AREVA

Ref. (Department/Year/Language/Serial No.) Rev.

Work Report

NEPS-G/2008/en/0056 B

Subject/Title

Definition of the Scope of KCB Systems, Structures and Components to be Taken into Consideration for the Long-Term Operation Process

Place: Erlangen

Date: 27-07-2011

Project

AMR KCB

Handling Instructions

RESTRICTED

Export Classification (Reports with techn. content)

AL: N ECCN: 0E001

Proj.-Code	UA	DCC	Contents Code	Doc. Ident. No.
NDL002	BN	M BB		0620165158

Summary

Pages of Text: 11 Appendices: 2 Pages total: 28

In 2013, the nuclear power plant Borssele (KCB) will have been in operation for 40 years. It is planned to extend the plant's lifetime until 2034. In this context, EPZ is implementing a long-term operation (LTO) process in accordance with IAEA guidelines.

The purpose of this document is to identify on a system level and for major structures and components all those systems, structures and components (SSCs) that are:

- important to safety
- not important to safety, but whose failure may impact SSCs important to safety

and are therefore within the scope of LTO.

The Scoping process did not solely regard the existing IAEA safety classification, but instead categorized each system in detail with respect to its importance for plant safety and safety function, based on proposed new IAEA safety classification methodology and AREVA experience in this regard.

The results of the scoping process, generally at system, subsystem or building level, are presented

List of revisions

Rev.	Date	Scope of revision	Section/Page
A	2008-12-18	First issue	-/-
B	2011-07-27	Revision based on preliminary Ageing Management Review R results	

Table of Contents

1. List of Abbreviations

AKS	Anlagen Kennzeichen System (Plant Identification Code)
AMR	Ageing Management Review
AS-RE	Reactor Internals Requirement Category (German: *Anforderungsstufe Reaktordruckbehältereinbauten*)
CRDM	Control Rod Drive Mechanism
EK I	Seismic class I
EK IIa	Seismic class IIa
EPZ	Elektriciteitsproduktiemaatschappij Zuid-Nederland
I&C	Instrumentation and Control equipment
IAEA	International Atomic Energy Agency
KCB	Nuclear power plant Borssele
LOCA	Loss-Of-Coolant Accident
LTO	Long-Term Operation
PSA	Probabilistic Safety Analysis
PWR	Pressurized Water Reactor
RCPB	Reactor Coolant Pressure Boundary
RPV	Reactor Pressure Vessel
RSK	German Reactor Safety Commission
SALTO	Safe Long Term Operation
SC	Structure and/or Component
SSC	System, Structure and Component
TIP	Technical Information Package (Dutch: *Technisch Informatie Pakket*)

2. Introduction

In 2013, the nuclear power plant Borssele will have been in operation for 40 years. It is planned to extend the plant's lifetime until 2034. In this context, EPZ is implementing a long-term operation (LTO) process in accordance with IAEA guidelines [1]. This report describes the scoping process for LTO, namely the definition and listing, on the basis of a set of clear criteria, of the systems, structures and components (SSCs) at KCB that are:

- important to safety
- not important to safety, but whose failure may impact SSCs important to safety.

For this purpose, the scoping criteria of the LTO process are set out in Chapter 3.

Using the scoping criteria, the LTO scoping of KCB SSCs is performed at a system, subsystem or building level.The results of the LTO scoping are presented in Chapter 4

In accordance with IAEA draft safety guide DS 367 [2], KCB specific safety functions, which are required to be performed in operational states and in the event of fault or accident, are categorized on the basis of their safety significance in safety categories S1-S3.

The criteria for the safety categories as defined in this report envelop the scoping criteria according to the IAEA LTO scope setting process as depicted in [1, Fig.2]. In this figure, steps 1 and 2 identify the SSCs important to safety, and the SSCs not important to safety, whose failure could impact a safety function. Step 3 identifies Structures and/or Components (SCs) that are replaced or refurbished based on a specified time period, and therefore are not subject to LTO evaluation. Since the scoping assessment in the frame of this document is performed on a system or subsystem level, this step is not included.

This report only addresses the scoping process and therefore does not deal with the subsequent screening process, which would be the next step of the LTO process [1, Fig.3]. The screening step consists of a more detailed consideration of SSCs subject to further assessment for LTO on the level of commodity groups and is reported separately.

It should be noted at this point that EPZ and AREVA NP collaborated closely in carrying out LTO scoping.

3. Scoping Criteria

3.1 Scoping Criteria according to IAEA

Safe plant operation is an essential prerequisite for the implementation of nuclear plant life extensions. To support safe long-term operation, IAEA developed specific guidelines on LTO. Safety report No. 57 (Safe Long Term Operation of Nuclear Power Plants) [1], has been published for this purpose in 2008. That report provides general criteria, including "scoping and screening" criteria to identify SSCs relevant for the LTO process. The basic definition for these SSCs in accordance with [1] is given in the following:

1. All SSCs important to safety that ensure
    a. the integrity of the reactor coolant pressure boundary
    b. the capability to shut down the reactor and maintain it in a safe shut down condition
    c. the capability to prevent accidents that could result in potential off-site exposure or that mitigate the consequences of such accidents
2. Other SSCs within the scope of LTO are those, whose failure may impact upon the safety functions specified above.

For scoping purposes, SSCs in compliance with this definition are subject to LTO assessment if they are not to be replaced or refurbished based on a specified time period.

This basic definition for SSCs subject to LTO evaluation in accordance with [1] is worked out in detail and safety categories are introduced below.

3.2 Principles for Safety Categories

Methods for safety classification of SSCs have evolved by lessons learned during the design and operation of nuclear power plants worldwide. The purpose of safety classification is to identify and categorize the plant specific safety functions and classify the related SSC items based on their safety significance. The herein defined and applied safety categories for KCB safety functions are in accordance with IAEA Draft Safety Guide DS367 [2], which is a further development of former IAEA classification guides.

3.3 Definition of Safety Categories and related Scoping Criteria for KCB

The following safety categories and resulting criteria for KCB are based on IAEA guidance as well as AREVA experience outlined in Chapters 3.1 and 3.2.

Safety category S1 (Main Components of the Reactor Coolant System)

In principle, safety category S1 corresponds to safety criterion 1a (see Chapter 3.1, as based on IAEA Safety report No. 57 [1]).

Safety category S2 (SSCs important to Safety)

In principle, safety category S2 corresponds to safety criteria 1b and 1c (see Chapter 3.1, as based on IAEA Safety report No. 57 [1]).

Safety category S3 (SSCs, whose failure may impact upon the safety functions specified in categories S1 and S2)

In principle, safety category S3 corresponds to safety criterion 2 (see Chapter 3.1, IAEA Safety report No. 57 [1]).

4. Scoping of KCB SSCs

All mechanical SSCs as well as electrical and I&C SSCs classified 1E or 1A at KCB are first listed according to the plant identification code (on system or subsystem level). Within this framework, the SSCs have been assessed on the basis of the criteria described in Chapter 3 .

In the same way, SSCs that are to be dealt with separately, such as buildings, pipe and cable ducts/cable bridges and lifting equipment with special requirements were considered separately .

5. References

[1] International Atomic Energy Agency
Safe Long Term Operation of Nuclear Power Plants;
Safety Reports Series No. 57; October 2008

[2] International Atomic Energy Agency
Safety Classification of Structures, Systems and Components in Nuclear Power Plants;
Draft Safety Guide DS367, Rev. 6.1a; November 2010