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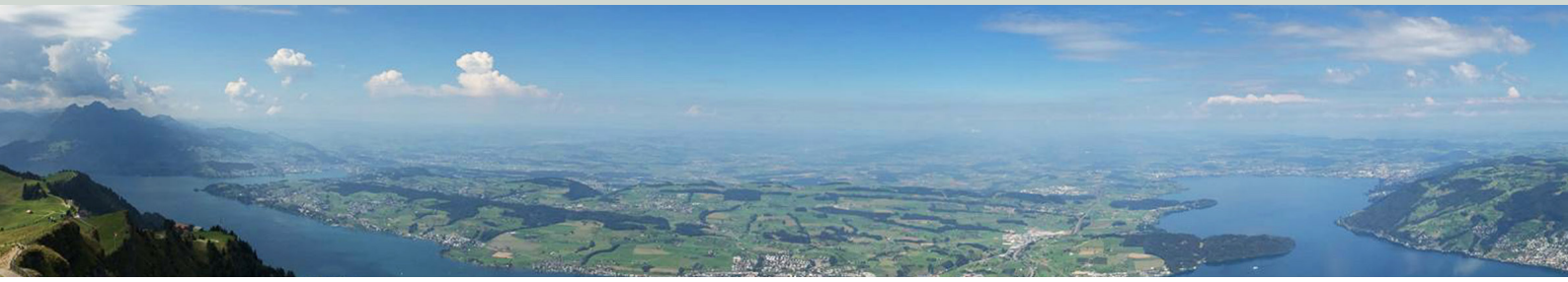

Oversight of deep geological repositories

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Objectives

ENSI plays an active role in ensuring that radioactive waste is disposed of safely in Switzerland. It anticipates and is prepared for future challenges associated with deep geological repositories.

ENSI is recognised in both Switzerland and the wider international community as a competent and credible interlocutor in the safe management and disposal of radioactive waste.

Introduction

As Stage 3 of the Sectoral Plan for Deep Geological Repositories (SPDGR) gets underway, ENSI's responsibilities will change increasingly from the oversight of the search for a deep geological repository to the oversight of the development and construction of a repository at a specific site. The ENSI Board has therefore decided to formulate in this position paper the requirements for supervising deep geological repositories and the division of roles between ENSI and the waste producers for the forthcoming tasks.

After a decree of the Swiss Federal Council concludes Stage 2 of the SGT (foreseeably by the end of 2018), Nagra will, in the next and final stage, suggest suitable sites for deep geological repositories for low and intermediate level waste (LLW and ILW) and high level waste (HLW) and prepare general license applications. At the same time, Nagra will also develop repository concepts in preparation for the subsequent construction licensing process.

As a result, ENSI faces a number of challenges: in addition to monitoring development work on storage concepts for later implementation, it must continue to evaluate proposed sites competently. Its oversight activities also include verifying cost estimates and monitoring waste management programs (both covering five-year periods). Moreover, ENSI will need to supervise geological investigations associated with exploratory drilling in Phase 3 of the SPDGR and with underground exploratory work after a general license has been issued.

The principles underlying the use of nuclear energy in Article 4 of the Swiss Nuclear Energy Act (NEA) also apply to the management and disposal of radioactive waste: consequently, humans and environment must be protected against the dangers posed by ionizing radiation. Radioactive substances may only be released into the environment in harmless quantities. Special care must be taken to prevent the release of unauthorized quantities of radioactive substances and to protect humans against inadmissible levels of radiation during normal operation and in case of accidents.

The NEA and the Swiss Nuclear Energy Ordinance (NEO) comprehensively govern the management and disposal of radioactive waste. It is mandatory for anyone operating or decommissioning a nuclear installation to safely manage all radioactive waste arising from that installation at their own cost (Art. 31, NEA).

According to Article 5 of the NEO, the Federal Government specifies in a sectoral plan the objectives and requirements for the disposal of radioactive waste in deep geological repositories. The SPDGR defines the objectives of the Federal Government, as well as methods and

criteria for selecting sites for deep geological repositories for all waste categories in Switzerland. The Swiss Federal Office of Energy (SFOE) leads the site selection procedure. ENSI has the overall responsibility for safety assessments of the proposed geological sites and repository projects. To this end, it defines the underlying safety criteria and requirements for individual stages of the search for deep repository sites and for construction of such repositories.

ENSI is the oversight authority responsible for nuclear safety and security (Article 70, NEA). Article 11 of the NEO defines fundamental requirements for the design of deep geological repositories and stipulates that ENSI should formulate specific design principles for deep geological repositories in the form of guidelines. In 2009 ENSI issued ENSI-G03 Guidelines in line with this statutory provision.

Principles for Oversight of Deep Geological Repositories

Principle 1: Different Oversight Requirements

The requirements for the oversight of deep geological repositories are very different from the requirements for the oversight of currently operating nuclear facilities (nuclear power plants, intermediate storage facilities, research installations).

Explanatory notes : When overseeing existing nuclear power plants, ENSI assesses in particular ongoing operations, upgrading projects, decommissioning and safety-related incidents.

In the case of the proposed deep geological repositories, ENSI assesses all safety-related aspects of the sites proposed in the selection process, as well as the status and development of repository projects. ENSI is also responsible for overseeing geological investigations before and after a deep geological repository has been built and up to the point at which it is sealed. During the decades-long process, the emphasis of the oversight activities lies on verifying the performance of both natural and engineered safety barriers. Human and organisational aspects also play an important role in connection with nuclear waste management.

Principle 2: ENSI Guidelines

ENSI specifies the legal requirements at the level of guidelines and defines protection objectives, guiding principles and safety criteria. The guideline requirements are further refined as needed. ENSI's requirements reflect the state of the art in science and technology, are made available in a timely manner and define the general safety conditions applicable to deep geological repositories as necessary.

Explanatory notes : Guideline ENSI-G03 defines the basic principles and requirements for deep geological repositories along with specific quantitative protection objectives to be met by a deep geological repository. The quantitative requirements (dose and risk protection objectives) are derived from the legislation on radiological protection (RPA, RPO) and international recommendations (ICRP, IAEA).

The requirements imposed by ENSI on the waste producers reflect the current state of the art in science and technology. This means in particular that international developments, for example by the IAEA and WENRA, are included in the set of regulations. As the stepwise implementation of deep repository projects proceeds, ENSI will continue to develop its set of regulations to achieve ever greater safety.

ENSI's regulations for deep geological repositories must be available in a timely manner to afford stakeholders, especially waste producers, planning reliability. On the other hand, it must keep the range of design options for a deep geological repository open for as long as possible so that waste producers can consider all current information on the geological formations and the latest scientific and engineering finding.

Principle 3: Division of Roles between ENSI and Waste Producers

Waste producers develop proposed solutions for the design of deep geological repositories. The main role of ENSI is to perform the engineering validation of the proposed solutions and to determine whether they comply with protection objectives, guiding principles and safety criteria.

Explanatory notes : The roles and responsibilities of waste producers and oversight authorities are defined in the NEA, the NEO and the SPDGR. According to Article 31 of the NEA, operators of nuclear installations are mandated to safely dispose of all radioactive waste arising in their facilities at their own cost. The obligation to dispose of radioactive waste also includes the necessary preliminary activities such as research and geological investigations, as well as providing a deep geological repository in a timely manner.

ENSI reviews the design concepts for deep geological repositories and the plans to construct these repositories in conjunction with waste management programs, which waste producers must periodically submit. ENSI will perform its own calculations on safety-related issues to ensure that the waste producers' proposals are checked by independent experts. ENSI consults with other oversight authorities on related topics and carries out its own research projects in connection with regulatory safety research. In carrying out these oversight activities, ENSI ensures that waste producers fulfil their obligations as stipulated in Article 31 of the NEA.

Principle 4: Interaction with Stakeholders

ENSI collects at an early stage safety-related technical questions from all stakeholders and considers safety relevant aspects while exercising its oversight.

Explanatory notes: New safety-related questions come to light during the implementation of the sectoral plan and as the deep geological repository project progresses. These questions arise because the site selection process becomes more specific and the deep geological repository project evolves. They may also relate to new scientific findings and new technical and social developments.

ENSI is receptive to stakeholders' concerns and collects safety-related questions at an early stage of the process. It handles these issues in its safety reports, in evaluations of Nagra's research program as well as in the context of regulatory safety research. It also takes into account the opinions of the Swiss Federal Nuclear Safety Commission (NSC) and the cantonal bodies. Safety-related technical discussions at the Technical Forum Safety also provide an opportunity to answer questions from the general public. ENSI incorporates its conclusions on relevant issues in the regulations, in its reports and its expert opinions, and also in safety-related discussions with its stakeholders.

Principle 5: Legislation

If ENSI comes to the conclusion that changes to the statutory regulations might be necessary, it will inform the responsible federal authorities.

Explanatory notes: ENSI monitors developments in the statutory regulations with respect to radioactive waste management and disposal. If ENSI, as the competent federal authority responsible for overseeing radioactive waste management, determines based on experience with oversight activities that the legal framework needs to be updated, it will notify the relevant authorities, DETEC and SFOE, accordingly.

English is not an official language of the Swiss Confederation. This translation is provided for information purposes only.

Brugg, July 2017

SWISS FEDERAL NUCLEAR SAFETY INSPECTORATE

signed	signed
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