



DECISION

(Translated from Swedish. In all cases concerning interpretation the Swedish version takes precedence.)

Date
September 28, 2006

Our reference
SKI 2006/914

Forsmarks Kraftgrupp AB
742 03 Östhammar

Implementation plan for the management of safety related activities in Forsmarks Kraftgrupp AB and supplements to the Safety Analysis Report (SAR)

The Swedish Nuclear Power Inspectorate decision

The Swedish Nuclear Power Inspectorate (SKI) has decided to impose the following requirements on Forsmarks Kraftgrupp AB:

- A) prepare an implementation plan to show how Forsmarks Kraftgrupp AB intends to:
- strengthen the ability of the employees to assess, classify and investigate discrepancies and also to take the necessary safety measures if one of the power stations reactors should behave in an unexpected manner or in situations when it is difficult to determine the impact on safety of the identified discrepancy,
 - improve the process for maintenance and periodic testing of installed components and systems,
 - improve routines and processes for alterations to the plant,
 - survey, assess and also strengthen the safety culture of the plant managers and other employees involved in the operation of the nuclear power plant.

- B) in accordance with chapter 4 § 2 in the regulations of the Swedish Nuclear Power Inspectorate (SKIFS 2004:1) concerning Safety in Nuclear Facilities add information to the Safety Analysis Reports for Forsmark 1, Forsmark 2 and Forsmark 3 concerning the design specifications applicable for the reactors in the event of electric power supply disturbances.
- C) disclose the directions/terms of reference that the Managing Director for Forsmarks Kraftgrupp AB has been issued by the Board of Directors concerning the prioritizing of safety contra production.

The implementation plan and the additions to the Safety Analysis Report shall be submitted to SKI on December 15th 2006 at the latest.

The disclosure of the directives to the Managing Director shall be submitted to SKI on October 20th 2006 at the latest.

This decision has been made in accordance with § 18 in the law (1984:3) concerning nuclear activities.

The subject-matter

On August 4th 2006 Forsmarks Kraftgrupp AB submitted a request for permission to restart the reactor Forsmark 1 after a category 1 event at the reactor on July 25th 2006.

On August 21st 2006 Forsmarks Kraftgrupp AB submitted additional information to the earlier request for permission to restart the reactor Forsmark 1.

On August 29th 2006 Forsmarks Kraftgrupp AB submitted a request for permission to restart the reactor Forsmark 2 and also submitted additional information concerning Forsmark 2.

On September 14th 2006 SKI released its review (SKI 2006/779) of FKA:s application to restart Forsmark 1 and 2 as a result of the event at Forsmark 1 on July 25th 2006.

On September 14th 2006 SKI decided to require Forsmarks Kraftgrupp AB to carry out further measures, in addition to those already taken by Forsmarks Kraftgrupp AB, necessary for the safety levels at the reactors Forsmark 1 and Forsmark 2 to be re-established in accordance with the regulations of the Swedish Nuclear Power Inspectorate (SKIFS 2004:1) concerning Safety in Nuclear Facilities.

During September 2006 Forsmarks Kraftgrupp submitted documentation as verification that the requirements have been fulfilled.

On September 28th 2006 SKI decided to give permission for the reactors Forsmark 1 and 2 to be restarted.

Reasons for the decision

The event which occurred demonstrated according to SKI:s assessment that safety had not been given the priority that the concept of defence in depth assumes. In SKI:s review of the event (SKI 2006/779) a number of deficiencies were noted that indicate deficiencies in the safety culture. SKI determined that there are deficiencies in the quality system routines associated with plant alterations, maintenance and testing which were contributing factors to the complexity of this event. Forsmark 1 carried out extensive modifications to the electrical systems and their presentation in the control room during the annual refuelling outage of 2005. The alterations resulted in amongst other things in the introduction of screen monitors for parts of the electrical system and new labelling of the electrical components. The new labelling required changes to the documentation and training of personnel. It was found that that this had not been completed at the time of the event at Forsmark 1 (July 2006). SKI also noted that the instruction packet for the shift team was incomplete with regard to approved versions for the new labelling system. It was further that there were deficiencies concerning the operator support for the monitoring and manoeuvring of components in the electrical systems (control equipment, instructions, labelling, etc.) at Forsmark 1.

A) Implementation plan

- *Deficiencies in ability to assess and classify events*

According to chapter 2 § 2 in the regulations of the Swedish Nuclear Power Inspectorate (SKIFS 2004:1) concerning Safety in Nuclear Facilities a plant shall without delay take the plant to a safe state¹ when for example it is behaving in an unexpected manner, or in situations when it is difficult to determine the impact on safety of the identified discrepancy.

According to chapter 2 § 3 in SKIFS 2004:1 when there are deficiencies or well grounded *misstanke* of deficiencies in a barrier or the defence in depth, measures shall be taken to the extent and in the time frame necessary with regard to the severity of the deficiency. In this respect the deficiencies shall be assessed, classified and investigated without delay.

According to chapter 2 § 4 in SKIFS 2004:1 the plant shall be put in a safe state without delay when a category 1 event has been identified, or if there are sufficient grounds that there is such a situation. Before a plant can from a safe condition to unconditional operation, the necessary investigations must be carried out and an independent safety review must be performed in accordance with chapter 4 § 3 SKIFS 2004:1 and they must also be reviewed and approved by the Swedish Nuclear Power Inspectorate.

Forsmark 1 maintained warm standby until midday July 26th when the decision to go to cold shutdown was taken. SKI considers that it should have been apparent for Forsmarks Kraftgrupp AB during the evening of July 25th that the problem was so large that it would not be possible to restart operation of the plant in the immediate future. SKI considers management should have made the decision to go to cold shutdown and also made the assessment that the event was a category 1 in accordance with SKIFS 2004:4 chapter 2 earlier. If an event of this severity is underestimated it can mean that

¹ A reactor is in a safe condition when it is cold shutdown or other operational condition that minimises the risk for a radiological accident.

the necessary investigations are not carried out in the depth and detail necessary to ensure that the appropriate measures are taken. SKI considers that the event illustrates that there are deficiencies in the routines, instructions and training for evaluation and classification of incidents.

Forsmark 2 should also have reported a category 1 event earlier than it did since it was evident that even if the event did not occur in the plant itself, there were “well-based indications of a deficiency” in accordance with SKIFS 2004:1 chapter 2.

SKI considers that Forsmarks Kraftgrupp AB has not applied the regulations that the plant shall be taken to a safe condition without delay when the plant behaves in an unexpected manner or in situations when it is difficult to determine the impact on safety of the identified discrepancy. SKI therefore considers that Forsmarks Kraftgrupp AB needs to take the necessary organisational and administrative measures and also train the appropriate personal within the company so that Forsmarks Kraftgrupp AB without delay can assess, classify and investigate deficiencies

SKI considers therefore that Forsmarks Kraftgrupp AB should submit an implementation plan describing how Forsmarks Kraftgrupp AB intends to strengthen the ability of the personnel to assess, classify and investigate deficiencies and take the necessary safety measures if one of the reactors behaves in an unexpected manner or if it is difficult to determine the impact on safety of the identified discrepancy.

- deficiencies in the management and following-up of plant modifications, maintenance, control and inspection

In accordance with chapter 5 § 3 of SKIFS 2004:1 nuclear activities shall be led, managed, evaluated and developed with the support of a quality system which is structured so that the requirements concerning safety are fulfilled.

According to chapter 5 § 3 in SKIFS 2004:1 structures, systems and components in a plant of relevance for safety shall be controlled continuously and maintained in such a manner that they comply with the established safety requirements. To this end there shall be a programme for maintenance, continuous control, and dealing with ageing related degradation and damage. The programme shall be documented and revised with regard to experience and developments in science and technology.

In the General Recommendations to these regulations it is noted that functional testing should reflect the conditions which are expected to pertain when the safety function is required. If this is not possible or reasonable, an analysis should show that an adequate verification of the safety function exists despite the limitations in the functional tests. The functional testing should be carried with a frequency and scope necessary to provide confidence that the equipment, when needed, complies with the functional requirements that are credited in the safety analyses. Functional testing should also encompass necessary auxiliary systems such as the auxiliary power supply and cooling systems.

The event which occurred demonstrated according to SKI:s assessment that Forsmarks Kraftgrupp AB had not applied these regulations to full extent intended. Deficiencies have been noted in the quality system and routines for plant alterations, maintenance

and testing. Forsmarks Kraftgrupp AB needs to take measures to improve their routines and processes for plant alterations so that they are steered correctly at all stages from defining the prerequisites and design to the control and testing which verify that the components and systems when installed function under the conditions which are expected to pertain when the safety function is required. Forsmarks Kraftgrupp AB also need to take measures to improve their processes for maintenance and periodic testing in order to ensure that these programmes provide the necessary confidence that the components and systems comply with the functional requirements credited in the safety analyses.

SKI therefore considers that Forsmarks Kraftgrupp AB should submit an implementation plan showing how they intend to improve the routines and processes for plant alterations as well as improving the processes for maintenance and periodic testing of installed components and systems.

- deficiencies in the management of safety and safety culture

Basic requirements concerning the safety in nuclear facilities are cited in the law (1984:3) concerning nuclear activities. According to § 4 in the law safety for a nuclear facility shall be maintained through measures are taken as necessary to prevent errors or malfunctioning of equipment, erroneous actions or anything else that could result in a radiological accident.

In accordance with chapter 2 § 1 in SKIFS 2004:1 every facility shall have multiple barriers as well as a facility-specific system for defence-in-depth in order to prevent radiological accidents. Important general prerequisites to attain and maintain an effective defence-in-depth are, as described in the General Recommendations to these regulations, a suitable organization and that an effective system is used for the management, control and following up activities at the facility. This means, amongst other things, that:

- safety is prioritized,
- sufficient financial resources and personnel with adequate competence are available,
- safety is monitored and followed up, failures and deficiencies are identified and corrected, that the organization learns from its own mistakes and those of others so that deficiencies in safety are not repeated,
- conservative assumptions and ample safety margins are applied in the design and operation of the facility,
- quality assurance is applied in the nuclear activities,
- opportunities for safety improvements are taken,
- the organization as a whole is characterized by a good safety culture.

SKI considers that Forsmarks Kraftgrupp AB needs to improve their work with safety so that it can guarantee that there is sufficient organization and management of the affected areas and a high safety culture exists in Forsmarks Kraftgrupp AB. Forsmarks Kraftgrupp AB needs to prepare an implementation plan that shows which measures

they intend to take to strengthen the safety culture of operational management² and other employees involved work of importance to safety.

In conclusion, SKI considers that Forsmarks Kraftgrupp AB did not assess and classify the deficiencies in the plant without delay, did not fully clarified the severity and classified the event whilst the status of the plant was unclear and was seen to be behaving in an unexpected manner, more quickly set the plant in a safe condition, had instructions that were not formally approved, had deficiencies in the documentation and incomplete training of personnel, had deficiencies in the routines for quality assurance in connection with plant alterations, maintenance and testing and also had deficiencies in operator support. In all this demonstrates deficiencies in the management and organisation of safety related matters. As a result, this demonstrates that there are also deficiencies in the conduct and attitudes which are characteristic of a good safety culture. These are deficiencies, which if not corrected, can risk the ability of the organization to deal with unclear and difficult situations and maintain safety. Forsmarks Kraftgrupp AB needs to take measures to ensure sufficient leadership, steering and following up in matters of safety.

SKI therefore considers that Forsmarks Kraftgrupp AB should submit an implementation plan showing how they intend to survey, assess and strengthen the safety culture of management and employees involved in the operation of the nuclear power plants.

B) Supplements to the Safety Analysis Report

According to chapter 4 § 2 in SKIFS 2004:1 a complete Safety Analysis Report shall show how the safety of the plant is organized to protect the lives and health of people and the environment in the event of a radiological accident. The report shall describe the plant as it is built, analysed and verified and also how the requirements concerning its design, function, organization and activities are met. Alterations to the plant shall be evaluated on the basis of the conditions specified in the report. This means that it must be easy to trace these requirements throughout the documentation from the information on which requirements and conditions are applicable, through the description of how they are met to the investigations and analyses that demonstrate that the requirements are met.

Deficiencies have been noted in the plants Safety Analysis Reports (SAR). They do not contain information on what the facilities should tolerate with regard to disturbances in the electrical power supply, which are important design conditions in connection with plant alterations.

Therefore SKI considers that Forsmark Kraftgrupp AB needs to complete the Safety Analysis Reports for the reactors Forsmark 1, Forsmark 2 and Forsmark 3 with information of which design basis conditions are applicable for the reactors with respect to disturbances in the electrical power supply.

² In accordance with the definition in the Swedish Nuclear Power Inspectorate's regulations concerning the competence of operational staff at nuclear power plants, SKIFS 2000:1

C) disclosure of the directions to the Managing Director

According to chapter 2 § 7 in SKIFS 2004:1 nuclear activities shall be conducted with an organization that has adequate financial and personnel resources and that is designed to maintain safety.

According to chapter 2 § 8 in SKIFS 2004:1 nuclear activities shall be managed, controlled, evaluated and developed with the support of a management system so formed that the requirements on safety can be met. The management system shall be documented and kept up to date.

According to chapter 2 § 9 in SKIFS 2004:1 the licensee shall amongst other things ensure that there are documented objectives and guiding principles for how safety shall be maintained and developed as part of the nuclear activities, and that the personnel working with nuclear activities are well acquainted with the objectives and guiding principles.

Thus there are clear requirements on the licensee themselves to have the technical, administrative, human and financial capacity necessary to mantle the responsibility imposed by the law on nuclear activities. The licensee must be able themselves, without limitations, to take the initiative and make the decisions on safety improving investments in the facility and with regard to the overall operations, both technical and organizational, even in the case when the operational responsibility has been transferred to someone else. The licensee, without limitation as a result of the delegation of responsibility in force shall be active in taking all the measures necessary to maintain the safety of the reactor.

SKI considers that Forsmarks Kraftgrupp AB have demonstrated deficiencies in the management and control of operations. Therefore, SKI wants to see how the directions from the Board of Directors to the Managing Director of Forsmarks Kraftgrupp AB are formulated with regard to the priority of safety contra production and how these are implemented in the company. SKI considers that it is very important that there are clear directions that safety should always be given priority rather than production and that these directions are the basis for operations. These directions/terms of reference from the Board of Directors to management and further to those responsible for operations need to be clear and transparent in all stages of delegation and also described clearly in the management system.

SKI therefore considers that Forsmarks Kraftgrupp AB shall disclose the directions/terms of reference that the Managing Director of Forsmarks Kraftgrupp AB has received from the Board of Directors concerning the prioritizing of safety contra production.

Overall assessment

SKI considers that Forsmarks Kraftgrupp AB has demonstrated deficiencies in the management and control of safety during operation. SKI bases this assessment on the collective deficiencies identified in connection with the event in Forsmark 1 such as deficiencies in the control and routines for plant alterations', maintenance and testing, deficiencies in operator support, deficiencies in the documentation and the training of

personnel, deficiencies concerning approved instructions, deficiencies in assessing and classifying the severity of the event whilst the status of the plant was unclear and behaving in an unexpected manner and thus were quickly able to put the plant in a safe condition.

Taken together this demonstrates that Forsmarks Kraftgrupp AB has deficiencies in the management and control of safety related to operations and thus deficiencies in the conduct and attitudes that characterize a good safety culture. These are deficiencies, which if not corrected, can risk the ability of the organization to deal with unclear and difficult situations and maintain safety. SKI therefore considers that Forsmarks Kraftgrupp AB needs to take measures to ensure sufficient leadership, steering and following up in matters of safety.

It is the obligation of the licensee not only to follow the requirements and regulations imposed by the government and the appointed authority but also to themselves be active and take all the necessary measures to maintain safety at the plant. The licensee must themselves have the technical, administrative, human and financial capacity necessary to mantle the responsibility imposed by the law on nuclear activities. The licensee must themselves be able to be active to maintain safety at a very high level.

Other pertinent matters

SKI is going to enforce special supervision³ until such time as Forsmarks Kraftgrupp have rectified the deficiencies, and that this has been confirmed through the authority's reviews, inspections and other activities.

SKI has on this date made the following decisions concerning the nuclear power plants in Forsmark:

- Permission for Forsmarks Kraftgrupp AB to restart the reactors Forsmark 1 and Forsmark 2 (dossier no. SKI 2006/779)
- Conditions for continued operation of the reactors Forsmark 1 – 3 (dossier no. SKI 2006/914)
- Implementation plan concerning management and organisation of safety related matters within Forsmark Kraftgrupp AB and supplements to the Safety Analysis Report (SAR) (dossier no. SKI 2006/914)

How to appeal against a decision

SKI's decision can be appealed against on application to the government.

The appeal shall be written and sent to the Swedish Nuclear Power Inspectorate, 106 58 Stockholm. Office: Klarabergsviadukten 90, Stockholm. Quote the dossier number of the decision in the appeal, the changes you want made to the decision and the reasons for the changes.

³ Special supervision means that SKI intensifies its supervision through specially directed inspections and extra requirements concerning reporting.

The appeal shall be received within three weeks from the date you received the decision, otherwise the appeal cannot be considered.

SKI forwards the appeal to the government for consideration in the event that SKI does not itself change the decision in accordance with your appeal.

Preparation of the matter

This decision has been taken by the Director General Judith Melin, in the presence of the Department Head Lennart Carlsson, the Section Heads Leif Karlsson and Lars Skånberg, Analyst Lars Gunsell, Inspector Klas Idehaag, Chief Legal Advisor Ingvar Persson and Section Head Anne Edland, the latter acting as rapporteur.

THE SWEDISH NUCLEAR POWER INSPECTORATE

Judith Melin

Anne Edland