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Zeichnungen

EU stress test: Swiss Progress Report
ENSI review of the operators' progress reports

Summary

In the ENSI ruling dated June 1st 2011, the Swiss nuclear power plant operators were asked to take part in the EU stress test process. According to the internationally agreed schedule for the EU stress test, the operators were requested to submit a progress report before August 15th 2011. The Swiss operators complied with the scheduled date.

The specifications of ENSREG (European Nuclear Safety Regulators Group) as to the content of the progress report, mainly a report on the work advancement status, were duly considered by the operators. According to the operators' statements, the bulk of the material has to a large extent been assembled. Reference documents have been examined and the process of collecting suitable material for the final report completed.

A definition of "safe shutdown state" has been derived by all operators and conforms to Swiss regulations. In their respective progress reports, the operators described the methodology they plan to adopt for evaluating their plants. With regards to earthquake and flooding, the operators will be able to make use of current studies, such as their plant-specific probabilistic safety analyses or the demonstrations of protection against flooding they submitted to ENSI in June 2011. In ENSI view, the methods outlined by the operators in the progress reports differ in their levels of detail, but they essentially meet ENSI expectations.

The requirements of ENSREG demand not only numerical results on the resistance of NPPs to earthquake and flooding, but also complementary indications regarding weak points and potential improvements. The necessary investigations and evaluations have already been carried out, according to the operators' statements.

After reviewing the operators' progress reports, ENSI concludes that, to date, work on the final reports for the EU stress test is progressing according to plan.

Verteiler:

External: ENSREG, KKB, KKG, KKL, KKM
ENSI: KASI, GL, ENSI-RAT
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Table of contents

1 Background

1.1 Introduction

On March 11th 2011, Japan was struck by the Tohoku-Chihou-Taiheiyou-Oki earthquake which together with the ensuing tsunami led to severe accidents resulting in core melt sequences in three units at the Fukushima Dai-ichi site (Fukushima I). On April 12th 2011, the Japanese authorities classified these events as INES 7 ("Major Accident").

Following these developments, ENSI issued three rulings (dated March 18th 2011 /Ü-2/, April 1st 2011 /Ü-3/ and May 5th 2011 /Ü-4/) ordering a review and, if necessary, an upgrade of the Swiss nuclear power plants with regard to earthquakes, external flooding, the combination of earthquake and external flooding, coolant supply, spent fuel pool cooling. In addition, external connections for mobile emergency equipment and an external storage facility for emergency equipment were requested. By June 1st 2011, an external storage facility shared by all plants had already been set up and had been inspected by ENSI.

Due to the events at Fukushima, a fourth ruling /Ü-5/ was issued by ENSI on June 1st 2011, requesting the Swiss nuclear power plant operators take part in the EU stress test. According to this ruling, the operators must produce a progress report by August 15th 2011, the final report being due by October 31st 2011. The operators' progress reports were reviewed by ENSI; the conclusions of that review are the object of the present document.

In total, there are five nuclear reactors operating at four different sites in Switzerland. The key data for the nuclear power plant at Beznau (a twin unit site with KKB 1 and KKB 2), Mühleberg (KKM), Gösgen (KKG) and Leibstadt (KKL) is shown in the following table.

Table 1: Main data for the Swiss nuclear power plants

	KKB 1	KKB 2	KKM	KKG	KKL
Thermal power [MW]	1130	1130	1097	3002	3600
Gross electrical output [MW]	380	380	390	1035	1220
Net electrical output [MW]	365	365	373	985	1165
Reactor type	Pressurised water reactor (PWR)	Pressurised water reactor (PWR)	Boiling water reactor (BWR)	Pressurised water reactor (PWR)	Boiling water reactor (BWR)
Reactor supplier	W	W	GE	KWU	GE
Turbine supplier	BBC	BBC	BBC	KWU	BBC
Generator data [MVA]	2 x 228	2 x 228	2 x 214	1140	1318
Cooling	River water	River water	River water	Cooling tower	Cooling tower
Commercial operation started in	1969	1971	1972	1979	1984

1.2 Documents submitted by the Swiss operators

The operators of the Beznau, Gösgen, Leibstadt and Mühleberg nuclear power plants complied with the scheduled date and submitted their progress reports to ENSI in response to the EU stress test by August 15th 2011 with accompanying letters /B-1/, /G-1/, /L-1/ and /M-1/. These documents contain information about the work advancement status, the methodology adopted for the EU stress test, the studies utilised and the first interim results.

1.3 Legal basis

The ENSI ruling dated June 1st 2011 /Ü-5/ regarding Switzerland's participation in the EU stress test is based upon the following Swiss legal requirements: Article 36, paragraph 3 of the Nuclear Energy Ordinance NEO (Kernenergieverordnung – KEV) /Ü-7/ states that the licence holder must monitor operating experiences and findings from similar installations and assess their significance for his own installation. The requirement to protect nuclear installations against accidents originating outside the installation is an important aspect of Article 8 in the NEO /Ü-7/ and of Article 5 in the Ordinance of the Federal Department of the Environment, Transport, Energy and Communications (DETEC) on Hazard Assumptions and the Evaluation of Protection Measures against Accidents in Nuclear Installations (Verordnung des UVEK über die Gefährdungsannahmen und die Bewertung des Schutzes gegen Störfälle in Kernanlagen) /Ü-8/.

1.4 Scope of the ENSI progress report

Besides demanding the Swiss NPP operators participate in the EU stress test, the ENSI ruling of June 1st 2011 /Ü-5/ dictated those issues which must be covered in the operators' progress reports. Accordingly, the ENSI progress report reviews the information provided by the operators for each site and covers:

1. The work advancement status
2. The methodology to be adopted for the EU stress test
3. The studies upon which the EU stress test will be based, and
4. The interim results (if available)

In order to harmonize the interpretation of the specifications of the European Nuclear Safety Regulators Group (ENSREG) /Ü-1/ regarding the EU stress test, ENSI has conducted discussions with the Swiss operators. As a result ENSI has set down its regulatory interpretation of the specifications and defined the table of contents for the final reports. For the operators' progress reports, ENSI has specified (as an addition to point 3) that the list of applicable documents for the EU stress test should also include an indication of the document type /Ü-10/. Furthermore, the definition of safe shutdown state should be given on a plant-specific basis.

After discussions with the international regulators represented within ENSREG, ENSI also added a chapter 3, "General data about site/plant" and a chapter 6, "Extreme weather conditions" to the table of contents for the operators' final reports /Ü-6/. A few points in the table of contents were further specified by ENSI as a result of a meeting with the operators /Ü-12/. The actual table of contents is included in the Appendix to the present document.

1.5 Structure of the ENSI progress report

Chapter 1 of the present document contains general information on the background of the review, the documents submitted by the operators, and the scope of the ENSI review.

Chapter 2 contains an evaluation of the definition of the safe shutdown state, which is of vital importance for the demonstrations which will be submitted in the final report.

Chapter 3 evaluates how the ENSI requirements on the content of the operators' progress reports have been implemented /Ü-5/. In the present document a subchapter is dedicated to the review of each main chapter according to the table of contents of the final report.

Chapter 4 evaluates the operators' lists of documents and the corresponding classification.

Chapter 5 contains a list of the references used.

2 Definition of safe shutdown state

According to Swiss regulations, a safe state for the plant is achieved, if all technical criteria are met, as set out in Articles 9 to 11 of the DETEC Ordinance on Hazard Assumptions and the Evaluation of Protection against Accidents in Nuclear Plants /Ü-8/ (Verordnung des UVEK über die Gefährdungsannahmen und die Bewertung des Schutzes gegen Störfälle in Kernanlagen). For accidents within accident categories 1 to 3 (frequency of occurrence between 10^{-1}/year to 10^{-6}/year), this requirement implies compliance with the fundamental protection objectives: control of the reactivity, cooling of the nuclear material, and containment of radioactive substances. Therefore, it follows from these requirements and Swiss regulations, that the two plant states – "hot shutdown" and "cold shutdown" – are both to be understood as safe shutdown states.

The plant-specific technical shutdown criteria during normal operation and operational incidents are stated in the technical specifications as per Annex 3 of the Nuclear Energy Ordinance NEO /Ü-7/ (KEV). The technical specifications also stipulate under which conditions the plant must be brought into the "hot shutdown" or "cold shutdown" states.

A definition of the safe plant state has been provided by all the operators, in accordance with the requirements stated in the ruling of June 1st 2011 /Ü-5/ regarding the content of the operators' progress reports. The plant-specific definition of safe shutdown state provided by the operators is compliant with Swiss regulations. Proof that safe shutdown state can be reached and maintained is provided on the basis of safety analyses which are submitted to ENSI for review and evaluation. According to the ENSREG-requirements /Ü-1/, the proof that the safe shutdown state is ensured for several days must be given assuming loss of off-site power.

3 Work advancement status

ENSI reviews and summarises in the following subchapters 3.1 to 3.9 the information supplied by the operators for each of the main chapters in the final report. The operators' statements regarding:

1. The work advancement status including the intended content of the final report (comparison with the table of contents as of August 10th 2011 /Ü-6/)
2. The methodology the operator plans to use

3. The studies the operator plans to refer to as basis
4. The interim results (if available)

are evaluated by ENSI.

3.1 Chapter 1: Introduction

There are no requirements on the operator in relation to this chapter as far as the progress report is concerned. The individual operators have each progressed to a varying degree on the introductory chapter, according to the information they have provided. In the final report this chapter would contain general information such as the reasons for the stress test, its background and purpose.

3.2 Chapter 2: Methodology adopted

During ENSI first meeting with the operators on the subject of the EU stress test on June 17th 2011, an agreement was reached that three hazard levels should be considered in the analysis. They have been listed accordingly in the table of contents for the final report /Ü-6/. The hazard levels are defined as follows:

- H1 Hazard level for which the installation was originally designed
- H2 Hazard level for which the installation was re-qualified (may be identical to H1)
- H3 new hazard levels

More detailed discussions of the methodology as applied to the seismic and flooding hazards are included in subchapters 3.4 and 3.5.

3.3 Chapter 3: General data about site/plant

This chapter in the final report will contain a description of the installation and the most important results of the probabilistic safety analyses (PSA). A plant-specific PSA is available for each Swiss NPP and takes into the account all the relevant internal and external initiating events.

A presentation of the analytical methods as well as the evaluation of safety margins is not required in this main chapter. Hence the statements in the operators' progress reports have been limited to a description of the current work advancement status, the studies used and the lists of documents (cfr. chapter 4 for an evaluation on the latter point).

Compared to the version of the table of contents established on June 17th 2011, the EU has considerably widened the scope of the main chapter 3, as documented by the changes to the table of contents made on August 10th 2011 /Ü-6/. The additional subjects could therefore not be covered by all the operators in their progress report. On the other hand, the documents necessary to finalise this main chapter are, from the ENSI point of view, already broadly available and can be considered for the final report.

3.4 Chapter 4: Earthquake assessment

ENSI has stipulated requirements regarding the hazard assumptions to be taken into account for the stress test. In accordance with ENSI requirements, the licensees will assess seismic safety by taking account of three hazard levels (expressed as ground motion levels) which were developed over time as the state of the art progressed:

- H1 Ground motion level which the plant was originally designed to withstand
- H2 Ground motion level for which the plant was requalified (may be identical to H1)
- H3 New ground motion results according to the studies for the renewed (to be submitted by March 31st, 2012) deterministic demonstration of protection against seismic events with an exceedance frequency of 1E-4 per year

The seismic ground motion levels for which the Swiss nuclear power plants were designed (hazard level H1) are based on individual concepts and requirements, which essentially corresponded to the state-of-the-art at the time when the plants were commissioned and built. Since the plants started operation, ENSI has asked for several re-assessments of the seismic hazard, which, in some cases, led to structural back-fitting or seismic requalifications (hazard level H2). In the course of this ongoing development, ENSI requested in 1999 that the nuclear power plant operators re-evaluate the seismic hazard in accordance with the most advanced methods and in particular to provide a comprehensive quantification of the uncertainty in the calculation results. In order to implement ENSI requirement, the nuclear power plant operators launched the PEGASOS project (probabilistic seismic hazard analysis for the nuclear power plant sites in Switzerland).

The seismic hazard was probabilistically assessed anew in this project, by comprehensively taking into account specialist knowledge available in international bodies (independent specialised organisations both from Switzerland and from abroad). The mains subjects of interest in this project, were the characterisation of the earthquake epicentre, the propagation and local effects at the site of the NPP). Switzerland broke new ground with the PEGASOS project, which is so far the only study of its kind in Europe.

ENSI concluded that the investigation methods adopted in the PEGASOS project satisfied the highest scientific standards. The PEGASOS project showed that in the past, the hazard posed by earthquakes had been under-estimated. On the basis of this insight, ENSI required the PSAs (probabilistic safety analyses) of the Swiss nuclear power plants be reassessed, considering the PEGASOS seismic hazards. The new PSA results demonstrate that all Swiss plants satisfy the IAEA criterion on core damage frequency.

Compared to previous seismic hazard analyses, the results obtained from the PEGASOS project show a wider range of uncertainties. In order to reduce the uncertainty level in the PEGASOS results, the nuclear power plant operators launched the "PEGASOS Refinement Project" (PRP) in 2008. The main subject areas examined in the PRP are the same as in PEGASOS. The PRP takes account of new knowledge, that has become available from seismic research since PEGASOS was completed and of the results from new measurements of the key seismological soil/ground parameters at the locations of the nuclear power plants. The PRP will likely continue until the end of 2012.

As a result of Fukushima, ENSI has demanded renewed deterministic demonstration of protection against seismic events with an exceedance frequency of 1E-4 per year. In relation to the earthquake hazard assumptions, the new design basis demonstration shall be based upon interim results from the PRP. The required proof is to be delivered by March 31st 2012. Since interim results as well as the PRP final conclusions are available too late for the EU stress test schedule, the determination of the seismic margins will be conducted only on the basis of the H1 and H2 hazard levels. In the discussion of the adequacy of the plant design basis, the operators are nevertheless requested to comment qualitatively on the PEGASOS resp. PRP results (as available) and put them in proper context.

From an ENSI standpoint, the determination of the seismic margins can be carried out by the operators according to the IAEA Safety Guide NS-G-2.13, "Evaluation of Seismic Safety for Existing Nuclear Installations", 2009 edition /Ü-11/, which is the solution they have envisaged.

For this purpose, it is first of all necessary to analyse the so-called success paths. As such, a success path comprises a large number of safety installations and measures which, together, are able to bring the plant to a safe condition (see chapter 2). The success paths shall be defined so that they are unambiguous and clearly understandable, and the structure of these success paths be presented in an appropriate manner, e.g. with Success Path Logic Diagrams (SPLDs) as per EPRI /Ü-13/, section 3. The success paths should include all safety-relevant structures, systems and components (SSCs) – not merely selected systems such as the special emergency equipment.

Furthermore, for each of the SSCs considered in the success path, the SSC's seismic capacity must be derived, as defined by the so-called HCLPF value (High Confidence of Low Probability of Failure). This value represents the acceleration for which the probability of failure of the SSC is less than 5% with a 95% confidence interval. This means that the seismic failure probability is less than 1% in case of accelerations lower than the HCLPF value.

For each of the success paths, the SSC with the lowest HCLPF value defines the overall HCLPF value of the path and of all success paths it is the one with the highest HCLPF value which defines overall the plant's HCLPF capacity.

The safety margins with respect to the H2 level is defined by the ratio of the plant HCLPF value to the acceleration value for the H2 level.

In the stress test, it is acceptable to use for all the SSCs the HCLPF values as available from the seismic PSAs. The SSCs taken into account in the individual success paths shall be specifically mentioned and their HCLPF value be identified.

In the seismic PSA the HCLPF values are the result of the so-called fragility analysis, in which the seismic failure probability is determined for each SSC as a function of the ground motion. Furthermore, for each SSC, the fragility analysis also delivers a median capacity representing the acceleration at which seismic failure is expected with a probability of 50 %. Within the context of the EU stress test, the seismic margin for each success path as well as for the overall plant must be determined on the basis of the HCLPF values. Specifying the ratio of the median capacity to the acceleration at H2 level is an additional information that is being envisaged by the operators. While developing the final reports, it will be examined to what extent this value is suitable for the purpose of reporting safety margins.

In ENSI view, the procedures outlined by the operators in the progress reports differ in their levels of detail, but they essentially meet ENSI expectations.

3.5 Chapter 5: Flooding assessment

The operators basically consider three hazard levels:

H1 External flooding hazard which the plant was originally designed to withstand

H2 External flooding hazard for which the plant was requalified (may be identical with H1)

H3 New results regarding the external flooding hazard following studies for new construction projects and also for the deterministic demonstration of protection against flooding with an exceedance frequency of 1E-4 per year

They rely on documents already submitted to ENSI in connection with the ruling dated April 1st 2011.

The procedure put forward by the operators can essentially be judged positively. With regards to the analysis of safety margins, ENSI identifies a need for harmonisation so that all operators need to assess the safety margins of their plants at least:

- with indication of flood levels, and
- in comparison with H3 conditions.

Furthermore, and in addition to the scope envisaged by the operators, ENSI considers it is necessary for them to undertake sensitivity studies in order to investigate the effects of total blockages (partial or total blockage by flowing debris), and also of the subsequent sudden collapse of the debris flow blockages, as potential cliff-edge effects. Debris flow blockages of this sort must generally be assumed upstream and downstream of the site, wherever the crosssection of the river is artificially restricted (e.g. by bridges or weirs)[1] and wherever a debris flow could affect flooding conditions at the site.

3.6 Chapter 6: Extreme weather conditions

Most of the plants have already initiated work on this chapter, which was an additional requirement announced at short notice. With one exception, the scope of consideration and the methods used are not described in the documentation that is currently available. Given that extreme weather conditions were also considered in connection with the probabilistic safety analysis and that technical bases are therefore available, ENSI assumes that no delays will occur in the area of "extreme weather conditions", and that the hazards due to extreme weather conditions listed in guideline ENSI-A05, which is relevant for the PSA, will also be taken into account. In general, statements regarding the impact of access restrictions are expected.

3.7 Chapter 7: Loss of electrical power

In the operators' final reports, Chapter 7 should cover the analysis of the three main categories of loss of electrical power supplies summarised below, in accordance with the previously mentioned requirements of the European Nuclear Safety Regulators Group (ENSREG) /Ü-1/, and the table of contents derived from them /Ü-6/.

[1] An acceptable criterion for excluding with certainty debris flow blockages is described in the Technical Report on the Flood Hazard Map, Aare Villigen – Klingnau, of the Department of Construction, Transport and Environment of the Canton of Aargau (December 2010) http://www.ag.ch/raumentwicklung/de/pub/themen/gefahrenkarte/originaldokumente.php/rails/dropdown/template/11_gefahrenkarte_hochwasser/show/213.

1st category in chapter 7.1 of the operators' final report: Loss of Off-Site Power (LOOP)

The term "LOOP" essentially refers to the loss of external operational mains power supplies (alternating current / AC supplies) and the simultaneous loss of the plant's auxiliary power supply from the plants' own generator(s), such that the safety-classified (class 1E) emergency power supply trains lose power, whereupon the main AC emergency power supplies are activated (emergency diesel generator(s) and/or class 1E supplies from the nearby hydroelectric power plants). In other words, the LOOP event represents the emergency power case.

2nd category in chapter 7.2.1 of the operators' final report: Station Blackout (SBO)

As required in the ENSREG specifications, the Swiss operators should consider two differentiated sub-categories of SBO for the EU stress test analyses: the SBO as such and the more stringent "total SBO" (see "3rd category" below).

Accordingly, the SBO (as per chapter 7.2.1) applied to the Swiss nuclear power plants comprises not only the loss of all operational supplies (external operational mains networks and own generator supply) but also the loss of all safety-classified main AC emergency power supplies, i.e. the emergency diesel generator and/or emergency hydroelectric power supplies (power feeds from hydroelectric power plants) which are intended for the emergency power case. Still available in this SBO case in Switzerland are the bunkered special emergency diesel generators as special measures have already been taken to ensure their resistance to flooding. Another exemption is made by considering the backed-up AC trains, which are fed by the direct current (DC) supply from batteries and inverters, and which have no significant role in supplying the energy needs for the electrically-powered nuclear cooling pumps.

In other words, the SBO accident is a "special emergency case" (Notstandfall) scenario in respect of the electrical supply, for which the availability of the backed-up AC trains (outside the emergency building) can be regarded as a sub-case.

3rd category in chapter 7.2.2 of the operators' final report: Total Station Blackout (Total SBO)

For the so-called total SBO, failure of the special emergency diesel generator supplies is also assumed in addition to the SBO. The only remaining sources of power supply are the safetyclassified, uninterruptible, battery-fed direct current supplies and (as applicable) the uninterruptible emergency AC trains supplied from them via inverters, as well as additional provisions made available by the Accident Management (AM) or Severe Accident Management (SAM) measures with the corresponding AM or SAM equipment.

The operators' progress reports indicate that the three categories mentioned above will be covered in the final reports. No missing information with respect to the required contents was identified. Moreover, in ENSI view, no difficulties are to be expected in meeting the deadlines for the completion of the relevant chapters in the final EU stress test reports.

3.8 Chapter 8: Loss of ultimate heat sink

Besides the progressive loss of the ultimate heat sink, Chapter 8 of the final report will also contain the same case with a simultaneous SBO / Total SBO. The procedure described by the operators seems adequate and at this point no difficulties in producing the final reports could be identified since, according to the operators' own statements, significant progress has already been registered.

3.9 Chapter 9: Severe Accident Management

The operators submitted the required information regarding the planned evaluation of the effectiveness of accident management. The operators largely base their descriptions on existing analyses such as the PSA, the safety analysis report, accident management and SAMG (Severe Accident Management Guidance) documents. Not all the operators adhere closely to the structure of the table of contents, according to which the emergency measures should be broken down as follows: (a) scenarios involving failure of core cooling; (b) scenarios to maintain the integrity of the containment after core damage; (c) scenarios to mitigate the consequences of core damage with failure of the containment; and (d) scenarios involving failure of the spent fuel pool cooling. ENSI expects the structure of the table of contents /Ü-6/ to be taken into account in the final report.

4 Document list and classification

As stipulated in the first meeting between ENSI and the nuclear power plants regarding the EU stress test /Ü-3/, ENSI and the operators have agreed that the referenced documents should be classified as follows:

- D1 Validated in the licensing process, or ENSI has at least conducted a preliminary assessment
- D2 Not D1, but quality-assured by the operator
- D3 Neither D1 nor D2

In their progress reports or as annex to minutes of official meetings /Ü-9/, the operators have indicated the main documents they intend to use for their analyses and have classified them according to the document type (D1, D2 or D3). The classifications are essentially correct, knowing that the final assigning of the documents to the three categories will be performed in the final reports. Furthermore, the document list could possibly expand with the production of the final reports.

Reference documents from the IAEA or equivalent organisations need not to be classified.

5 References

Generally relevant reference documents

/Ü-1/ European Nuclear Safety Regulators Group (ENSREG)
Declaration of ENSREG from 25.05.2011 including Annex 1
"EU Stresstests´specifications"
http://www.ensreg.eu/sites/default/files/EU%20Stress%20tests%20specifications_0.pdf

/Ü-2/ ENSI
"Verfügung: Massnahmen aufgrund der Ereignisse in Fukushima"
KKB/KKG/KKL/KKM Verfügung vom 18.03.2011

/Ü-3/ ENSI
"Verfügung: Vorgehensweise zur Überprüfung der Auslegung bezüglich Erdbeben und Überflutung"
KKB/KKG/KKL/KKM Verfügung vom 01.04.2011

/Ü-4/ ENSI
"Verfügung: Stellungnahme zu Ihrem Bericht vom 31. März 2011"
KKB/KKG/KKL/KKM Verfügung vom 05.05.2011

/Ü-5/ ENSI
"Verfügung: Neubewertung der Sicherheitsmargen des Kernkraftwerks KKB/KKG/KKL/KKM im Rahmen der EU-Stresstests"
KKB/KKG/KKL/KKM Verfügung vom 01.06.2011

/Ü-6/ ENSI
"Inhaltsverzeichnis für die Schweiz, Table of contents (TOC)", Anhang 1: Stress Test Report, Table of content mit Stand vom 10.08.2011
CNI/HOL – 11(KKM)/12(KKL)/14(KKB)/17(KKG).STRESSTEST, Brief vom 12.08.2011

/Ü-7/ KEV 2004, Kernenergieverordnung vom 10. Dezember 2004 (KEV), Verordnung, vom 10. Dezember 2004 (Stand am 1. Januar 2009)

/Ü-8/ UVEK SR 732.112.2, Verordnung des UVEK vom 17. Juni 2009 über die Gefährdungsannahmen und die Bewertung des Schutzes gegen Störfälle in Kernanlagen, Verordnung, vom 17. Juni 2009 (Stand am 1. August 2009)

/Ü-9/ UVEK SR 732.114.5, Verordnung des UVEK über die Methodik und Randbedingungen zur Überprüfung der Kriterien für die vorläufige Ausserbetriebnahme von Kernkraftwerken, Verordnung, vom 16. April 2008 (Stand 1. Mai 2008)

/Ü-10/ ENSI
Aktennotiz 7663 "1. ENSI-KKW Sitzung zum Stresstest vom 17. Juni beim ENSI (Brugg)" vom 22.08.2011

/Ü-11/ International Atomic Energy Agency (IAEA)
Safety Guide No. NS-G-2.13
"Evaluation of Seismic Safety for Existing Nuclear Installations for protecting people and the environment" , Vienna 2009

/Ü-12/ ENSI
Aktennotiz 7683 "2. ENSI-KKW Sitzung zum Stresstest vom 24. August beim ENSI (Brugg)" vom 14.09.2011

/Ü-13/ EPRI
EPRI NR-6041-SL "A Methodology for Assessment for Nuclear Power Plant Seismic Margin (Revision 1)", August 1991

Kernkraftwerk Beznau

/B-1/ KKB
Technische Mitteilung TM-511-R 11034 vom 15.08.2011
„KKB-Zwischenbericht über die Arbeiten am EU-Stresstest: Vorgehen, Referenzdokumente und Stand der Arbeiten"

Kernkraftwerk Gösgen

/G-1/ KKG
Schreiben BRI-D-54274 „EU-Stresstest Neuberwertung der Sicherheitsmargen des Kernkraftwerks Gösgen, Verfügung vom 1. Juni 2011" mit angefügtem
Bericht BER-D-54218 vom 08.08.2011
„EU-Stresstest: Zwischenbericht zum methodischen Vorgehen und zum Stand der Arbeiten"

Kernkraftwerk Leibstadt

/L-1/ KKL
Schreiben KOR/KKL/110815/0004 „Pendenz: Verfügung vom 1. Juni 2011 – Neubewertung der Sicherheitsmargen des Kernkraftwerks Leibstadt im Rahmen des EU-Stresstests – Fortschrittsbericht" mit angehängtem
Technischem Bericht BET/11/0241 vom 15.08.2011 „Zwischenbericht zum Vorgehen und Stand der Arbeiten bei der Neubewertung der Sicherheitsmargen des KKL im Rahmen der EU-Stresstests"

Kernkraftwerk Mühleberg

/M-1/ KKM
Schreiben vom 10.08.2011 mit angehängter
Aktennotiz AN-UM-2011/083 vom 05.08.2011 „Fortschrittsbericht EU-Stresstest –KKM" vom 11.08.2011