

Convention on Nuclear Safety
 Questions Posted To Switzerland in 2008

Q.No	Country	Article	Ref. in National Report
1	Canada	General	Entire report

Question/ Comment It was useful that the report named the Swiss regulatory documents as well as reports relevant to Inspectorate or licensees' activities. Several of these were of interest to open for additional information and detailed follow-up. Unfortunately, most of such documents were not found in English on the HSK Web site. Examples of such documents include R-48/d on PSR, regulatory requirements leading to issuing a General Licence, and those required for back-fitting.

Answer English is not an official language of Switzerland. The translation of guidelines needs many resources. HSK has not yet decided which guidelines will be translated into English.

Q.No	Country	Article	Ref. in National Report
2	Canada	General	Entire report

Question/ Comment The report does not appear to include any mentioning of good practices, lessons learned or specific issues for possible improvements that were pointed out to Switzerland at the 3rd Review Meeting by the Rapporteur or by delegations of other countries. Please explain the reasons for this apparent non-reporting (Please see IAEA INFCIRC/572/Rev2; Page 3, Paragraph 6)

Answer Switzerland has chosen not to specifically point out good practises, lessons learned or specific issues for possible improvements, but to describe that matter in the text of the country report. You will find an answer to those topics there.

Q.No	Country	Article	Ref. in National Report
3	Canada	General	Articles 6 to 19

Question/ Comment Good Practice – The report is arranged to demonstrate not only compliance with article-by-article of the Convention but also compliance with clause-by-clause within each article. In addition, the inclusion of a section labeled “Development and Conclusion” is a good practice worth mentioning. Its value to the reader may increase if it is placed at the beginning of every article-by-article reporting.

Answer Thank you for your comment.

Q.No	Country	Article	Ref. in National Report
4	Germany	General	

Question/ Comment Switzerland has presented a comprehensive and well structured report. The content is guided by the IAEA Synopsis on the relevant safety requirements statements. We consider this to be good practice.

The report provides many insights into the regulatory practices.

Answer Thank you for your comment.

Q.No	Country	Article	Ref. in National Report
5	Netherlands	General	

Question/ Comment The Netherlands compliments Switzerland with the well-written report.

Answer Thank you for your comment.

Q.No	Country	Article	Ref. in National Report
6	Austria	Article 6	

Question/ The first generation of NPPs is approaching the end of their design life. What is the

Comment status of plant life extension activities for the first generation of Swiss NPPs?

Answer Swiss NPPs are being closely monitored by a detailed ageing management programme. Within this programme, components are evaluated against a list of ageing mechanisms so that inspections are planned and conducted accordingly. Especially with the older NPPs, a large proportion of components have been exchanged for new ones. For important non exchangeable components such as the RPV or the primary containment, a set of ageing related criteria have been developed, whose non-fulfilment will demand an immediate shutdown.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 6	para 6.1, p. 23

Question/ Comment This item of the report states that Baseback NPP power unit No. 2 was decommissioned on 31 May 2005. All fuel was reloaded from the core to the cooling pond on 10 June and in one year this fuel was transferred to the Clab interim storage facility.

What conditioned the cooling term of fuel assemblies in CP within only one year (assembly design, energy release etc.)?

Answer Question asked to the wrong country.

Q.No	Country	Article	Ref. in National Report
8	Canada	Article 7.1	Introduction, page 14, paragraph 3

Question/ Comment Under “Background of Nuclear Power in Switzerland” the comment is made in paragraph 3 that “nuclear power production is within the realm of private industry, there is no ‘national nuclear programme’ as such.” In such a situation, how does the federal government act on a national energy strategy that includes new privately-operated NPPs?

Answer The government's energy strategy is mainly sending a political signal indicating the priorities of the Government. The energy strategy only influences research and development activities directly, but still has an important impact on energy industry. As a reaction to the governmental strategy, the industry announced its intention to apply for a general licence (early site permit) for new NPPs.

Q.No	Country	Article	Ref. in National Report
9	Canada	Article 7.1	Pages 22, 23

Question/ Comment Under “Planned New Ordinances”, there is mention of a new ordinance dealing with “methodology...for the temporary placing out of operation of NPPs.” Please indicate briefly what would be the main elements of this ordinance.

Answer This ordinance, which will become effective mid of 2008, substantiates the three shutdown criteria: the integrity of the primary circuit, the integrity of the primary containment and the core coolability in the case of incidents and describes the criteria and the methodology of their determination in detail. For example with the primary circuit, threshold values for the ductility of the RPV steel and for the thickness of the primary circuit pressure boundary have been set.

Q.No	Country	Article	Ref. in National Report
10	Canada	Article 7.1	Page 23, clause 2(i), paragraphs 1-3

Question/ Comment Under “National Requirements”, the report states that “the content of regulatory guidelines is semi-mandatory.” Please explain what semi-mandatory means in a regulated environment. In paragraph 3, it is stated that there are a number of regulatory guidelines that contain “mandatory...requirements and conditions,” which appears to contradict the information in paragraph 1. Some clarification of this section would be useful.

Answer “Semi-mandatory” in the mentioned context means, that HSK makes a proposal in the regulatory guideline. The operator may or may not accept this proposal. If he does not want to accept this proposal he has to prove that his solution is on the same level or a higher level than the proposed solution of HSK. As the procedure of approbation is very complex and time-consuming, it is applied very rarely. A possible example may be the following one: The guideline suggests a certain one-time test method and the operator would rather like to introduce a test method with permanent monitoring. In this case the suggested method of the operator is better than the one in the guideline.

Q.No	Country	Article	Ref. in National Report
11	Canada	Article 7.1	Page 26

Question/ Comment Under “Developments and Conclusion”, the report indicates that as a result of the new Nuclear Energy Act (2005) all guidelines of the Inspectorate will require revision. What would be the timeframe and level of human resources allotted to these required revisions that could compete with other priorities?

Answer HSK plans to have revised most of its guidelines by to the end of 2010. About 10 % of the human resources of HSK are allotted to these revisions.

Q.No	Country	Article	Ref. in National Report
12	Japan	Article 7.1	p.21, Nuc.E.Act

Question/ Comment It is provided in the Nuclear Energy Act that licensees are obliged to backfit the installation to the extent necessary.

Is backfitting conducted as a regulatory requirement?

Who decides the scope and the extent of backfitting in each specific case?

Answer The general requirements for the backfitting of NPPs are indicated in the article 22, paragraph 2, letter c of the Nuclear Energy Act (KEG). It is required that the utility must be backfitted according to the necessities of operating experience of the state of the (backfitting-) art and further as long as this will result in an increase in safety and as long as it is adequate. These general requirements have not been detailed further in the Nuclear Energy Ordinance (KEV) and HSKs guidelines do not further specify the requirements for backfitting. As a rule, HSK points out the need for backfitting in the periodic safety review of the power plants and after an incident which showed relevant deficits in design. Incidents in other power plants may also be a reason for backfitting requirements. For example, after Tschernobyl, HSK demanded the possibility of a controlled and filtered depressurisation of the containment during severe accidents. In order to increase safety with external events, such as airplane crashes, pressure waves from explosions or with third party involvement, HSK demanded backfitting with bunkered secure shutdown systems. HSK thereby only provides the goals to be achieved. The licensees are responsible for the detailed technical design. The licensee presents a concept which is studied in detail by HSK. If the concept is adequate, HSK will grant a permit. If HSK discovers a potential for improvement, the permit will be granted with additional requirements or the concept will be wholly disapproved.

Q.No	Country	Article	Ref. in National Report
13	United Kingdom	Article 7.1	Page 22

Question/ Comment The Ordinances seem to be fundamental to the Regulatory system. Could Switzerland provide more information on how these are developed? Which organization decides when an ordinance needs to be developed or revised? Who coordinates their development? Which organization is responsible for drafting ordinances? Which organization inputs the technical requirements? What

consultation process is in place?

Answer Swiss parliament passes laws. Laws are formulated in a general manner and often contain an order to create an additional ordinance. Ordinances are more technical and passed either by the Swiss Federal Council or by a Ministry. Several offices coordinate the development of the ordinance and take care that every organisation dealing with the matter is informed and consulted. It is mostly the technical organisation that drafts the technical requirements. After that there is a consultation of every department (ministry). The consultation process of ordinances always includes the Federal Offices.

Q.No	Country	Article	Ref. in National Report
14	Japan	Article 7.2.2	p.24, Licensing proc

Question/ Comment It is said in the report that the general licence is granted, in the case of a popular referendum, by the people of Switzerland.

On what case is a popular referendum conducted?

Answer There are two kinds of popular referenda in Switzerland: Mandatory referenda and optional referenda. Mandatory referenda are conducted for example in case of revisions of the Federal Constitution or the entry into organisations for collective security or into supranational communities. Optional referenda are conducted when 50'000 citizens request a vote. Article 48 paragraph 4 KEG formally provides: "Resolutions by the Federal Assembly concerning the approval of general licences are subject to optional referendum".

Q.No	Country	Article	Ref. in National Report
15	United Kingdom	Article 7.2.2	Page 24

Question/ Comment In addition to the general licence, it is stated that other licences are required for construction, commissioning, modification or decommissioning. Could Switzerland clarify what sort of modification requires a licence issued by UVEK and which can be approved by a permit by HSK? Approximately what is the frequency of granting or renewing a licence?

Answer In cases were modifications would cause a deviation of a valid licence the granted licence has to be changed. In cases were the modification does not affect the licence but can influence the safety HSK has to grant a permit.

Q.No	Country	Article	Ref. in National Report
16	Canada	Article 8.1	Page 29, 3rd paragraph

Question/ Comment What is the number of Inspectors employed by HSK at sites and at Headquarters? In addition to planned inspections, do the same inspectors perform "reactive inspections"? How long does it take to plan an inspection (such as an audit or system inspection), and analyze its findings? (Note: Under Article 14, page 54, 5th paragraph, the report states "On the average, 80 inspections per plant and per year are carried out". Therefore, for four plants, this makes 320 inspections per year.)

Answer All HSK employees work at the HSK headquarters in Wurenlingen, thus including the 70 inspectors. There are currently no resident inspectors with a workspace inside the utilities. All inspectors conduct reactive inspections on request. The planning of the inspections is carried out in two stages. Gross planning is done within the yearly planning, where the subject and the date (month) of the inspection are chosen. Detailed planning is done in the weeks before the inspection. The evaluation of the inspection and the drafting of the inspection report are done within two weeks of the inspection.

Q.No	Country	Article	Ref. in National Report
17	Canada	Article 8.1	Page 31

Question/ Comment Under “Knowledge Management & Training”, in paragraph 2, there is a comment that “the inspectorate tries to replace leaving employees at a very early stage...” Is this knowledge transfer technique embedded in the business plan process for the inspectorate or is it on a “best effort” basis? What measures does the inspectorate employ to monitor the effectiveness of its knowledge transfer activities?

Answer Knowledge transfer is foreseen by HSK's management system. The specific implementation is based on two control cycles. The first – strategic – control cycle has to ensure the presence of the competencies required for accomplishing the legal mandate. Within the strategic cycle HSK identifies high value knowledge. Domains to acquire knowledge and related objectives are defined. The strategic cycle is managed by the executive board and the evaluation of success is part of the management review. The second cycle covers operational aspects. It is used in various fields of application and therefore exists in several versions. Common to all versions is the fact that they all include activities for planning, implementing and evaluation. Knowledge objectives defined for different knowledge fields like research, legislation, management systems, plant conditions and operational events link the operational cycle with the strategic cycle. The concept has been presented at the IAEA Conference on Knowledge Management in Nuclear Facilities in June 2007.

Q.No	Country	Article	Ref. in National Report
18	Finland	Article 8.1	

Question/ Comment Do you have currently in your regulatory staff, or in a technical support organization (TSO) working for the regulatory body, an adequate number of technical experts (e.g., in the areas of reactor physics, thermo-hydraulics, and materials engineering) who can conduct an in-depth safety assessment of nuclear power plant, as would be needed for evaluation of operating events, large power upgrade, lifetime extension, or new build? Do these experts have tools and ability to conduct independent safety analysis, including both deterministic analysis and PRA? What is the number of such experts in various technical areas within the regulatory body and within the TSO? What is the outlook concerning the number of experts in a few years ahead?

Answer Approximately 70 of HSK's 100 staff members are technical or scientific experts in the different fields of installation assessment and operation surveillance. Two sections – approx. 20 staff members – of HSK's reactor safety division are engaged in deterministic and probabilistic safety assessments. Furthermore, HSK mandates external experts for specific inspection tasks, assistance in legal questions or technical support (e.g. modelling of accident scenarios). Funding applied research provides an additional basis for the assessment of safety issues like ageing of materials or behaviour of high burn-up fuel. Nevertheless, the current regulatory staff and technical support organisations will not be able to cope with additional tasks referring to the construction of new NPPs or the realisation of a radioactive waste repository. In case the construction of new NPPs will be approved, HSK intends to increase its staff by approximately 20 experts.

Q.No	Country	Article	Ref. in National Report
19	Finland	Article 8.1	

Question/ Comment What kind of systematic training and development programmes you have for your new regulatory staff members? How do you ensure that they are ready to conduct their duties as regulatory staff members in the tasks assigned to them?

Answer HSK's human resource development process includes a systematic analysis and periodical review of the competencies needed for a specific job profile. The process

allows for the concerted training of skills which is usually done in the framework of courses, seminars and scientific conferences. Training on the job by experienced experts complements the introduction of new staff members into their duties. A major challenge for HSK's staffing policy is the generation change due to retirement of experienced experts. HSK tries to meet this challenge by replacing leaving employees at an early stage in order to create a certain overlapping period. This "tandem processing" should give the successor the opportunity for situated learning and a comprehensive introduction to the field of activities of the predecessor.

Q.No	Country	Article	Ref. in National Report
20	Germany	Article 8.1	page 30

Question/ Comment Performance indicators for the management processes of HSK are mentioned. Please elaborate upon the nature and use of these indicators. What are the main improvements due to these indicators?

Answer The indicators for management processes are related to the achievement of management objectives, objectives given by the mandate, amount of administrative work, training of staff members or on-time fulfilment of project tasks. They are used for two purposes. Firstly they are used to show to the parliament, if HSK fulfils the given mandate; we have to mention here that some indicators are already defined within the mandate and are integrated in the overall indicator system. Secondly they are used by HSK management as an indication for the performance of the organisation. Within this set, there are several internal indicators that are used to monitor specific processes or important periodic tasks. Some of them are recorded monthly providing data for taking immediate corrective actions if the desired performance is not achieved. As a result, several internal procedures or instructions have been optimized (and in some cases even entire processes have been redesigned in order to meet the requirements) or electronic tools have been put in place in order to assist staff members in doing things the right way.

Q.No	Country	Article	Ref. in National Report
21	Hungary	Article 8.1	p.30

Question/ Comment The complete area of the surveillance of manufacturing, repair, replacement, modification and in-service inspections of pressure-bounding components has been fully outsourced to the Swiss Association for Technical Inspections (SVTI) an independent private organisation.

Q: What is the legislative solution for the authorization of SVTI for these inspection activities? What are the requirements set to SVTI as an organisation, and to the individual technical inspectors? What are the technical inspectors responsible for from technical, and liability aspect?

The above statement covers the pressure-bounding components. What is the situation with the active mechanical (e.g. motor driven valves or pumps), electrical, I&C and computerized (incl. micro processor & micro controller) components?

Answer Article 101 para. 6 of the Nuclear Energy Act states, that within the scope of its own competencies, the enforcement authority may call on third parties to assist with the enforcement of this Act, in particular for carrying out audits and inspections. SVTI is such a third party.
As a rule, SVTI supervises technical inspections on behalf of HSK. These inspections are carried out either by the utilities or by qualified personnel from manufacturers or from inspection companies. SVTI is accredited by the Swiss Accreditation Service according to Swiss standards (SIA). In order to be accredited, SVTI must fulfil certain criteria and obligations (such as being independent and

training of their own qualified personnel). The utilities themselves are liable for the technical inspections. SVTI supervises inspections of mechanical components (including motor driven valves and pumps); they do not supervise inspections of electrical or electronic components.

Q.No	Country	Article	Ref. in National Report
22	Japan	Article 8.1	p.27, Organization

Question/ Comment It is said in the report that the Swiss regulatory body consists of HSK and SK besides the licensing authorities.

To what administrative organization do the licensing authorities belong?
Will the licensing authorities exist after the HSK becomes an independent organization?

What arrangements are there to ensure that duplication or omission are avoided among the regulatory organizations?

Answer The Government and the Departement of the Environment, Transport, Energy and Communications has been and will also in the future be the licensing authorities. This situation is not affected by the forming of an independent supervisory body. Since 1.1.2008 SK is part of HSK which prevents any duplication or omission.

Q.No	Country	Article	Ref. in National Report
23	Luxembourg	Article 8.1	page 31

Question/ Comment The replacement of one third of its management within only two years from 2005 to 2007 is certainly very challenging for the Swiss Federal Nuclear Safety Inspectorate. Could Switzerland already present first conclusions on how it affects the work of the Inspectorate?

Answer The members of the executive board and the middle management who had to be replaced left HSK for their retirement. As the dates of retirement were known, the succession could be carefully planned. There was enough time for the selection and training of suitable candidates. The work of HSK was not significantly affected by the change. In cases of difficulties HSK could find solutions by contracting the retiree.

Q.No	Country	Article	Ref. in National Report
24	Netherlands	Article 8.1	p.29

Question/ Comment “Supervisory authorities”, HSK:

All activities on pressure-bounding components are outsourced to SVTI. Does this mean that HSK sets the requirements for this work and that SVTI has to report to HSK about the results?

If there is a deviation found by SVTI, what will be the role of HSK?

Does HSK have a role in the accreditation of SVTI? What is the corresponding number of full-time staff in SVTI?

Answer Article 101 para. 6 of the Nuclear Energy Act states, that within the scope of its own competencies, the enforcement authority may call on third parties to assist with the enforcement of this Act, in particular for carrying out audits and inspections. SVTI is such a third party.
As a rule, SVTI supervises technical inspections on behalf of HSK. These inspections are carried out either by the utilities or by qualified personnel from manufacturers or from inspection companies. SVTI is accredited by the Swiss Accreditation Service according to Swiss standards (SIA). In order to be accredited, SVTI must fulfil certain criteria and obligations (such as being independent and training of their own qualified personnel). The utilities themselves are liable for the technical inspections. SVTI supervises inspections of mechanical components

(including motor driven valves and pumps); they do not supervise inspections of electrical or electronic components.

Q.No	Country	Article	Ref. in National Report
25	Netherlands	Article 8.1	p.29

Question/ “Advisory committee” KSA:

Comment What are the main subjects on the agenda, the frequency of the meetings and what is the involvement of HSK? Do recommendations have to be followed by HSK?

Answer On 1.1.2008 KSA has been replaced by the Commission for Nuclear Safety (KNS). It gives advice to the Federal Council, the Department of the Environment, Transport, Energy and Communication and ENSI. It consists of 7 members. Their meetings are once a month.

Q.No	Country	Article	Ref. in National Report
26	United Kingdom	Article 8.1	Page 28

Question/ Are discrepancies between the KSA and the Supervisory Authorities a frequent occurrence? Has the licensing authority the competence to resolve such issues?

Answer Because of potential discrepancies, the competencies of the successive KNS have been reduced to a clear advisory task. The recommendations of KNS are not mandatory.

Q.No	Country	Article	Ref. in National Report
27	United Kingdom	Article 8.1	Page 31

Question/ The report notes the generation change confronting HSK and the efforts made to develop knowledge management. Are there difficulties in the recruitment of new staff to HSK? Could Switzerland elaborate on the training programme for new inspectors?

Answer It is more and more difficult to recruit experienced staff. Nevertheless Switzerland could so far "profit" from Germany's political decision to phase out nuclear power and recruit experienced staff from German industry and authorities. HSK's human resource development process includes a systematic analysis and periodical review of the competencies needed for a specific job profile. The process allows for the concerted training of skills which is usually done in the framework of courses, seminars and scientific conferences. Training on the job by experienced experts complements the introduction of new staff members into their duties. A major challenge for HSK's staffing policy is the generation change due to retirement of experienced experts. HSK tries to meet this challenge by replacing leaving employees at an early stage in order to create a certain overlapping period. This “tandem processing” should give the successor the opportunity for situated learning and a comprehensive introduction to the field of activities of the predecessor.

Q.No	Country	Article	Ref. in National Report
28	Japan	Article 8.2	p.32, Separation

Question/ It is said in the report that both HSK and SK will be separated from the BFE and converted into an institution.

To what administrative organization does the institution report?

Is the institution separated from the UVEK?

Will the KSA be designated as an advisory body to the UVEK after the institution is established?

Answer This new institution ENSI is an independent institution of public law. As a novelty, it will report directly to the UVEK – that is the ministry (Federal Department of the

Environment, Transport, Energy and Communications). It will no longer report to the Federal Office of Energy, which is also in charge of licensing.
KSA has become KNS – a smaller institution than KSA used to be.

Q.No	Country	Article	Ref. in National Report
29	Netherlands	Article 8.2	Clause 2, p.32

Question/ Comment Drafting technical license conditions often is the result of regulatory experience on those matters, which are not well treated/described in the existing technical rules and regulations.

After January 1 2009, there will be a formal, institutional and financial independency of the HSK.

Does that mean that all HSK involvement in drafting license conditions is reduced to absolutely nothing? If that is the case, how is the feedback arranged?

Answer No, the technical work of the Swiss Regulatory Body is not affected by the reorganisation. All HSK staff will change to the new institution ENSI.

Q.No	Country	Article	Ref. in National Report
30	United Kingdom	Article 8.2	Page 33

Question/ Comment The report notes the progress made regarding the independency of HSK. However despite the “de jure” separation from the licensing authorities it is clear from the response to Article 7 and 8 that there needs to be significant interaction between HSK and the licensing authorities. Are arrangements in place to manage this interaction while preserving the legal separation?

Answer There are regular meetings of HSK with the Department of Environment, Transport, Energy and Communication, which is the licensing authority.

Q.No	Country	Article	Ref. in National Report
31	Canada	Article 9	Page 35, 3rd paragraph, 1st line

Question/ Comment The report states that the concept of the “Safety Controller” was introduced in 2006 at two NPPS. Please explain briefly: Why was this concept introduced? What are the qualifications and competencies of such a Safety Controller? How would this person gather or obtain information to make a judgment or a recommendation? Is the Safety Controller supported by any dedicated staff? How frequent or systematic would this person review “all kind of safety issues” and how would these reviews interface with utility audit functions? What could be the positive and negative effects of the functions and activities of such a “Safety Controller” on the morale of the staff and the promotion of a health safety culture at the plants? Currently this position has been implanted at 2 of the NPP, are there plans to implement a similar position at the other NPPs?

Answer First of all, a definition: In German "kontrollieren" means "to survey". I.e. the Safety Controller watches for safety issues but he does not directly interfere with daily operations.

The safety controller was introduced by two NPPs belonging to the same utility after their positive experience with WANO Peer Reviews. The intent was to have a permanent function within the plant that is not involved in daily business and his work is also not guided by the QM-system with the aim to independently have an eye on safety issues.

The controller is situated outside the line organisation, works on his own and reports periodically (e.g. 3 months) to the plant manager and to the CEO of the utility. Reports are used to independently identify strengths or potential weaknesses in safety issues and to react on the findings.

The controller gains his information on a daily basis by participating in meetings,

observation of ongoing work and talking to the staff and walkthroughs in the plant. He acts also as a type of “ombudsman” for the personnel without relation to the trade (labour) union. There is no interface with other audit functions (QA) or management walkthroughs.

HSK is aware that such a position could be perceived as "the responsible person for safety" and give a tendency to withdraw safety for responsibility from the rest of the staff. However, the experience gained until the present time does not support this apprehension.

Since HSK mainly uses a non prescriptive regulatory approach in organisational issues, it is on the plant's initiative to introduce such functions. The other two NPPs in Switzerland did not implement such a function so far and there are no plans for a regulatory requirement at the time.

Q.No	Country	Article	Ref. in National Report
32	Germany	Article 9	page 35

Question/ Comment The position of a “safety controller” in two Swiss NPPs is described. Will such a position be required by the authorities?

Will other Swiss NPPs also create such a position?

What was the rationale to install such a position? (events?)

Are there already experiences to assess the benefits?

Answer There is no legal basis for the requirement of safety controllers at the other plants. The present experience shows that the safety controllers are well accepted at the plants and that there are several safety issues that could be identified by the controller. HSK does not have enough experience at the time to assess the effects of such a position.

Q.No	Country	Article	Ref. in National Report
33	Japan	Article 9	p.34, L9 frm btm

Question/ Comment It is said in the report that in order to keep the responsibility with the operator, HSK refrains from a too prescriptive approach in regulation.

Please explain more in detail or more specific about this policy/ approach.

Answer The operator has to demonstrate that his measures fulfil the safety goals and the legal requirements.

One important goal of oversight is to foster, respectively not to hinder, a safety culture of the operators that goes beyond mere “compliance with rules”. A too prescriptive approach in oversight which puts on the operators very detailed requirements of comprehensive solutions can have detrimental effects on the operators’ safety culture, insofar as the regulator takes over the responsibility from the operator and the operator, on its part, delegates the responsibility to the regulator. Moreover, a too prescriptive approach does not support or even hinders the operator’s learning processes. Depending on the regulatory issue, therefore, HSK does normally not require specific measures but formulates general requirements about processes or goals that leave it open to the operator to formulate the concrete solutions and processes. Nevertheless, if the operator does not demonstrate to be able or willing to take over the responsibility in an adequate manner, HSK increases prescriptivity in its oversight.

Q.No	Country	Article	Ref. in National Report
34	Netherlands	Article 9	p.35

Question/ ‘safety controller’:

Comment The introduction of a safety controller is an interesting development.

Is the safety controller a requirement imposed by HSK?

In the plants, what is the status and function of the reports from the safety controller?

Do the reports for instance contain binding advices?

How is this organized in the other plants not mentioned in the section about the safety controller?

How does the safety controller determine the right allocation of resources?

Answer The safety controller acts as an advisor to the plant manager and the CEO of the utility. He does not decide on the allocation of resources.

First of all, a definition: In German "kontrollieren" means "to survey". I.e. the Safety Controller watches for safety issues but he does not directly interfere with daily operations. The safety controller was introduced by two NPPs belonging to the same utility after their positive experience with WANO Peer Reviews. The intent was to have a permanent function within the plant that is not involved in daily business and his work is also not guided by the QM-system with the aim to independently have an eye on safety issues. The controller is situated outside the line organisation, works on his own and reports periodically (e.g. 3 months) to the plant manager and to the CEO of the utility. Reports are used to independently identify strengths or potential weaknesses in safety issues and to react on the findings. The controller gains his information on a daily basis by participating in meetings, observation of ongoing work and talking to the staff and walkthroughs in the plant. He acts also as a type of "ombudsman" for the personnel without relation to the trade (labour) union. There is no interface with other audit functions (QA) or management walkthroughs. HSK is aware that such a position could be perceived as "the responsible person for safety" and give a tendency to withdraw safety for responsibility from the rest of the staff. However, the experience gained until the present time does not support this apprehension. Since HSK mainly uses a non prescriptive regulatory approach in organisational issues, it is on the plant's initiative to introduce such functions. The other two NPPs in Switzerland did not implement such a function so far and there are no plans for a regulatory requirement at the time.

There is no legal basis for the requirement of safety controllers at the other plants. The present experience shows that the safety controllers are well accepted at the plants and that there are several safety issues that could be identified by the controller. HSK does not have enough experience at the time to assess the effects of such a position.

Q.No	Country	Article	Ref. in National Report
35	Canada	Article 10	Summary & Conclusions, page 8, para. 2

Question/ Comment It is indicated that all Swiss NPPs have established programs "to systematically develop their safety culture." Please indicate the criteria used to establish these programs, and measure the success of their implementation.

Answer Each Swiss NPP has its own specific programme of activities dedicated to the further fostering of a good safety culture. These programmes comprehend periodic activities such as trainings or instructions and campaigns on safety culture related topics, but also daily activities and work practices that are somehow related to or have an impact on the safety culture, as well as singular activities which can be triggered by events or other sources. The nature of these programmes and activities reflects the understanding of the concept of safety culture and the values of the operators' (top) management.

Since safety culture is not a measurable quantity, criteria to measure the success of

the implementation of the safety culture activities are very difficult to establish. The operators rely partly on “hard facts” such as the number of events and the development of the overall safety performance of the plant, but also on “soft” indicators such as the daily observations of the employees’ (including the management’s) behaviour and their application of the safety culture principles during their daily activities, their expression of ownership feelings etc.

Q.No	Country	Article	Ref. in National Report
36	Canada	Article 10	Page 36, paragraph 4

Question/ Comment The report indicates that one of the findings of the OSART missions, conducted up to 2002, was “a tendency towards complacency.” The NPPs therefore initiated programs to address this issue. Please indicate what measurable outcomes resulted from these actions.

Answer Different programmes were introduced like training sessions, workshops, discussion on night shifts, special attention during simulator training, etc. Increased attention has been dedicated to teamwork, work practices and communication. HSK observed the increased number of training sessions and workshops for the staff on these issues.

Q.No	Country	Article	Ref. in National Report
37	Germany	Article 10	

Question/ Comment Reference to the Summary Report of the 3rd Review Meeting, item 36, 38, 42 and 43

The following set of questions is of special interest for Germany for the further development in this field. As some of these items may already be covered by your report or by other questions posted by Germany, we do not expect repetitions of information already delivered. Please just give additional information as appropriate. It was decided at the Third Review Meeting to discuss this topic at the Fourth Review Meeting.

1. Is a safety management system (SMS) planned or implemented?
2. What is the basis of the SMS (IAEA Requirements, other criteria)?
3. Is the implementation of a SMS voluntary or obligatory? (Does the regulator require the implementation of the SMS? If yes, how detailed are the requirements for the contents of the SMS?)
4. How is the SMS assessed and approved? (Does the regulatory body check whether the appropriate processes are implemented or available in the SMS? Does the regulatory body check whether and to which extent the applicable criteria for a safety management system are fulfilled? Is the authority entitled to inspect the results of the SMS assessment and if so, to which extent?)
5. How is an external review process performed?
6. What are the key elements of an SMS? (Indicators, Integrated or stand alone system, Continuous improvement and treatment of deviations (Are there regulations how to handle deviations from the specified process?); Participation on benchmarks exercises of licensees)

Answer To questions 1 to 3: Neither the Swiss Nuclear Energy Act nor the related ordinances use the term safety management system. The Ordinance on Nuclear Energy requires a quality management system that complies with state of nuclear and safety technique. In HSK’s view, safety management has to be integrated into the plant’s management system. The regulatory guideline on the organisation of NPPs requires compliance of the NPP’s management systems with IAEA GS-R-3. To Question 4: The implementation of the system, compliance with GS-R-3 and

specific safety relevant processes are inspected by the HSK. Special attention is paid to assessment (independent and self assessment). Specific requirements that are part of the processes are inspected on a regular basis.

To Question 5: External review is required by the Ordinance on Nuclear Energy: All plants maintain a certificate according to ISO 9001:2000 which requires regular external reviews. Safety issues are inspected by HSK. All plants were subject of OSART missions including follow-ups.

6: All NPPs have Integrated Management Systems (quality, health and work safety). They use a large set of indicators for process control:

- a) indicator for self assessment
- b) Indicators which are required by HSK for the yearly safety assessment of the plant.

Specific processes are assessed in HSK team inspections (i.e. operation experience feedback (internal and external events), plant modifications, decision making, use of contractors etc.

All plants have undergone WANO peer reviews.

Q.No	Country	Article	Ref. in National Report
38	Japan	Article 10	p.36, L14 frm btm

Question/ Comment It is said in the report that the inspectorate concentrates on specific issues of safety management.

What are specific issues of safety management?
Please explain more specific about this approach.

Answer Neither the Swiss Nuclear Energy Act nor the related ordinances use the term safety management system. The Ordinance on Nuclear Energy requires a quality management system that complies with state of nuclear and safety technique. In HSK's view, safety management has to be integrated into the plant's management system. The regulatory guideline on the organisation of NPPs requires compliance of the NPP's management systems with IAEA GS R 3. The implementation of the system, compliance with GS-R-3 and specific safety relevant processes are inspected by the HSK. Special attention is paid to assessment (independent and self assessment). Specific requirements that are part of the processes are inspected on a regular basis. External review is required by the Ordinance on Nuclear Energy: All plants maintain a certificate according to ISO 9001:2000 which requires regular external reviews. Safety issues are inspected by HSK. All plants were subject of OSART missions including follow-ups. All NPPs have Integrated Management Systems (quality, health and work safety). They use a large set of indicators for process control:

- a) indicator for self assessment
- b) Indicators which are required by HSK for the yearly safety assessment of the plant.

Specific processes are assessed in HSK team inspections (i.e. operation experience feedback (internal and external events), plant modifications, decision making, use of contractors et.

All plants have undergone WANO peer reviews.

Q.No	Country	Article	Ref. in National Report
39	Netherlands	Article 10	p.36

Question/ operating policy:

Comment What are the main topics of the operating policies of the Swiss NPPs? Are they based on IAEA and or WANO documents or others?

Answer Safety and operating policy is stated in the Power plants internal regulations. They are derived from requirements stated in laws and ordinances, whereas laws and ordinances reflect IAEA requirements. The most important topic in the plant internal regulations is the priority to safety. This is specified in the protection of:

1. the population and the environment against radiation;
2. the plant's personnel against radiation and accidents;
3. the nuclear installation against damage and contamination.

Further the regulations require:

- to foster a good safety culture and high safety awareness;
- to comply with regulations;
- to provide high quality training in order to keep a high level of competence of the plant's staff;
- to use high-quality processes, materials, technologies and organisational structures and procedures for design, construction, commissioning and operation of the plant;

to keep the radiation dose low.

Q.No	Country	Article	Ref. in National Report
40	Netherlands	Article 10	p.37

Question/ management of change:

Comment During the implementation of organizational change, what transitional effects are taken into account?

Apart from the in-house evaluations, does HSK require evaluations to be reported to the regulatory body during and after the implementation? With what frequency? What are the subjects of the evaluation (in-house and to the regulatory body)?

What method is used for the examination of the safety impact of organizational change prior to their implementation. Is PSA used in this method?

Answer Guideline G07 (chapter 7) states that the impact of the change shall be continuously tracked and monitored during the implementation of organisational changes. I.e. it should be verified whether the expected safety-related effects will still be valid once the change becomes active and whether personnel-related aspects were also taken into account.

Modifications of the plant regulation (describes the organisational structure and responsibilities) need the approval of the HSK.

Pursuant to Guideline HSK-B02, HSK requires to being notified of major changes in the organisational structure and the management system, changes in the ownership of the utility as well as changes to the plant that have an impact on the organisation.

For the examination of the safety impact of organisational changes HSK uses review methods that reflect the requirements stated in Guideline G07. Depending on the change, PSA might be among these methods.

Q.No	Country	Article	Ref. in National Report
41	Japan	Article 11.2	p.41, Conclusion

Question/ It is said in the report that the new ordinance on checks of trustworthiness was released.

Please explain what trustworthiness is in more detail.

Answer The issue deals with security. Persons representing important safety functions at the plant (Managers, guards, certain licensed positions) need a periodic check of their "lifestyle" (clean record). The idea is to make sure that they could not become

subject to extortion due to their lifestyle (financial situation, abuse of psychotropic substances etc.). Actually, for the concerned persons periodic screenings of databases of the police are performed.

Q.No	Country	Article	Ref. in National Report
42	Netherlands	Article 11.2	p.38

Question/ Comment Financial and human resources, clause 2: requirements regarding qualified staff.

Does HSK require the NPP to monitor the sufficiency/adequacy of staff permanently and report to HSK about it? Does HSK perform its own independent review?

Does the HSK receive (on a regular basis) information from the NPPs which indicates that the plant has (or not has) a sufficient number of qualified personal.

Answer All plants report monthly on the number of staff in the different departments and in detail on the licensed personnel.

HSK does not have criteria for adequate staffing. However, delays in the response on regulatory requirements, delays in issuing event reports or implementation of remedial actions after events, inadequate quality of documents etc. are used by the regulator as indicators of the adequacy of staffing. In the case of weaknesses in such areas the regulator requires an analysis by the plant and adequate corrective actions. In several instances the staff of certain organisational units at the plant were reviewed and increased after such regulatory interventions.

An new ordinance on the competence of personnel in nuclear plants and a related regulatory guideline defines education training and necessary experience for licensed personnel, maintenance and technical support. Therefore a minimum of qualified inhouse functions are defined.

Q.No	Country	Article	Ref. in National Report
43	Romania	Article 11.2	page 40

Question/ Comment Please provide more information on the role of HSK in the licensing of control room personnel.

Answer HSK personnel is part of the license examination commission for control room personnel. The examination is organized by the operator. The oral examination is led by the training representative of the plant. Other operator representatives (2 or 3 persons and a least 3 HSK experts observe the candidate. HSK experts are allowed to ask questions. The final decision to issue the license is with the HSK.

Q.No	Country	Article	Ref. in National Report
44	United Kingdom	Article 11.2	Page 40

Question/ Comment The response to Article 11.2 gives a very comprehensive overview of the training of NPP staff. Could Switzerland confirm which organisation actually issues the professional licence? Is the examination that is conducted prior to the issue of the conducted by the NPP and HSK jointly, or are there two separate examinations? What happens if the NPP and HSK disagree regarding a candidate's suitability?

Answer HSK personnel is part of the license examination commission for control room personnel. The examination is organized by the operator. The oral examination is led by the training representative of the plant. Other operator representatives (2 or 3 persons and a least 3 HSK experts observe the candidate. HSK experts are allowed to ask questions. The final decision to issue the license is with the HSK.

Q.No	Country	Article	Ref. in National Report
45	Austria	Article 12	

Question/ Comment 1. Does the group established at each NPP for the analysis of human errors only analyse safety significant events or is it also charged with promoting excellence in human performance?

Answer The Nuclear Energy Ordinance (Art. 30 KEV) demands a group for analyses of such events, suggestion of measures and supervision of putting into practice.

Q.No	Country	Article	Ref. in National Report
46	Austria	Article 12	

Question/ Comment 2. Which specific analyses were undertaken to support the change of the Technical Specification format?

Answer Beznau NPP performed, with the aid of an external company, a thorough analysis of the existing TS in terms of usability for operating personnel. The analysis consisted of several steps, such as an analysis of function and structure of the TS, a comparison of the Beznau TS with the Technical Specifications of other Swiss NPPs, a questionnaire survey and interviews with operating personnel etc. The results of the analysis resulted in a concept for the improvement of the usability of the TS from which a concrete modification plan was established. (Concerning the implementation of the concept cf. also the answer to question 51).
In order to ensure that editorial modifications of the TS do not inadvertently give rise to changes in the content of the TS, moreover, HSK required from the Beznau NPP a formal procedure for reviewing and testing of the modified TS. This testing procedure contains criteria for its application, defines the persons involved, the procedure for the documentation and testing of the modifications as well as criteria for their assessment (cf. question 51).

Q.No	Country	Article	Ref. in National Report
47	Austria	Article 12	

Question/ Comment 3. What percentage of operational events was caused by human errors during the last 5 years? Is the trend of contributions of human errors monitored?

Answer The safety authority e.g. does not consider the number of events with human and organisational factors contribution as an indicator of safety awareness. Increased safety awareness may lead to an increased sensitivity regarding human actions. So, an increased safety awareness may even result in an increase of the number of event reports with human factors contribution.

Q.No	Country	Article	Ref. in National Report
48	Canada	Article 12	Page 43

Question/ Comment Under “Organization and Safety Culture”, paragraph 1, lines 2 and 3, the report states that “the current guideline on organization does not meet all these requirements”. Please indicate the schedule for revising the guideline. On what methodology(ies) and tools is the guideline based?

Answer Guideline G07 (Organisation of NPP) will come in force on April, 1st 2008. The guideline is based on the IAEA Safety Requirements No. GS-R-3, on Switzerland's experience in operating NPPs and takes account of well established principles of the work and organisational science.

Q.No	Country	Article	Ref. in National Report
49	Japan	Article 12	p.43, L9 from top

Question/ Comment It is said that the involved HIS, human performance and organizational aspects are investigated.

How does HSK participate or commit to the investigation?

For example, development of investigation guides or reviewing investigation

reports is supposed to be possible.

Answer HSK requires an in-depth investigation by the NPP concerned.

Q.No	Country	Article	Ref. in National Report
50	Japan	Article 12	p.43, line 4 frm btm

Question/ Comment It is said in the report that among these are in particular inspections and technical discussion.

With what levels in licensee's organization technical discussion is held?
Do HSK have any discussion with the top management?

Answer HSK requires an in-depth investigation by the NPP concerned.

Q.No	Country	Article	Ref. in National Report
51	Slovenia	Article 12	p. 42

Question/ Comment Beznau NPP is currently altering the presentation of its technical specifications.

Before the plant started the development of the new presentation, the Inspectorate required a detailed analysis and diagnosis of the actual technical specifications as well as the demand of a revision and analysis of requirements of the new technical specifications.

Can you explain in more detail the proposed alterations of the TS' presentation (for example, are the new TS based on some established generic TS format, and if, on which)?

Answer HSK's requirement concerned solely an analysis of the Technical Specifications' usability/ergonomic aspects and not their contents. The analysis showed the need for action concerning some specific aspects of the presentation of the Tech Specs, but did not result in their comprehensive renewal. Beznau NPP chose to implement the modifications stepwise. Not all the ascertained need for improvement has been implemented yet. In the first step, in particular several foot notes were removed or relocated and some recurrent expressions were harmonized. HSK approves changes of the contents of the Technical Specification, but not mere editorial changes. Therefore HSK required from Beznau NPP to establish a formal process for the review and testing of the modified TS in order to avoid that editorial changes inadvertently result in changes of the content. This formal procedure was object of approval by HSK.

Q.No	Country	Article	Ref. in National Report
52	Hungary	Article 13	p.46

Question/ Comment All plant activities outside normal operation such as backfitting, replacement and modifications of systems and components, etc. need a permit.

Q: In another context the Inspectorate uses graded approach (page 38) to decide on the justification of safety measures. Is there similar graded approach applied towards the backfitting, replacement and modifications of systems and components, for example on the basis of safety classification or risk weighting?

Answer By law, the Swiss utilities are required to backfit, to replace components and to modify their plant "adequately", according to the state of art and technology. While the utilities have mostly followed this requirement by their own in the past, there have been some examples when HSK has demanded such backfits expressly (such as bunkered shutdown systems). Both the utilities and HSK take instruments such as PSA's and periodic safety analysis reviews into account when planning such measures.

Q.No	Country	Article	Ref. in National Report
53	Canada	Article 14.1	Pages 50 and 51

Question/ Comment Under “Review of Ageing Surveillance Programme (ASP)”, how are ASP activities built into the ageing process evaluation on an ongoing basis? How are the results of such evaluations documented? How is the “effect of ageing on safety margin” (page 50, last paragraph, first line) assessed and evaluated? What is meant by the “Swiss NPP ASPs living programs” (page 51, paragraph 1, line 5)?

Answer The Swiss utilities are required to generate ageing management documents, in which each relevant (classified) component is described and evaluated against a catalogue of ageing mechanisms (and environments) and in which the international operating experience with that type of component is described. The ageing management documents are revised by the utilities and reviewed by HSK on a regular basis so that a full-scope revision cycle of all documents is completed every ten years. HSK uses the information provided in the ageing management documents to plan its inspections and the utilities use the information to schedule maintenance and repair.

Q.No	Country	Article	Ref. in National Report
54	Canada	Article 14.1	Page 51

Question/ Comment Under “Evaluation of Periodic Safety Review”, what is the extent (bases, scope and depth) of the PSR submitted by the licensee? How long does it take the licensee to perform a PSR? What are the criteria for HSK’s review of the submitted licensee’s PSR, and how long does it take HSK to do so?

Answer A PSR has to be performed at least every 10 years. The extent of the PSR is defined in HSK's guideline R-48 (in German). Important elements of the PSR are the presentation of the safety concept, the assessment of the operational experience, the deterministic safety assessment of the design basis accidents and the probabilistic assessment of beyond design basis accidents. It takes the licensees several years to complete a PSR. HSK's review of the PSR founds on the complex of the regulatory framework and takes 1 to 2 years.

Q.No	Country	Article	Ref. in National Report
55	Canada	Article 14.1	Pages 55 to 57

Question/ Comment Under “Integrated Oversight: Annual Systematic Safety Assessment”, what is the HSK annual effort expended thereon? How complex in reality is Table 2 shown on page 56? Is trending performed every year? What is the logic used for decision making? How will assigning weights to assessed aspects change the responses of the regulator or the licensee to findings from such assessments?

Answer For the annual evaluation at the end of the year, a meeting of half a day per utility is held to which about 30 people attend which adds up to about 30 man days. The preparation and the evaluation of the results add up to a similar amount. The table shown is not more complex than at first sight. All columns and rows are based on IAEA requirements and are defined transparently and logically. The development of the assessments is analysed yearly in order to detect trends in a timely manner. For the final assessment, single assessments are counted according to their weight. The weight allocated to the single assessments also has an influence on the question which measures are adequate and appropriate. The higher the importance of a deviation or of improvement necessity for the safety of a utility is, the greater the complexity of adequate measures might be. Assessments with high importance also have higher significance for the future planning of inspections.

Q.No	Country	Article	Ref. in National Report
56	Japan	Article 14.1	p.47, PSR

Question/ It is said in the report that PSR has to be performed at least every ten years.

Comment Is ASP, aging management or plant life management included in the PSR?

Answer The presentation of the ASP and the assessment of ASP insights are mandatory subjects of the PSR. In addition, ASP documents have to be submitted to HSK as part of related applications for plant changes and whenever relevant new insights arise.

Q.No	Country	Article	Ref. in National Report
57	United Kingdom	Article 14.1	Page 48

Question/ The report sets out the assessments required for a licence renewal. When are licence renewals required. Does the outcome of a Periodic safety Review require a new licence?

Answer Commonly, licence renewal applications used to be combined with PSRs. Today, with the exception of Mühleberg, there are no timely restrictions anymore on the licences of the Swiss NPPs. For Mühleberg a related application is pending. A licence is valid as long as the plant is judged to be safe. A PSR may identify a need for a licence renewal, however, has not done so yet.

Q.No	Country	Article	Ref. in National Report
58	United States of America	Article 14.1	

Question/ How will you consider seismic issues in your next update of safety assessments of NPPs?

Answer Based on the insights from the recent probabilistic seismic hazard assessment (project PEGASOS) HSK has specified new, more-stringent seismic hazard parameters that are now used in the PSAs for the Swiss NPPs. Also, HSK is preparing new seismic design specifications to be applied for substantial plant modifications and for licensing of new NPPs. No complete seismic requalification of existing plants will be required, as long as the regulatory risk criteria are met. HSK places emphasis on a risk-informed seismic backfitting process that aims at further reducing the risk.

Q.No	Country	Article	Ref. in National Report
59	United States of America	Article 14.1	

Question/ Will you use plant specific PSAs to inform the inspection process or assess the safety significance of events?

Answer Yes, regarding inspections it is intended to use, e.g., importance lists of components, operator actions and systems. Regarding the assessment of the safety significance of events it is planned to use in the future the INES scale only. In order to involve PSA the scope of the existing INES Criteria or Safety Attributes (i.e., off-site impact, on-site impact, defence in depth degradation) would be extended by an additional criterion (risk impact). HSK has established Incremental Conditional Core Damage Probability (ICCDP) threshold values in order to assign to the INES scale the risk significance of an event.

Q.No	Country	Article	Ref. in National Report
60	United States of America	Article 14.1	

Question/ Will safety culture be included in the integrated oversight process that was started in 2004?

Answer Safety culture is accounted for in the assessment of events and of inspections in the category „state and behaviour of man and organisation“.

Q.No	Country	Article	Ref. in National Report
61	Austria	Article 14.2	

Question/ Comment What is the experience (e.g. visible positive effects) with the implementation of the integrated oversight process?

Answer Decisive progress has been made with the consistent and comprehensible assessment of inspection results. Specifications for the allocation of inspection findings to the different evaluation categories and to the rows and columns of the table used for the safety evaluation have been defined. The reporting of inspections has been unified and has been structured according to the aforementioned table. The analysis and the assessment of events have been improved also by not only providing an overall rating but by recording different aspects separately. An example for this might be an event with a technical initiation and human errors during its coping. Additionally, electronic aids have been introduced which enable a rapid overview over inspections and events.

Q.No	Country	Article	Ref. in National Report
62	Hungary	Article 14.2	p.55

Question/ Comment There is a statement in the section about Reporting: Data related to general plant performance, including radiological characteristics and plant modifications for which no permits are required, must be reported on a periodic (monthly or yearly) basis.

Q: What are the criteria to decide whether the modification requires permit or not? How do you avoid the wasting of human resources on cases with low safety significance?

Answer The differentiation between modifications which are subject to a reporting requirement and modifications which are subject to a permit is defined in Art. 65 para. 3 of Nuclear Energy Act (KEG) and detailed further in Art. 40 Nuclear Energy Ordinance (KEV). In cases of doubt, HSK decides according to Art. 65 para. 5 lit. c KEG if a modification is subject to a reporting requirement or subject to a permit. This decision may be case driven or may be based on guidelines. HSK's management system helps to avoid the waste of resources with modifications of little safety significance. It uses the importance to safety as a criterion for the assessment of the corresponding processing depth.

Q.No	Country	Article	Ref. in National Report
63	Japan	Article 14.2	p.55, line 3 frm btm

Question/ Comment It is said that the systematic safety assessment system is not a one way process. How is the systematic safety assessment system interactive or multi ways?

Answer In one direction the systematic safety assessment system defines how the available data (i.e., inspection findings, event analysis results, etc.) are aggregated into a picture of plant safety. In the other direction, potential gaps in the aggregated picture of plant safety may help to identify what additional data has to be gathered in order to allow for a complete and well-balanced evaluation of the plant safety.

Q.No	Country	Article	Ref. in National Report
64	Japan	Article 14.2	p.55, Int.Oversight

Question/ Comment How are the results of the integrated oversight opened or published?

Answer The results of the integrated oversight are published concisely in HSK's yearly Oversight Report. A large proportion of the documents authored by HSK can be viewed on demand according to the federal law on public administration transparency from December 17th of 2004 (BGÖ). Among this proportion are most documents which include assessments which have been conducted within the integrated oversight. The most important of these are inspection reports, which

include the majority of assessments.

Q.No	Country	Article	Ref. in National Report
65	United Kingdom	Article 14.2	Page 54

Question/ Comment Regarding the inspection process, is the role of the Co-ordinator an administrative one or a technical one? Are inspections carried out by individual inspectors or by teams? Could Switzerland give some examples of recent topical inspections?

Answer On one hand the Co-ordinator has administrative tasks and on the other hand he conducts inspections himself and participates in team inspections. Inspections can be conducted by both, single inspectors or by a team. Examples for topical inspections in the last years are the maintenance of diesel generators, the deployment of external companies in NPPs and the decision making process in NPPs.

Q.No	Country	Article	Ref. in National Report
66	Bulgaria	Article 15	p. 58

Question/ Comment What specific requirements have been included in Guide R-47 “Calculation of the radiation exposure in the vicinity of nuclear installations due to emissions of radioactive materials” with regard to the computer models and parameters which are applied in the performance of these calculations?

Answer In the appendices of the guideline HSK-R-41, the exact mathematical formulas and parameters for the calculation of the radiation exposure in the vicinity of nuclear installations due to emissions of radioactive materials are given. The formulas and parameters, which are not regulated in the appendices of the Swiss Radiological Protection Ordinance, are taken from international guides like IAEA Safety Guides, Safety series No. 50SG-S3, 1980 or foreign regulations like the German “Allgemeine Verwaltungsvorschrift zu § 45 Strahlenschutzverordnung, Ermittlung der Strahlenexposition durch die Ableitung radioaktiver Stoffe aus kerntechnischen Anlagen (AVV)” Bundesanzeiger, 42(64a) vom 21. Februar 1990 and the American NUREG/CR-1918, National Technical Information services (NTIS), D.C. Kocher, 1981: “Dose-Rate Conversion Factors for External Exposure to Photons and Electrons.”

Q.No	Country	Article	Ref. in National Report
67	Germany	Article 15	page 64

Question/ Comment The Beznau NPP has successfully reduced its liquid discharges using nanofiltration.

Will HSK require such a filtration system also for the other NPPs to further reduce the discharges according to the ALARA principle?

Answer The Inspectorate requires a reduction of the liquid discharges if the liquid discharges are higher than the median value of the European pressurised and boiling water reactors, respectively. The liquid discharges of Leibstadt and Gösgen NPP are equal or below the correspondent median value. For Mühleberg NPP in the frame of the assessment of the periodic safety review in 2007 the Inspectorate formulated the following requirement: “The Mühleberg NPP has to take measures to reduce the liquid discharges in view of the appropriateness under a target value of less than 1 GBq (without tritium).” The Inspectorate demands the achievement of target values but not any specific technical solution, like nanofiltration.

Q.No	Country	Article	Ref. in National Report
68	Netherlands	Article 15	pp. 60,61

Question/ Why is the Mühleberg NPP performing less well than the other NPPs with respect

Comment to individual doses for the workers and the calculated doses based on the annual emissions?

Answer The calculated annual doses for a virtual exposed group of the population include the exposure due to deposition from former years. In 1986 the Mühleberg NPP had a malfunction of the waste treatment system of dry resin, which led to an emission of radioactive particles (Cs-137). The radiation of this deposition gives the main contribution to the calculated dose. The dose contributions of the aerosols, which are dispersed in the reporting years, are negligible to that and lie in the order of the doses of the other NPPs.

Compared to the other NPPs of Switzerland the Mühleberg NPP is less well performing concerning the mean individual doses for the workers.

The reason for this behaviour is the following: The mean individual dose accumulated in the Mühleberg NPP during outage is in the same order of magnitude as the dose accumulated in other BWRs.

The differences for the higher mean individual dose compared to other NPPs occurs at normal operation. In the Mühleberg NPP the main steam line is passed on the ceiling of the turbine housing and the reactor building. During the regular inspection walks the workers accumulate higher doses due to the geometrical and technical circumstances given in the Mühleberg NPP.

Q.No	Country	Article	Ref. in National Report
69	Netherlands	Article 15	p.63

Question/ Comment Are the NPPs using a value of unit collective dose (Euros/mSv) to decide on which ALARA-measures to take? If so, are these values recommended by the government of Switzerland?

Answer There are no alpha values recommended by the government of Switzerland (nothing like that is asked for neither in the Nuclear Energy Legislation (www.admin.ch/ch/d/sr/7/732.1.de.pdf) nor in the Radiation Protection Legislation (www.admin.ch/ch/d/sr/8/814.50.de.pdf).

Nevertheless in a few cases the NPPs have used the alpha values recommended by the German VGB for assessing the optimisation. The German VGB proposes for doses less than 10 mSv an alpha value of 150 Euro/mSv and for doses higher than 10 mSv a value of 1500 Euro/mSv.

Q.No	Country	Article	Ref. in National Report
70	Netherlands	Article 15	p.64

Question/ Comment Can Switzerland provide some information on the results of the environmental surveillance program of the inspectorate?

Answer A summary of the results of the environmental radiological surveillance program is annually published by the Federal Office of Public Health. The report can be downloaded on the Internet site of the Federal Office of Public Health (www.bag.admin.ch/themen/strahlung/00043/00065/02239/index.html?lang=de).

Q.No	Country	Article	Ref. in National Report
71	Canada	Article 16.1	Page 71

Question/ Comment Regarding “Emergency Exercises”, given that several teams are required to provide full coverage of the Emergency Response function, would all teams gain sufficient experience with the indicated frequency for training and exercises?

Answer In addition to the emergency exercises performed according to the guideline B11 “Emergency Exercises” the nuclear plants – including the interim storage ZWILAG – are performing plant internal emergency trainings for the different emergency

teams such as fire brigades, first aid treatment staff, support groups for mechanical and electrical tasks for example.

Q.No	Country	Article	Ref. in National Report
72	Ukraine	Article 16.1	Article 16, page 70

Question/ Comment Are the alert procedures include the classification of accidents outlined in the IAEA safety requirements GS-R-2?

Answer The organisation of the plants include in addition to the shift personnel an engineer on duty coverage at all times (e. g. the engineer on duty has to be at the control room within 10 minutes of being summoned).
The engineer on duty has the authority and responsibilities to classify a nuclear or radiological emergency and upon classification promptly and without further consultation to initiate an appropriate on-site response. In addition, he is responsible to inform the appropriate off-site notification offices (HSK, national emergency operation centre NAZ, local government Canton) to provide sufficient information for an effective off-site response.
The plant organisation is provided with means and processes of alerting on-site response personnel.

Q.No	Country	Article	Ref. in National Report
73	Luxembourg	Article 16.2	page 72

Question/ Comment Emergency plans are not only tested at the national plan but Switzerland invited the neighbouring countries to take part in some full scale exercises and also participated in the exercises of a French NPP. What are lessons learned from the recent international emergency exercises? What kind of feedback from lessons learned was implemented to the emergency plan or its practice?

Answer All partners involved in full scale emergency exercises (Gesamtnotfallübungen) evaluate the result thereof, e. g. based on the evaluation of the full scale emergency exercises IRIS (2003) and KRONOS (2005) the emergency plan of the Beznau and Leibstadt plant was adjusted with respect to the criteria for immediate alarming of the population RABE (Rasche Alarmierung der Bevölkerung).

Q.No	Country	Article	Ref. in National Report
74	Slovenia	Article 17.1	Art. 17, p. 75

Question/ Comment Currently, the Inspectorate is also preparing bases, approaches and decisions regarding new seismic design specifications for substantial plant modifications and for licensing of new NPPs.
Please, could you update this information and provide more details regarding regulatory position. Which values will be required for seismic design specification – new results without uncertainties, average value with uncertainties or something else?

Answer HSK intends to lay down a procedure that defines how specific seismic design values (without uncertainty) have to be derived from the results of the probabilistic seismic hazard analysis.

Q.No	Country	Article	Ref. in National Report
75	Netherlands	Article 17.2	p.75

Question/ Comment project PEGASOS.

During the NEA/ workshop in Korea, representatives of the Swiss utilities didn't agree with the outcomes of the study. As a result the licensees developed a programme for a refinement effort. On the other hand, the HSK has specified more stringent seismic hazard parameters for the PSA and prepares bases, approaches

and decisions regarding seismic design specifications for substantial plant modifications.

1. Does that mean that the HSK is forcing unilaterally that the plants need to be back fitted due to a new hazard curve?

2. If so, did the relation between HSK and utilities play a role in the decision-making? In other words, is there besides the independency of the HSK from other governmental organizations also a change in attitude towards the licensees; more enforcement oriented?

Answer The new (more-stringent) seismic hazard parameters are now applied by the Swiss licensees in the PSA. No complete seismic requalification of existing plants will be required, as long as the regulatory risk criteria are met. HSK places emphasis on a risk-informed seismic backfitting process that aims at further reducing the risk. Until new seismic design specifications will be formally laid down, the seismic hazard assumptions for particular backfits are individually specified, taking into account also the cost-benefit ratio.

Q.No	Country	Article	Ref. in National Report
76	Japan	Article 17.3	p.76, Measures

Question/ Comment Components and structures that have been backfitted over the past years as results of PEGASOS project are reported in the report.

Are these backfits required by regulation or licensee's voluntary action?

Answer For the most part, the seismic backfits that are specifically mentioned in the report were suggested based on insights gained through PSA studies and related walk downs. These backfits were carried out over an extended period of time; in part even before, however, mostly during the time the PEGASOS project was carried out. Based on the results of the PEGASOS project, HSK has requested the licensees to systematically investigate the possibilities and benefits of additional seismic backfits. First measures resulting from this request are expected to be implemented this year.

Some of the seismic backfits that are specifically mentioned in the report were voluntary licensee actions, some were requested by HSK. One request (relating to the strengthening of a series of masonry walls in an operations building) was in the form of a regulatory ultimatum.

Q.No	Country	Article	Ref. in National Report
77	Finland	Article 18.2	

Question/ Comment Have you met specific problems to find spare parts or replacement components properly qualified to a high safety class, as needed for plant lifetime management? If yes, how have you addressed the problem?

Answer Until now the procurement of replacement components and parts has not lead to problems. However, large classified components such as the heat exchanger of the Nuclear Island Closed Cooling Water System must be ordered well ahead of time. The exchange of the component cooling heat exchanger is planned in a Swiss NPP.

Q.No	Country	Article	Ref. in National Report
78	Canada	Article 19.1	Page 83, last paragraph

Question/ Comment The report appears to indicate that it took from 1998 to 2002 for Leibstadt to uprate the power by 14.7%. What were the bases for the power uprate? Why did it take 4 years to reach the targeted power of 114.7%? What were the structures, systems and components (SSCs) that had to be re-assessed or back-fitted (from the safety viewpoint) to accommodate this uprate?

Answer The Leibstadt NPP (KKL) is a General Electric Boiling Water Reactor of the type BWR/6-238 with Mark III Containment. It started commercial operation in December 1984 with a reactor power of 3012 MWth. Approximately one year later the reactor power was increased by about 4 % to 3138 MWth. This first power uprate could be easily accomplished because the BWR/6 design included this margin.

The standard BWR/6 was designed for a reactor power of about 3600 MWth, i.e. the power up-rate of KKL is generally within the design basis of the BWR/6. The safety assessment showed that most of the safety systems, such as the emergency core cooling systems, were already designed for the power uprate. Minor plant modifications were required, such as a modification of the blockage of the Automatic Depressurisation System and a feedwater pump run back during an ATWS-Transient, to improve the plant behaviour.

However, in comparison with the standard BWR/6, the KKL reactor core is smaller: it comprises 648 instead of 748 fuel assemblies. This implies a higher power density (62.8 MW/m³).

In Switzerland, the regulatory authority HSK, restricted the power uprate of NPPs to steps of about 5%. The reason was to verify by experience the expected plant and fuel behaviour during normal operation and by special test programmes for each step during a minimum period of six months (KKL). Each step of the power uprate required a successfully performed test programme (turbine, feedwater and recirculation pump trips etc.), normal operation without power uprate related events such as fuel cladding failures, and a plant performance report to the authority. Each step had to be approved and confirmed by the authority.

Q.No	Country	Article	Ref. in National Report
*	Pakistan	Article 19.1	Section 19.1, Page 83

Question/ Comment Kindly Refer to Clause (i) and elaborate the reason behind seeking separate permits/licenses for step by step power levels as mentioned for Leibstadt NPP?

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step had to be approved and confirmed by the authority.

Q.No	Country	Article	Ref. in National Report
79	Bulgaria	Article 19.3	

Question/ Comment What criteria are used to determine the lifetime of the plant.

Answer NPPs must operate safely at all times, therefore, when the systems, structures and components (SSCs) of NPPs cannot fulfil their safety functions anymore, despite backfitting, replacements and other actions, then the NPP is deemed to have reached end-of-life. Large passive items, such as the reactor pressure vessel (RPV) and the containment are considered to be irreplaceable, so when they cannot fulfil their design function, e.g. freedom from brittle fracture (RPV) and ability to retain radioactive releases (containment), they will determine the operational life. The operator may take actions to recover the NPP and make it fit for service, but the safety case will always take precedence over economic considerations.

Q.No	Country	Article	Ref. in National Report
80	Bulgaria	Article 19.3	

Question/ Comment Do you have long term operation strategy or plans to operate the NPPs beyond design lifetime.

Answer The NPPs in Switzerland have been continually kept up to the state of science and technology (as a legal requirement). This means that many improvements have been done to structures, systems and components (SSCs) and operational conditions over the years and thus, the NPPs are technically on a level with modern NPPs in terms of safety and reliability of the safety-relevant SSCs. Ageing surveillance programmes are required and are in place since 1990. These follow the ageing of SSCs and allow for continual control to assist timely actions to address ageing issues in SSCs. The NPPs may continue to operate as long as the current safety level is maintained/improved and demonstrable, and that a sufficient safety margin is present. Design lifetime does not necessarily have to be the end-of-life, especially when backfitting and other actions have been done to improve safety and reliability.

Q.No	Country	Article	Ref. in National Report
81	Bulgaria	Article 19.3	

Question/ Comment Do you have a re-qualification program for components to be used beyond their design lifetime.

Answer For safety-relevant components monitoring, inspection and testing programmes are implemented. Results from these determine the acceptability for continued operation. Replaced/new design structures, systems and components (SSCs) have to be re-qualified to ensure functional equivalence compared to the removed SSC.

Q.No	Country	Article	Ref. in National Report
*	Pakistan	Article 19.4	Section 19.4, Page 86

Question/ Comment Kindly Refer to Clause (iv) and indicate whether event based or symptom based approach has been adopted for the development of Emergency Operating Procedures (EOPs).

Answer All Swiss NPP have at their disposal emergency operating procedures that are either condition-oriented or system-oriented. Additionally there are event-driven procedures for operating failures with a high probability of occurrence i.e. for troubles occurring several times during service life of a plant.

Q.No	Country	Article	Ref. in National Report
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82	Canada	Article 19.5	Page 87, clause (v)
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Question/ Comment What mitigating actions are the licensees implementing to prevent the potential loss of technical expertise?

Answer At this time there are no signs of a phase out of nuclear energy programmes in Switzerland, on the contrary, the regulator expects the application for new plants by the utilities. So, NPPs are still considered as good employers, therefore, they are still attractive for young people. Education and training in nuclear and plant specific issues are performed either at specialized institutions, suppliers of devices, reactor designers, manufacturers and with vendors but also at the plant itself. However, on a higher educational level there is a lack of educational institutions providing courses in nuclear engineering in Switzerland. This was the reason why the Swiss utilities decided to sponsor a professorship in nuclear engineering at the Swiss Federal Institute of Technology.

Q.No	Country	Article	Ref. in National Report
83	Germany	Article 19.5	page 85

Question/ Comment Does the Inspectorate require programmes for the maintenance of corporate knowledge at the operating organisations?

Has HSK an own programme to maintain its knowledge?
Please report about the experiences made so far.

Answer Currently a new ordinance on the requirements for competencies of personnel of nuclear plants is in force and a related regulatory guideline will be issued which are important instruments for the maintenance of corporate knowledge. In the past, only the part for the licensed personnel was required in a regulatory guideline. At that time the conservation of corporate knowledge and personnel development was and is a regular point on the agenda of the annual management meeting between NPPs and the regulator. In addition the regulator performed several inspections to this issue. The regulator has recognized that all plants have implemented effective means to maintain their cooperate knowledge. Especially in order to cope with the effects of the generation change all plants provide longer periods of overlapping time between people belonging to the new and the old generation. For some important functions the new guideline specifies a minimum of experience for the job.

Two years ago a working group of Swiss utilities and the regulatory body did a survey of the approaches used at NPPs as well as with the regulator to maintain corporate knowledge. Also this result shows examples of effective means to transfer knowledge from the old to the new generation.

Q.No	Country	Article	Ref. in National Report
84	Canada	Article 19.6	Page 88, paragraph 1, clause vi

Question/ Comment This section indicates that for Class S, A, or O events, the decision to inform the media is made by the Inspectorate rather than the Licensee. Why is this approach to public information used in Switzerland?

Answer Information to the media is not delivered exclusively by HSK. The licensee and HSK coordinate the release of information.

Q.No	Country	Article	Ref. in National Report
85	Romania	Article 19.6	

Question/ Comment Please specify the correlation between the scale (based on INES), presented in article 14, page 57, and the safety significant classes S, A and B related to the reporting time and content of reports, presented in article 19, page 87.

Answer Up to now there has been no clear and simple correlation between the safety

significant classes S, A and B on one hand and the INES scale on the other. In practice the majority of events of the class B were classified 0 with INES and only a few were classified INES 1. Ever since the INES classification was introduced, only a single event of class A (which was classified INES 1) and not one event of class S has occurred. Generally, events of class A would be considered INES 2 and events of class S would be INES 3 or higher.

Q.No	Country	Article	Ref. in National Report
86	Canada	Article 19.7	Page 90

Question/ Comment Regarding “Reactor Head Corrosion event (Davis Besse)”, what self-assessment, if any, was performed by the Swiss NPPs as a result of any internationally reported event (e.g., safety culture review as a result of the Davis Besse event (WANO SOER 02-04))? As a result of such self-assessment, how have identified gaps been addressed by the NPP?

Answer All internationally reported events are assessed in the internal safety boards of the Swiss NPPs. Boric acid corrosion at the reactor vessel head was well known in Switzerland since 1971, when a canopy seal weld leakage caused corrosion on the vessel head of Beznau I. Boric acid corrosion is identified as a possible ageing mechanism in the ageing surveillance programmes for the reactor vessel heads of all Swiss PWRs. An appropriate ageing surveillance was already in place before the Davis Besse event happened. It consists of visual inspections, volumetric inspections of penetrations and leakage monitoring. The ageing surveillance is reassessed at any important domestic or international finding of reactor vessel degradation and at periodic safety assessments. The assessment of the Davis Besse event did not show gaps in ageing surveillance.

Q.No	Country	Article	Ref. in National Report
87	Finland	Article 19.7	

Question/ Comment Please explain the principles or criteria applied by the regulator and operator for screening other experience than incidents (e.g., management issues, unexpected degradation, design weaknesses, external hazards not considered earlier), for the purpose of ensuring adequate sharing of important experience with international interested parties (regulatory bodies, operators, designers, international bodies). Identify the relevant guide documents, if any, used for the screening.

Answer There are no specific criteria and no guide documents. The reporting guideline HSK-R-15 defines what has to be reported to the regulatory body, events and other findings that may be of some safety interest. This guideline is under revision and the new guidelines B02 (periodic reporting) and B03 (event reporting) will be more specific in these aspects. In addition, every guideline contains evaluation criteria and identifies areas of interest to be considered in the safety evaluation. Especially the Guideline on the Organisation of NPPs (HSK-R-17, replaced by G07 by April 1st, 2008) contains requirements in the area of management and organisation. This is done either spontaneously in the case of a major finding or in the monthly report in the cases of minor significance. The reporting level is rather low. Criteria to share the information on an international base are:

- safety significance of the finding
- novelty of the finding
- estimated interest of an international public

In addition the criteria in the IRS Guidelines (HSK) and in the WANO Guidelines (NPPs) are applied.

Q.No	Country	Article	Ref. in National Report
88	Finland	Article 19.7	

Question/ Comment Please explain how the regulatory body ensures or verifies that the operators are informed and properly analyse the operating experiences reported through the well established international channels (e.g., WANO, IRS), and that they address the lessons learned by taking proper actions.

Answer All plants have an established process for dealing with external information on events or findings in other NPPs. Different information sources are used. HSK inspects these processes. In addition HSK requires that the plants report every three months on their findings and actions based on information from external events. HSK sends IRS reports that may be of interest/relevance for Swiss NPPs to the plants and requires an evaluation of the significance of the information for their own installation.
Several modifications in Swiss NPPs are based on external information.

Q.No	Country	Article	Ref. in National Report
89	Finland	Article 19.7	

Question/ Comment Please explain your national policy and practice of sending feedback reports to the international interested parties on actions that have been taken in your country as response to significant events reported through international channels (e.g., WANO, IRS).

Answer Switzerland is hooked up to the IRS-system and follows the specifications of OEF which are given in the reporting guidelines of the IRS. Formal feedback of the measures which are taken due to IRS reports and to other international OEF is not planned. However, HSK informs on such measures in its yearly oversight report and in meetings of CSNI/CNRA, WGOE, IRS, INES etc.
The licensees of Swiss NPPs inform WANO about the implementation of OEF measures and their implementation is checked during the periodic WANO Peer Reviews.

Q.No	Country	Article	Ref. in National Report
90	Germany	Article 19.7	

Question/ Comment Reference to the Summary Report of the 3rd Review Meeting, item 36, 38, 42 and 43

The following set of questions is of special interest for Germany for the further development in this field. As some of these items may already be covered by your report or by other questions posted by Germany, we do not expect repetitions of information already delivered. Please just give additional information as appropriate. It was decided at the Third Review Meeting to discuss this topic at the Fourth Review Meeting.

1. Which are the screening criteria for the internal and external experiences to be considered? (Are audits and reviews performed by external experts for controlling the effectiveness of OEF? Which procedures, committees etc. are established for the review and exchange of operating experience at the plant operator level and the supervisory level?)
2. How is the implementation of lessons learned from operational experience monitored?
3. How are operating experiences handled that are below the statutory reporting threshold?

Answer 1. For criteria see answer to question 87. OSART and WANO Peer Reviews were performed at all Swiss NPPs and an IRRT mission at the regulatory body. All missions had a close look to the OEF programmes and their effectiveness. For

procedures and guidelines see also answer to question 87.

There is no need for a special committee within Switzerland on a regulatory basis. There is one regulator.

The plants share information in different working groups dealing with different issues, also with events.

HSK shares information on an international level via official channels:

- IRS, using the criteria in the IRS Guidelines
- IAEA Technical Meetings on IRS and INES
- bilateral contacts with other regulators

and in a more informal way in different working groups e.g. of the OECD/NEA.

In addition, HSK has annual meetings on regulatory aspects with Germany (Deutsch-Schweizerische Kommission) and with France (commission franco-suisse). One regular point on the agenda is exchange of information on events in NPPs.

The Swiss NPPs share their information on an international level via WANO (based on the WANO criteria), via different international working groups, owner groups, vendors, and on a bilateral base between plants.

Q.No	Country	Article	Ref. in National Report
91	Japan	Article 19.7	p.88, line 11 frm btm

Question/ Comment It is reported in the report that in the case of events that are of safety significant a plant internal investigation team starts a through analysis.

Is this internal investigation team independent in the plant? For example, independent from the operation or the maintenance division.

Answer Different solutions are established in the different plants in Switzerland. For events with a simple technical cause independency is not an issue. However, in the case of Human and Organisational Factors contributions independency is important. The Swiss Nuclear Energy Ordinance requires that each plant forms a group that investigates such events, defines corrective actions and follows their implementation. In these cases the team is interdisciplinary and this gives a certain guarantee for independence. In two plants the persons assigned for event analysis are not within the departments involved in the operation of the plant. In all plants, the investigation of more complex events is performed by an interdisciplinary group formed by members of different technical departments. The chairperson of this group is always the same; he or she has experience in coordinating the activities and driving the investigation process.