justification;
  - Specification of the results of the propagation calculations in the form of radiation doses and soil contamination (in particular the radionuclides Cs-137 and I-131);
  - Presentation of the probability distribution of the results, not just the calculated mean values.
  - In addition, it should be specified which international documents (IAEA, WENRA, EUR) are binding for the project.

It is particularly important that the accident scenarios described in the EIA comprehensively cover all envisaged reactor designs.

7 TRANSBOUNDARY IMPACT

The scoping document Background to the Consultation on Transboundary Impacts: 19.02.2025 displays transboundary impacts for a release using a source term of 100 TBq. However, without evidence that releases of the planned reactors can and will remain below this 100 TBq limit even in adverse conditions, the potential risk cannot be properly evaluated, regardless of distance.

For dispersion modelling, the EIA should determine not only the maximum conceivable source terms for each planned reactor but also expected deposition under the most adverse weather conditions, regardless of distance from the site. Beyond assessing potential population dose exposure, it should map any deposition exceeding 750 Bq/m². Under Austrian regulations (as well as those in Germany and Czechia), this threshold triggers mandatory protection measures and initiating evaluations of possible environmental harm, particularly to food production.

It would therefore be desirable for the dispersion calculation to explicitly include potential depositions and to refer to the radiation protection regulations of the potentially affected countries. Additionally, not only atmospheric dispersion but also hydrological dispersion should be part of the calculations.

It is noted that the source term value of 100 TBq has been prescribed also in the Swedish legislation, though it is a kind of "safety goal" rather than an actual physical limit of what could be released during a severe accident. In the view of the experts, the discussion on the severe accidents contained in the EIA report should not necessarily select the most limiting (highest imaginable) release category. There are accident scenarios that would have a (significantly) lower probability, but would lead to a release that is 1-2 orders of magnitude higher than the 100 TBq used in the transboundary assessment. Just as comparison, in the Fukushima accident, the estimate for release of Cs-137 was about 7-20PBq[3]

It is stated in the scoping document that the modelling uses conservative assumptions to assess the fallout and resulting radiation doses. This statement cannot be confirmed by the experts.

It is therefore recommended that the EIA report detail the amount of radioactivity released in a severe accident, including scenarios involving containment failure and/or filtered venting (if applicable).

[3] IAEA-TECDOC-2020

Using this source term for such a release, the dispersion model should assess not only doses to the affected population, but also expected deposition based on at least one year of weather data.

The distance of approximately 940 km between the Värö peninsula and Austrian territory nominally exceeds the suggested radius of the Ingestion and Commodities Planning Distance (ICPD) defined in the IAEA general safety requirements. This radius is defined as “Area around a facility for which emergency arrangements are made to take effective emergency response actions following the declaration of a general emergency in order to reduce the risk of stochastic effects among members of the public and to mitigate non-radiological consequences as a result of the distribution, sale and consumption of food, milk and drinking water and the use of commodities other than food that may have contamination from a significant radioactive release.” [IAEA Safety Standard: Preparedness and Response for a Nuclear or Radiological Emergency, GSR Part 7]

Nevertheless, the EIA report is focusing on the doses to an individual person, rather than other parameters of specific interest to Austria, in particular the deposition of radionuclides (Cs) on the ground. It is also worth noting that contamination can have different effects depending on the time of year and land use. Even if the doses to the population from a possible radioactive release are small, the fact that protective measures have to be activated classifies a nuclear accident in a plant that is relatively distant from Austrian territory still as an important event.

Historical data on the Chernobyl and Fukushima accidents show that accidents may have consequences far beyond those predicted during the planning process. Therefore, planning for an emergency should consider possible effects of a large-scale accident with a potential for contamination even far beyond emergency planning zones and distances defined for a specific nuclear facility.

In conclusion, the EIA report should contain the following information as relevant for the transboundary impact that might affect Austria:

1. List of accidents and incidents analysed to establish the source term. This should be done for each of the envisaged reactors and reactor types. If more than one unit is concerned, accidents and their releases at multiple units should be calculated as well.
2. Detailed description of severe accident scenarios and their sequences, and the resulting estimated source terms for each of

those (not just for Cs-137, but other relevant radionuclides for transboundary impact).

3. Detailed description of the assumptions taken when modelling accident sequences addressing source term, including duration of a release, levels of release, energy, etc…
4. Thorough presentation of the dispersion modelling, including the weather parameters taken (covering a range of weather situations as well as the determination of radiation impacts.
5. Calculation of possible deposits of radionuclides in Bq/m^2, additionally to the resulting doses to the population.
6. Discussion on relevant assumptions for the dispersion calculation and their justification.
7. Resulting probability distribution of the radiological impact, covering all cases.

8 SPENT FUEL AND RADIOACTIVE WASTE

The volume of radioactive waste produced during plant operations hinges heavily on the reactor types and numbers built.

The EIA report should therefore quantify operational waste for each planned reactor.

The project proponent states that, “the permit applications cover the management and storage of nuclear waste within the operational area in preparation for, or pending, continued management and final disposal at another location.”

The EIA report should address in detail the on-site interim storage of spent fuel.

9 GLOSSARY

Bq .... Becquerel

BWR............................ Boiling Water Reactor

CDF............................. Core damage frequency

DBA .... Design Basis Accident

DEC-A/B .... Design Extension Condition

EIA .... Environmental Impact Assessment

EU .... European Union

EUR............................. European Utility Requirements

IAEA............................ International Atomic Energy Agency

LERF .... Large early release fraction

MW .... Megawatt

MWe........................... Megawatt electric

MWth .... Megawatt thermal

NPP .... Nuclear power plant

PBq............................. Petabecquerel

PWR .... Pressurized Water Reactor

SSC .... System Structures & Components

SMR .... Small Modular Reactor

TBq .... Terabecquerel

WENRA....................... Western European Nuclear Regulators‘ Association

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