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Legal Services and Safety Division

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Review of Emergency Preparedness Measures in Switzerland

Report by the IDA NOMEX Interdepartmental Working Group

Contents

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Summary

Following the events in Japan during March 2011, IDA NOMEX (the Interdepartmental Working Group to Review Emergency Preparedness Measures in case of Extreme Events in Switzerland) was convened to review emergency preparedness measures in Switzerland on behalf of the Federal Council. This report records the results of the work undertaken by IDA NOMEX, arranged according to subject areas.

Sections I to III explain the background created by the events in Japan, the mandate issued by the Federal Council to IDA NOMEX, and the implementation of this mandate.

The first chapter of Section IV deals with the provision of personnel, equipment and material to deal with events. As a consequence, the existing obligations of individuals are to be reviewed, the operational readiness and resilience of the Federal NBCN Crisis Management Board (BST ABCN) are to be improved, and issues relating to support for the cantons by the Federal government in case of events are to be clarified. In addition, a reserve of equipment and material is to be created in order to provide support for Swiss citizens abroad. Furthermore, issues regarding the financing and provision of protective equipment, operational systems and personnel for emergency preparedness are to be clarified in conjunction with the Consultation and Coordination Mechanism of the Swiss Safety Alliance (Sicherheitsverbund Schweiz, KKM SVS) and the operators of nuclear power plants.

The second chapter deals with legislation on radiation protection. In this context, it is intended to improve liaison and coordination among individual Federal agencies and departments for the purpose of organising sampling, measurements and assessments of the radiological situation, and for ordering actions to be taken. Moreover, there are to be reviews of the harmonisation of limits and reference values to bring them into line with internationally specified requirements, of the existing situation regarding the treatment of persons exposed to radiation, and of the "Contact Point" concept for affected individuals. In addition, it is intended to create a basis for controlling flows of people and goods at borders in case of increased radioactivity.

The third chapter presents adaptations that may be required in connection with the NBCN Operations Ordinance. On the one hand, this aspect concerns improvements in terms of the deployment, responsibilities, composition and coordination of BST ABCN. On the other hand, it focuses on the newly-established KKM SVS, its collaboration with BST ABCN and cooperation between the Federal government and the cantons in case of extreme events. In addition, the existing "Dose Measures Concept" (DMK) is to be converted into a "Measures Concept" (MK), ensuring that means of communication and measuring systems are both redundant and fail-safe.

The fourth chapter explains the goals, implementation, actions required and planned measures in connection with the existing OWARNA (Optimisation of Warning and Alarm Systems) project.

Measures related to the Emergency Preparedness Ordinance are covered in the fifth chapter. The reference scenarios for emergency preparedness and the current zoning concept are to be reviewed. In addition, bases will be developed for large-scale precautionary evacuation and evacua-

tion subsequent to an event, and the emergency preparedness concept for nuclear power plants is to be reviewed, especially as regards planning and preparations in emergency preparedness zones, and the arrangements for receiving and looking after evacuees.
The distribution concept for iodine tablets outside of the current emergency preparedness zones 1 and 2 is to be reviewed, as detailed in the sixth chapter.

The seventh chapter describes the revision and implementation of the Alarming Ordinance which have already taken place. No further measures are required in this area.

International aspects are presented in the eighth chapter, which details the existing agreements and cooperation work with neighbouring countries and international organisations for the purposes of mutual information exchange, coordination and assistance in emergencies. Specific requirements for further international collaboration are also noted.

Sections V and VI deal with the resources that are required, the allocation of the costs of these resources, and the impact on the cantons. It is not possible to give a precise assessment of the consequences in this regard at present. This will only be possible when the individual measures are specified as processing of these aspects continues.

The further procedure is presented in Section VII: it is envisaged that future reviews of emergency preparedness measures in Switzerland should be continued under the auspices of BST ABCN and KKM SVS.

The report describes a series of organisational and legislative measures which have proven to be necessary as a result of the review conducted by IDA NOMEX. The Federal agencies and offices with responsibility for the respective areas will be responsible for implementing these measures. Given that cooperation between the Federal government and the cantons is necessary for the practical implementation of much of the knowledge that has been gained, the mandated Federal agencies and offices will liaise with the cantons in order to draft the relevant mandates and to develop the measures.

After this report has been approved, the review of emergency preparedness measures in Switzerland is to be continued under the auspices of BST ABCN and KKM SVS. In addition, BST ABCN is scheduled to compile a final report in 2014 which will describe the implementation of the measures proposed by IDA NOMEX.

I. Background

1. Events in Japan

Following the catastrophic earthquake on 11 March 2011, the Japanese authorities were abruptly confronted with a multidimensional crisis. During the first hours, they had to cope with the immediate effects of the earthquake and the tsunami: the natural disaster claimed 20,000 lives, while hundreds of thousands of people sustained injuries, lost all their possessions and had to be provided with makeshift accommodation. Large parts of the infrastructure were affected or destroyed in the stricken prefectures. A series of technical accidents (including accidents at nuclear power plants (NPPs) and chemical accidents, dam breaches, etc.) occurred as consequences of the natural disasters.

2. Effects on Switzerland

In Switzerland, various specialist units concentrated mainly on the severe incident in the nuclear plants at Fukushima Dai-ichi and its potential impact on Europe. For the Federal Department of Foreign Affairs (FDFA), the focus was chiefly on the wellbeing of the 2,000 or so registered Swiss citizens, the Embassy staff and the Swiss rescue forces in Japan. Because the affected Swiss citizens at the location were very anxious and because it was difficult to foresee the development of events at Fukushima, equipment and supplies were also made available on an ongoing basis (measuring instruments, dosimeters and iodine tablets).

Various companies operating in Japan, such as Swiss International Air Lines, asked Federal agencies and offices for an assessment of the situation on the ground. At the same time, numerous companies based in Switzerland and with business activities in Japan appraised the hazard situation arising from the accident at the nuclear power plant on their own initiative. Several companies had to implement measures, sometimes on an extensive scale, in order to protect their workforces and products, and for the purpose of Business Continuity Management (BCM). The events related to the incident at Fukushima gave rise to a very high demand for information on the part of the media, which continued for several weeks.

3. Consequences in Switzerland

On the basis of a report by ENSI[1], the Federal Council decided on 4 May 2011 to set up an Interdepartmental Working Group to Review Emergency Preparedness Measures in case of Extreme Events in Switzerland (**IDA NOMEX**).

IDA NOMEX comprises representatives of:

- the Federal Chancellery (FCh)
- the Federal Department of Foreign Affairs (FDFA): Directorate of Public International Law (DPIL)
- the Federal Department of Home Affairs (FDHA): Federal Office of Public Health (FOPH)

[1] Cf. the ENSI report, "Status of Investigations into the Accident at the Fukushima Nuclear Power Plant (Japan) and Status of Measures and Advance Safety Reviews at Swiss Nuclear Power Plants", available on the internet: http://static.ensi.ch/1312522250/hintergrundinformation_fukushima.pdf

- the Federal Department of Justice and Police (FDJP): Federal Office of Justice (FOJ)
- the Federal Department of Defence, Civil Protection and Sports (DDPS): Federal Office for Civil Protection (FOCP), National Emergency Operation Centre (NEOC), Armed Forces Joint Staff (AFJS), National NBC Protection and Coordination Office
- the Federal Department of Economic Affairs (FDEA): Federal Veterinary Office (FVO)
- the Federal Department of Environment, Transport, Energy and Communications (DETEC): Federal Office for the Environment (FOEN), Federal Office of Transport (FOT) and Swiss Federal Office of Energy (SFOE)
- the Swiss Federal Nuclear Safety Inspectorate (ENSI)
- Cantons: Conference of Cantonal Governments (KdK), Governmental Conference of the Armed Forces, Civil Defence and the Fire Brigades (RK MZF), Conference of Cantonal Justice and Police Directors (KKJPD), Swiss Conference of Cantonal Health Directors (GDK), Conference of Cantonal Energy Directors (EnDK), Cantonal NBC Coordination Platform (KP ABC)

SFOE is responsible for general co-ordinance and coordination of the Working Group's activities.

II. Mandate

As a consequence of the events in Japan, the Federal Council mandated DETEC to convene an Interdepartmental Working Group to review the adaptation of existing legislative and organisational measures in the area of emergency preparedness. DETEC had to report to the Federal Council by autumn 2011. The responsible departments were instructed to submit any draft changes that might be needed to laws and ordinances by mid-2012.

The immediate need to take action on any necessary measures in Switzerland was described and clarified on this basis of this mandate. Measures beyond the scope of immediately necessary action are designated as medium- and long-term measures in the report to the Federal Council.

III. Implementation

SFOE conducted a survey of the members of IDA NOMEX in order to formulate a list of the issues to be covered. This survey focused on the need for immediate action in respect of any measures that might have to be taken in Switzerland based on knowledge gained from the events in Japan, especially in connection with the secondary event in the Fukushima nuclear plants.

At the first meeting of IDA NOMEX on 22 June 2011, the issues submitted by all the representatives in the IDA were discussed and allocated to specific areas, usually relating to existing ordinances. For three of these areas, namely the Radiation Protection Ordinance (RPO/StSV; SR [Systematic Collection of Federal Law] 814.501), the Ordinance relating to the Organisation of Operations in case of NBC and Natural Events (NBCN Operations Ordinance; SR 520.17) and the Ordinance concerning Emergency Preparedness in the Areas Surrounding Nuclear Plants (Emergency Preparedness Ordinance, NFSV; SR 732.33), Working Groups were formed and were mandated to process the issues assigned to them. General co-ordinance of the Working Groups was assigned to the Federal agency or department with responsibility for the relevant ordinance. The interested parties delegated representatives to these Working Groups. For the remaining subject areas, the responsible agencies and offices were requested to compile a sub-report to be included in the present report. The three Working Groups held several sessions. Interim and final results were discussed in IDA NOMEX. The present report was approved by IDA NOMEX on 4 April 2012.

In line with the working structure based on ordinances, the report deals with legislative measures primarily in terms of the intended amendments to ordinances. This does not mean that all these changes, as such, are already possible on the basis of existing legislation. If it becomes evident that there is a need for additional basic Federal legislation when the amendments to ordinances are being drawn up, then prompt action must be taken to introduce such legislative bases.

The issues to be dealt with are varied, and the resultant measures are complex. Coordinating these measures in terms of content and timing is a demanding task. For this reason, it was not possible to submit the report to the Federal Council in autumn 2011. Ahead of the legislative measures, it is necessary to draft the bases for them, which are very complex in some cases. For this reason in particular, it was impossible to draft the legislative measures as specified in the mandate.

Cooperation between the Federal government and the cantons is necessary in order to implement much of the knowledge acquired, so the mandated Federal agencies and offices will liaise with the cantons in drawing up the relevant mandates and measures. The Federal agencies and offices in question, as well as BST ABCN, will coordinate implementation of the measures mentioned in the report with KKM SVS in cases where key issues of cooperation between the Federal government and the cantons are involved.

IV. Subject areas

1. Personnel, equipment and material

This chapter combines subject areas covered by the three Working Groups on the Radiation Protection Ordinance, the NBCN Operations Ordinance and the Emergency Preparedness Ordinance which are related to the provision of personnel, equipment and material in case of an event.

1.1. Obligations incumbent on individuals

Article 20 of the Radiation Protection Act (RPA/StSG; SR 814.50) stipulates that Federal Council shall issue provisions regarding the obligations incumbent upon individuals and enterprises. This refers to individuals, entities and enterprises which, in case of an event, should take on specific tasks that are essential in order to protect the population as part of their normal professional and entrepreneurial activities (e.g. transport enterprises, rescue services and the Federal Customs Administration (FCA), etc.). Article 120 of the Swiss Federal Radiation Protection Ordinance (RPO/StSV) defines the categories of individuals who are subject to such obligations.

Summary, conclusions and consequences

- **Organisational measures**
  - DETEC/SFOE is mandated to examine, by 31 December 2012, whether the basic legislation is adequate in order to impose obligations on public transport enterprises.
  - DDPS is mandated to examine, by 31 December 2012, the conditions under which and the extent to which units of the Armed Forces and the civil defence forces can be deployed.
  - FDHA/FOPH is mandated to compile, by 31 December 2012, a concept for the dosimetry of persons subject to obligations and for the registration of personal doses (possibly with the involvement of the Group of Experts on Personal Dosimetry of the Federal Commission for Radiation Protection and Radioactivity Monitoring (KSR)).

- **Legislative measures**
  FDHA/FOPH, DDPS and DETEC/SFOE are mandated to initiate, by 31 December 2013, the necessary adaptations regarding the imposition of obligations on individuals as required.

1.2. Definition of preparedness requirements and resilience for the Federal agencies and offices represented in BST ABCN

1.2.1. Knowledge gained from Fukushima

Although the events in Japan took place at a great distance from Switzerland, various Federal agencies and offices were operating round the clock for almost two weeks (examples include the National Emergency Operation Centre (NEOC) as a permanent core element of the Federal NBCN Crisis Management Board (BST ABCN)). In case of an event at a Swiss nuclear power plant, the requirement for resources would be considerably greater.

1.2.2. Deficiencies and shortcomings of current provisions

Major differences regarding the resilience of the individual Federal agencies and offices presently exist. Many of the bodies involved in dealing with an event are not prepared for crisis management over a period of several weeks in terms of organisation, staffing or equipment. In addition, there is a lack of suitable alternative locations for most of the bodies involved in managing a crisis.[2]

The principle is that all the Federal agencies and offices represented in BST ABCN must set up their own resilient management cells, with appropriate infrastructure. In case of an event, these cells must provide the necessary services for BST ABCN. Likewise, BST ABCN must have a suitable management infrastructure at its disposal, together with the management support elements. The bases required for BST ABCN to achieve this are being developed as part of the "BST ABCN Development" project.

Summary, conclusions and consequences

- **Legislative measures**
  DDPS/FOCP is mandated to submit to the Federal Council, by 31 December 2013, the necessary additions to the NBCN Operations Ordinance (Articles 4 and 5) in order to ensure the operational readiness and resilience of the Federal agencies and offices represented in BST ABCN.

1.3. Support from the Federal government in case of an event

1.3.1. Bases

In various concepts for dealing with accidents in Swiss nuclear power plants, it is assumed that the Federal government will make available personnel, equipment and material to cope with the event (e.g. the "Contact Point" concept).

[2] Various government organisations in Japan were unable to work at their accustomed management locations because they were damaged by the earthquake or could no longer be used due to the radiological situation.

1.3.2. Deficiencies and shortcomings of current provisions

The specialist agencies of the Federal government do not currently have personnel whom they could make available (for example) to the affected cantons or the affected nuclear power plant in case of an event. Such personnel are required in the government's own organisations in order to cope with the event and to guarantee resilience.

Summary, conclusions and consequences

- **Organisational measures**
  DDPS is mandated to clarify, by 30 June 2013 in connection with the "Concept for Event Control at National Level" and in collaboration with the cantons under the auspices of KKM SVS, issues relating to support from the Federal government for the cantons in the form of personnel, equipment and material. Likewise, further aspects should be regulated in connection with assistance to be provided in case of an event, e.g. as regards financing, management responsibility, the authorities and responsibilities of the Federal agencies and offices involved, and the responsibilities regarding offers of aid from other countries.
- **Legislative measure**
  DDPS is mandated to apply to the Federal Council, by 31 December 2013, for an Ordinance relating to the use of DDPS resources in favour of BST ABCN, and to adapt the Ordinance relating to NEOC Military Staff (Stab BR NAZ) as required.

1.4. Provision of protective equipment and operational systems

1.4.1. Knowledge gained from Fukushima

As far as is known at present, the operational team at the Fukushima Dai-ichi nuclear power plant was left on its own for several days after the disastrous natural catastrophe and the ensuing nuclear power plant accident, and was overtaxed by the situation. Support from the Armed Forces, civil defence units and technical specialists only arrived after a long delay.

1.4.2. Deficiencies and shortcomings in the current situation

It is questionable whether preparations and reaction times are adequate in order to make protective equipment and operational systems available for an extreme event in Switzerland.[3]

[3] As an immediate measure, the Federal Nuclear Safety Inspectorate (ENSI), as the responsible supervisory authority, ruled on 18 March 2011 that by 1 June 2011, all nuclear power plants must have access to an external storage facility containing additional equipment that is protected against earthquakes and flooding.

Summary, conclusions and consequences

- **Organisational measures**
  - DDPS/FOCP is mandated, by 31 December 2013 and in cooperation with KKM SVS, to define principles according to which the Federal government and the cantons will regulate the financing and provision of protective equipment and operational systems in case of extreme NBCN events.
  - On the basis of these requirements, DDPS/FOCP is mandated to conclude, by 31 December 2014, suitable service agreements between the partners in the Swiss Safety Alliance (Sicherheitsverbund Schweiz).

1.5. Resources to provide support for Swiss citizens abroad

1.5.1. Knowledge gained from Fukushima

Because the affected Swiss citizens in Japan were very anxious, and because it was difficult to foresee the development of events at Fukushima, equipment and supplies were sent to Japan on an ongoing basis (measuring instruments, dosimeters and iodine tablets).

1.5.2. Deficiencies and shortcomings of current provisions

Neither stocks of equipment and material nor processes for operations abroad are in place, so the supplies required in Japan were assembled on an improvised basis from the reserves of NEOC and the Armed Forces pharmacy. However, the available resources proved to be extremely slender.

Summary, conclusions and consequences

- **Organisational measures**
  DDPS is mandated to set up, by 31 December 2013, a rapidly available reserve of equipment and material (such as measuring instruments, dosimeters and iodine tablets) to provide support for Swiss citizens abroad.
- **Legislative measure**
  DDPS is mandated to stipulate, by 31 December 2013, the scope, financing and management of this reserve under the terms of the Ordinance relating to the Deployment of DDPS in favour of BST ABCN (see chapter 1.3).

1.6. Equipment, material and personnel required for emergency preparedness

1.6.1. Knowledge gained from Fukushima

During the acute phase of an accident at a nuclear power plant, there is a major requirement for equipment, material and personnel. If, in addition, there are environmental conditions (such as earthquakes or tsunamis) which make the situation more difficult, available equipment may be damaged or even destroyed so that replacements have to be obtained. The accident at the Fukushima Dai-ichi nuclear power plant showed that personnel, equipment and material in the following areas place intensive demands on resources:

- Implementation of measures in the plant to contain the effects
- Measures to protect and support the population (evacuations, emergency accommodation, medical care, contamination checks, etc.)
- Measuring capacity to register the radiological situation
- Resilience of emergency and crisis teams

In order to deal with an event efficiently, there is also a requirement in the preparation phase for sufficient personnel with specialist technical know-how who can undertake the necessary preparatory planning work and who can be deployed in case of an event. Likewise, there must be clarity as to who is responsible for each area and who has to provide the necessary resources.

1.6.2. Bases

According to Article 16 of the Emergency Preparedness Ordinance, the parties involved (operators of nuclear plants, ENSI, MeteoSwiss, the FOCP, the cantons, regions and communes) must ensure the availability of the personnel, equipment and material required for emergencies.

1.6.3. Shortcomings in the current situation

- Measures at the source (i.e. in the plant) and those taken to protect and support the population are resource-intensive in terms of material and personnel, and they are of long duration. Measurement capacities to register the radiological situation must be ensured throughout Switzerland. If several events are combined (e.g. an earthquake and a nuclear power plant accident), very large numbers of personnel are required at different locations. In Switzerland, the organisational arrangements enabling the resources (personnel and material) required for events at nuclear power plants to be held in readiness at Federal government and cantonal levels are deficient (e.g. personnel and measuring equipment for contact points, sufficient measuring equipment to register the radiological situation in all areas of the environment). At the same time, the event at Fukushima has created greater requirements and expectations on the part of politicians and society in Switzerland as regards precautions to cope with accidents at nuclear power plants.

  It must be ensured that adequate personnel are available at all times to cope with all the necessary emergency management activities. This includes the availability of the necessary qualified staff in all the involved agencies and offices.

- Fukushima has made it clear that not all of the emergency and crisis teams will meet the resilience requirement in case of an extreme event in Switzerland, and that this aspect must be improved.

In order to deal with an event efficiently, there is also a requirement in the preparation phase for sufficient personnel with specialist technical know-how who will undertake the necessary planning and preparatory work. Likewise, there must be clarity as regards who is responsible for each area and who has to provide the necessary resources. The responsibilities of the parties mentioned in the Emergency Preparedness Ordinance in connection with providing equipment, material and personnel for the purposes of emergency and crisis management must be clarified and defined unambiguously (implementation of Article 16, paragraph 1, letter d).

Summary, conclusions and consequences

- **Organisational measures**
  DDPS/FOCP is mandated to clarify, by 31 December 2012 and in cooperation with the operators of nuclear power plants, ENSI, MeteoSwiss and the cantons, the responsibilities for providing equipment, material and personnel for emergency preparedness purposes, and to develop proposals to rectify deficiencies in the situation regarding personnel, equipment and material.

2. Radiation Protection Ordinance

At the first meeting of IDA NOMEX on 22 June 2011, the Working Group on the Radiation Protection Ordinance was set up under the general co-ordinance of the Federal Office of Public Health (FOPH). In addition to the FOPH, the following parties were represented in this Working Group:

- the Swiss Federal Nuclear Safety Inspectorate (ENSI)
- the Federal Office for Civil Protection (FOCP)
- the Cantonal NBC Coordination Platform (KPNBC)
- the Directorate General of Customs (DGC).

2.1. Background

In Switzerland, the health-related aspects of radiation protection are regulated by the Federal Law on Radiological Protection (RPA/StSG) and the Radiation Protection Ordinance (RPO/StSV). The review of legislation on radiation protection focused on the following questions, among others:

- how to deal with instances of exposure to ionising radiation and how such radiation can be controlled in order to prevent deterministic damage; and
- how the risks of stochastic damage can be reduced in an appropriate manner.

The following section explains the legal and organisational shortcomings, as well as the short- and long-term measures. The objective is to improve the current legislative basis in order to facilitate coordination among the numerous authorities involved in case of an event.

The proposals tabled by the FOCP, FOPH, ENSI and the KPNBC relate to the following subject areas:

Clarification of responsibilities when the sampling and measurement organisation is deployed in case of increased radioactivity:

- Responsibility for assessing the radiological situation and for ordering measures
- Harmonisation of Swiss radiation protection limits with the EU values
- Control of flows of people and goods at borders
- Responsibility for assisting and treating individuals exposed to radiation
- Information and support for individuals who are concerned / affected
- Review of the concept for the distribution of iodine tablets
- Imposition of obligations on individuals.

2.2. Sampling and measurement organisation

2.2.1. Knowledge gained from Fukushima

The events at Fukushima showed that issuing alarms and implementing immediate measures to protect the population were key aspects.

The purposes of the sampling and measurement organisation are to review the protective measures implemented during the cloud phase, and to monitor contamination in the soil (ground) phase. These checks must be based on reliable measurements and interpretations carried out by professional (accredited) and decentral laboratories which should, ideally, already be responsible for analyses of this sort under normal circumstances.

2.2.2. Bases

According to Article 19, RPA/StSG, the Federal Council sets up an operational organisation for events which could create a hazard for the population due to increased radioactivity. This operational organisation has the following tasks in particular: in case of an event, it compiles forecasts regarding the hazards to the population; it tracks the extent and progression of the increased radioactivity and assesses potential effects on people and the environment; in case of direct danger, it orders the necessary immediate measures and monitors their implementation.

The FOPH is responsible for monitoring radioactivity and, in normal cases, it coordinates the sampling and measurement organisation. In case of an event, additional measuring equipment and organisations are deployed (mobile measurement teams with measuring vehicles and military helicopters, redundant systems, etc.). According to the applicable Ordinance regarding the National Emergency Operation Centre (VNAZ; SR 520.18), NEOC deploys the sampling and measurement organisation in case of an event. This results in problems regarding interfaces and responsibilities.

Summary, conclusions and consequences

- **Organisational measures**
  FDHA/FOPH is mandated to review, by 30 June 2014 in collaboration with DDPS/FOCP and ENSI under the auspices of BST ABCN and in cooperation with the cantons, the establishment of a platform to handle the technical and organisational coordination of the sampling and measurement organisation for events with increased radioactivity, and to develop a proposal on this subject.

2.3. Assessing the radiological situation and ordering measures

Three exposure situations are differentiated internationally:

- *Planned exposure situations* are situations that go hand-in-hand with the intentional introduction and utilisation of sources. Planned exposure situations may be exposures which are specifically expected to occur (normal exposures) as well as exposures that are not necessarily bound to occur (potential exposures).
- *Emergency exposure situations* are those which may occur during the sequence of a planned situation or as the consequence of a malicious act or of any other unexpected situation, and which require immediate measures in order to prevent unwanted consequences.
- *Existing exposure situations* are those which already exist when a decision has to be taken about bringing them under control; they include long-lasting exposure situations following emergency situations.

The FOCP is responsible for ordering immediate measures in case of a direct hazard, and for assessing the radiological situation in the acute phase of the event. ENSI is responsible for assessing the radiological situation and its development in the nuclear plants. The FOPH is responsible for assessing the radiological effects on people and the environment in all other situations.

For the purposes of ordering immediate measures, the FOCP bases its decisions on forecasts and an initial assessment of the radiological and general situations. The "Dose Measures Concept" (Annexe 1 of the NBCN Operations Ordinance) provides the basis for ordering immediate measures. As it is very difficult to determine doses for the population in the early phase of an event, there should be a review of the question of replacing the "Dose Measures Concept" with a "Measures Concept". In the latter case, directly measurable variables would have to be defined as additional triggering criteria.

Summary, conclusions and consequences

- **Organisational measures**
  DDPS/FOCP is mandated to develop, by 31 December 2013 in collaboration with FDHA and DETEC, specific triggering criteria for ordering immediate measures which could form the basis of a new "Measures Concept". The cantons should be involved as appropriate.

- **Legislative measures**
  FDHA/FOPH is mandated to draft, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance and in collaboration with DDPS/FOCP, internationally harmonised reference values for emergency exposure situations together with regulations on long-lasting exposure situations.

2.4. Limits and reference values for radiation protection

2.4.1. Knowledge gained from Fukushima

Developments at Fukushima showed that predefined limits and reference values play an important part in protecting the intervention forces and in protecting the population.

In the subsequent phase, limits are essential not only for the control of goods flows and the management of radioactive contamination (disposal of accident-related radioactive waste), but also for voluntary returns of the population (where applicable) to contaminated areas, possibly linked to lifestyle restrictions or decontamination measures and monitoring of subsequent doses.

One important factor in defining the various limits and reference values is harmonisation with international and European values in order to achieve credibility and acceptance. For this purpose, the values must be explained transparently and the associated risks must be communicated openly to the affected persons.

2.4.2. Bases

The limits and reference values stipulated by Swiss legislation on radiation protection are only partially harmonised with the values of the EU and the International Commission on Radiological Protection (ICRP).

In particular, the new reference values and optimisation processes introduced by the ICRP and the EU (Basic Safety Standards, BSS) should be reviewed with reference to a long-lasting exposure situation following an emergency situation.

Summary, conclusions and consequences

- **Organisational measures**
  FDHA/FOPH is mandated to examine, by 31 December 2013 and in collaboration with ENSI, which limits and reference values should be adapted or accepted in the legislation on radiation protection, in connection with the overall revision of the Radiation Protection Ordinance.

- **Legislative measures**
  FDHA/FOPH is mandated to target, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance, harmonisation with the values of the EU and the ICRP, insofar as is possible and appropriate.

2.5. Control of flows of goods and people at borders in case of increased radioactivity

2.5.1. Knowledge gained from Fukushima

Experience gained from Fukushima showed that the population very quickly began to suspect contamination and hazards to health in respect of people and products originating from Japan. The main objective here is to provide the population with targeted information on the real radiation risks. This should be based on a reliable control system at borders.

2.5.2. Bases

Under normal circumstances, cooperation on radiation protection between the customs authorities and the general co-ordinance agencies functions well. In cases of increased radioactivity and special radiological events, there is a need to clarify cooperation between the customs authorities, the general co-ordinance agencies and the infrastructure operators (ports, terminals, airports, etc.) in respect of responsibilities, interfaces and processes. The existing concept for controlling goods flows has already been reviewed and amplified. In an abnormal situation, it is the infrastructure operators who are the first to come into contact with potentially contaminated or radiated means of transport and goods. The customs administration can only take measurements and implement appropriate actions after the goods have been forwarded to it. Moreover, it could in our view be necessary for controls to be coordinated with the EU in abnormal situations. Goods from third countries that have already been inspected on the external border of the EU do not have to undergo further comprehensive inspection when they are imported into Switzerland; however, targeted random sampling should not be discontinued.

The Radiation Protection Ordinance does not provide a legislative basis for the transfer of tasks to the Federal Customs Administration (FCA) in exceptional situations, in contrast (for example) to the provisions stipulated by the legislation on food. In normal cases, the FCA and the FOPH should carry out regular joint checks on key points, similar to those already organised with other Federal agencies (FVO, Swissmedic, etc.). Periodic checks can ensure that a suitable operational and measurement organisation is available and ready to function in exceptional situations.

Summary, conclusions and consequences

- **Legislative measures**
  FDHA/FOPH is mandated to apply, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance and in cooperation with Federal Department of Finance (FDF)/Directorate General of Customs, and with the Swiss Accident Insurance Fund (SUVA) and the cantons as appropriate, for an amendment to Article 138, RPO/StSV which would stipulate the responsibilities and obligations of the customs authorities, training for the customs organisations assigned to these tasks, the legislative basis for procuring and maintaining measuring equipment, and cooperation with the FOPH in normal circumstances, in case of unusual radiological events and in case of increased radioactivity.

2.6. Assistance and treatment for persons exposed to severe radiation

2.6.1. Knowledge gained from Fukushima

Fukushima confirmed that the health impact of a severe nuclear accident creates major requirements for the population and the intervention forces.

2.6.2. Bases

At present, it is not clear who has the responsibility for coordinating care for persons severely affected by radiation. The Coordinated Medical Services (KSD), ENSI, SUVA and the FOPH are all partially involved, but nobody is in charge. It is necessary to review the measures that must be taken in order to ensure care for radiation victims in line with the international standard (the WHO REMPAN (Radiation Emergency Medical Preparedness and Assistance Network)).

Summary, conclusions and consequences

- **Organisational measures**
  ENSI is mandated to compile, by 31 December 2012 and in cooperation with FDHA/FOPH, SUVA and the cantons, a report on the existing situation regarding support and treatment for persons with severe radiation exposure, to draw up agreements with the plants and to suggest specific alternative solutions.

- **Legislative measures**
  FDHA/FOPH is mandated to examine, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance and in cooperation with the cantons, the possible introduction of a new provision on the treatment of radiation victims.

2.7. Information and support for concerned / affected persons

The current emergency preparedness concept makes provision for a "Contact Point" to offer individual assistance and information to concerned individuals. At present, those cantons where plants are located can only operate a Contact Point of this sort with limited capacity (1,000 persons/day) for a few days. Fukushima showed that a far greater number of people must be expected. These people need information, and some of them must be examined for potential contamination. Large numbers of measuring points are also needed to measure people for clearance.

Summary, conclusions and consequences

- **Organisational measures**
  DDPS/FOCP is mandated to review, by 31 December 2012 in collaboration with the cantons, the "Contact Point" concept for providing individual assistance and information to concerned individuals, and to define the responsibilities.

- **Legislative measures**
  DDPS/FOCP is mandated to review, by 31 December 2013 in collaboration with the cantons, the possibility of introducing a new provision regarding the provision of information and support to concerned and affected persons into the NBCN Operations Ordinance or the Emergency Preparedness Ordinance.

2.8. Review of the concept for the distribution of iodine tablets

This subject is covered in chapter 8 on the Iodine Tablets Ordinance.

3. NBCN Operations Ordinance

At the first meeting of IDA NOMEX, the Working Group on the NBCN Operations Ordinance was set up, under the general co-ordinance of the Federal Office for Civil Protection (FOCP). In addition to the FOCP, the following organisations are represented in this Working Group:

- the Federal Chancellery (FCh)
- the Swiss Federal Office of Energy (SFOE)
- the Federal Office of Public Health (FOPH)
- the Federal Office for the Environment (FOEN)
- the Directorate of Public International Law (DPIL)
- the Swiss Federal Nuclear Safety Inspectorate (ENSI)
- Armed Forces Joint Staff (AFJS)
- Canton of Aargau, Military and Civil Protection Department
- Cantonal NBC Coordination Platform (KPNBC)

3.1. Background

The proposals tabled by the members of this Working Group relate to the following issues:

- Specification of the scope of application of the ordinance and the triggering criteria for BST ABCN, and optimisation of the flow of information and of coordination before and during an event
- Adaptation of the composition of BST ABCN
- Allocation of tasks and responsibilities within BST ABCN
- Definition of preparedness requirements and resilience for the Federal agencies and offices represented in BST ABCN
- Conversion of the "Dose Measures Concept" (DMK) into a "Measures Concept" (MK)
- Specification of the interfaces between the Federal government and the cantons based on KKM SVS concept in order to deal with events at national level
- Interfaces between the NBCN Operations Ordinance and the Swiss Safety Alliance (SVS)
- Support from the Federal government in case of an event
- Protective equipment and operational systems
- Resources to support Swiss citizens abroad
- Telematics in all situations, and redundancy of means of communication
- Status and implementation of Master Plan "A"
- Coordination of the implementation of organisational measures

3.1.1. Dealing with an extreme event in Switzerland

Good preparations are in place in Switzerland to deal with the first hours of an accident at a Swiss nuclear power plant (emergency management) in terms of concepts and organisation, both at Federal government and cantonal levels. Since the formation of BST ABCN, more efforts have been made to advance the development of basic provisions for dealing with an accident at a nuclear power plant (crisis management) in the medium and long terms.

However, preparations in Switzerland focus mainly on dealing with a "pure" or single event at a nuclear power plant. So far, little work has been done on multi-dimensional NBCN scenarios, for example those involving severe impairments of the infrastructure. Moreover, the preparations are limited to dealing with NBCN events in Switzerland or in adjacent foreign countries. But as the events in Japan showed, no matter where in the world a large-scale NBCN event occurs, it is highly likely that Swiss citizens and Swiss interests will be affected, and protection for both must also be ensured.

The events at Fukushima have not yet been conclusively analysed, and knowledge gained from Japan cannot simply be transferred directly to Switzerland. Nevertheless, it is already clear at present that various gaps in terms of equipment and material, organisation and concepts must be closed in Switzerland in order to optimise preparations for coping with an event of a similar nature in the medium to long term.

3.1.2. Work in progress

- Consultation and Coordination Mechanism of the Swiss Safety Alliance (KKM SVS)
- Project to set up and develop the Federal NBCN Crisis Management Board (BST ABCN), including resource management at Federal government level
- Federal government crisis communication concept
- Recommendations of the Federal Commission for NBC Protection to the Federal Council on precautionary measures for NBC events and measures to deal with them
- Consensus paper report: Operational resources to handle NBC operations and decentralisation of the operational NBC resources made available by the Federal government
- Project: "Measures to Optimise Communications relating to Operational Organisation in case of Increased Radioactivity (EOR)"
- Master Plan, area A [= nuclear] (emergency preparedness for Switzerland)
- Optimisation of Warning and Alarm Systems (OWARNA, see chapter 4)

3.2. Adaptation of the triggering criteria for the deployment of BST ABCN and optimisation of the flow of information and of coordination before and during events

3.2.1. Knowledge gained from Fukushima

According to Article 1 of the NBCN Operations Ordinance, BST ABCN is deployed in case of events with national implications which threaten or adversely affect the population, animals or the environment. Although the serious incident at the nuclear plants in Fukushima took place at a great geographical distance from Switzerland and its radiological impact here was low, the events in Japan placed many of the specialist organisations represented in BST ABCN under severe strain. For instance, there was a need to coordinate the assessment and communication of the impact of the incident on Switzerland. In order to manage the crisis, FDFA too had to rely heavily on the support and assessments provided by the specialist units represented in BST ABCN, for example in order to provide assistance to Swiss citizens abroad.

3.2.2. Deficiencies and shortcomings in the current situation

- The events at Fukushima showed that cooperation among the various participants is already required when events occur that do not have a serious impact on Switzerland, but which nev-

ertheless arouse great interest among the public. Information must be ensured right from the outset when such events occur. This also corresponds to a clear requirement on the part of the cantons. In this context, the role of BST ABCN as the central instrument for precautions and measures to deal with events must be strengthened, especially as regards the coordination of information. The exchange of information with the cantons must also be improved for this purpose.

- BST ABCN Board bases its decision on whether to deploy BST ABCN on the picture of the situation compiled by the permanent Reporting and Situation Centre (MLZ) of BST ABCN. So that the MLZ can provide the Board with the relevant bases for its decision, the specialist bodies represented in BST ABCN must automatically provide the MLZ with all the relevant information in case of a potential NBCN event, before an event is "declared" under the terms of the NBCN Operations Ordinance. This obligation to give notification of potential NBCN events is mentioned in Article 4 of the NBCN Operations Ordinance, but is not yet adequately implemented.

Summary, conclusions and consequences

- **Legislative measures**
  DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for incorporation into the NBCN Operations Ordinance of the necessary specific provisions regarding:
  a) the role of BST ABCN Board in connection with the decision to deploy;
  b) the criteria for activation of BST ABCN;
  c) designation of the Chair in case of an event;
  d) notification obligations incumbent upon Federal agencies and offices;
  e) the tasks of the core element of BST ABCN in connection with ongoing tracking of the situation;
  and
  f) further development of BST ABCN into the key instrument to prepare for and deal with extreme events.

3.3. Adaptation of the composition of BST ABCN and allocation of tasks and responsibilities within BST ABCN

3.3.1. Knowledge gained from Fukushima

BST ABCN Board currently consists in the main of representatives of the specialist units responsible for NBCN events. For this reason, the Board assessed the events in Japan primarily from the technical perspective, i.e. in terms of their potential radiological consequences for Switzerland. In addition, however, questions arose regarding the coordination of communication among and by the authorities, the requirements of the cantons and the needs of the crisis management team at FDFA in order to assist Swiss people who were directly affected in Japan. It also emerged that the tasks and responsibilities of the Federal agencies and offices participating in the various phases of events involving increased radioactivity need to be specified more precisely in some cases.

3.3.2. Deficiencies and shortcomings in the current situation

The exchange of information can be optimised, and the situation can be assessed on a more comprehensive basis, by arranging for the representation of additional directly affected offices and agencies at Federal government and cantonal level on BST ABCN Board, and by defining tasks and responsibilities more clearly.

- At Federal government level, BST ABCN consists mainly of representatives of specialist agencies. At cantonal level, the governmental conferences are represented at general secretariat level. Expansion of BST ABCN by adding specialist staff from cantonal management organisations should be reviewed.
- To allow a comprehensive assessment of the situation, Federal agencies and offices with overarching responsibilities must already be represented on the Board. In particular, the Federal Chancellery should be involved at an early stage because it is responsible for coordinating information at Federal government level. Giving the spokesperson of the Federal Council a seat on BST ABCN Board should ensure that, in future, the Federal Chancellery will immediately be able assume its role of coordinating communications in case of a crisis.
- In some cases, the distribution of responsibilities among the Federal agencies and offices must be examined and clarified. This relates to, for example, responsibilities for assessing the situation in foreign nuclear plants (including the coordination of information in case of incidents abroad), medical care for potentially contaminated individuals, decontamination, waste management or accepting offers of aid from abroad in case of events in Switzerland. The necessary equipment and resources must be made available, and the relevant preparations must be undertaken.

Summary, conclusions and consequences

- **Organisational measures**
  BST ABCN is mandated to review and (as appropriate) clarify, by 31 December 2013, the responsibilities and tasks of the Federal agencies and offices involved in the various phases of an event.

- **Legislative measures**
  - DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for the necessary changes to the NBCN Operations Ordinance regarding the composition of BST ABCN and its Board.
  - DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for the necessary additions to the NBCN Operations Ordinance regarding the procedure and responsibilities within BST ABCN for accepting aid from abroad in case of an event.
  - Depending on the results of this review of responsibilities and tasks, the responsible Federal agencies and offices will adapt the relevant legislative bases in their areas of responsibility as of 31 December 2014.

3.4. Conversion of the "Dose Measures Concept" (DMK) into a "Measures Concept" (MK)

3.4.1. Bases

The current "Dose Measures Concept" (DMK) (Annexe 1 to the NBCN Operations Ordinance) forms the basis for ordering protective measures in the emergency management phase ("acute

phase") in case of events involving increased radioactivity. The objective is to minimise the health risk for the population. The decision as to which measures should be implemented is based on the expected doses, among other factors.

3.4.2. Knowledge gained from Fukushima

Experience gained from Japan shows that when measures to protect the population are ordered in case of combined events, consideration must be given not only to radiation protection but also to the entire range of hazards (earthquake, flooding and nuclear power plant accidents). The bases for reaching such complex decisions ("Measures Concept", decision-making criteria and prioritisation) are not in place at present.

3.4.3. Deficiencies and shortcomings in the current situation

The current "Dose Measures Concept" takes insufficient account of external conditions and combined events. The "Dose Measures Concept" should therefore be converted into a "Measures Concept" (MK) for the acute phase in case of events involving increased radioactivity. This "Measures Concept" (MK) defines the factors that must be considered other than criteria related purely to radiation protection, and the weightings that should be given to these other factors.

Summary, conclusions and consequences

- **Organisational measures**
  DDPS/FOCP is mandated to draft, by 31 December 2013 in cooperation with the affected Federal agencies and offices, the basis for converting the "Dose Measures Concept" (DMK) into a "Measures Concept" (MK). For this purpose, consideration should be given to the scenarios for combined events to be compiled in advance by BST ABCN together with the responsible departments in each instance, to ENSI's revised reference scenarios, and to international standards. The cantons should be involved as appropriate.
- **Legislative measures**
  DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2014, for the necessary changes to Annexe 1 ("Dose Measures Concept" (DMK)) to the NBCN Operations Ordinance in accordance with the bases to be developed for the "Measures Concept" (MK).

3.5. Specification of the interfaces between the Federal government and the cantons, and clarification of the roles of BST ABCN and the Swiss Safety Alliance (SVS), and of cooperation between these bodies

3.5.1. Bases

The creation of BST ABCN gives the Federal Council an important operational management and coordination body which is responsible at Federal government level for implementing precautions against events and for dealing with them in order to protect the population, thereby eliminating an

existing shortcoming. At Federal level, BST ABCN is therefore comparable to the management bodies of the cantons.

KKM SVS platforms are bodies with equal representation of the Federal government and the cantons, and they work on issues of safety policy which affect the Federal government and the cantons in equal measure. KKM SVS covers all areas of safety policy, including protection for the population, police measures to avert dangers, national security, prosecution of criminal acts, prevention of and defence against military attack, and safeguarding Switzerland's interests abroad.

In these respects, BST ABCN and KKM SVS bodies cover different needs and requirements, but there are interfaces between the two organisations.

3.5.2. Deficiencies and shortcomings in the current situation

The different orientations of BST ABCN and the bodies in KKM SVS are insufficiently known. They should therefore be communicated actively. Moreover, cooperation between the two organisations should be regulated more clearly. Both aspects are among the responsibilities not only of the Delegate for the Swiss Safety Alliance (SVS) who was elected at the end of February 2012, but also of BST ABCN and/or the Federal agencies and offices represented within it.

Summary, conclusions and consequences

- **Organisational measures**
  - The DDPS is mandated to work towards defining, by 30 June 2013 in cooperation with KKM SVS and the responsible Federal agencies and offices as well as the cantons, principles according to which the Federal government and cantons can cooperate for the purpose of dealing with extreme events.
  - KKM SVS and BST ABCN are mandated to regulate their cooperation and to communicate the results by 31 December 2013.

3.6. Telematics in all situations and fail-safe/redundant means of communication

This subject area was addressed by the Working Groups on the NBCN Operations Ordinance and on the Emergency Preparedness Ordinance.

3.6.1. Knowledge gained from Fukushima

The Fukushima Dai-ichi nuclear power plant was damaged so severely that key plant parameters were not available. In case of an extreme event in Switzerland, it is also impossible to rule out the failure of all conventional means of communication (voice and data transmission). For example, the transmission and processing of data by the existing automatic radioactivity measuring networks of NEOC, ENSI and the FOPH could be impaired, interrupted or destroyed by an earthquake. The private networks could also fail quickly, thereby posing a risk to Internet connections.

3.6.2. Deficiencies and shortcomings in the current situation

2009 saw the launch of the project to develop a communication concept for operational organisation in case of increased radioactivity (EOR). The first two phases (determining the needs of the service recipients in terms of communication and transmission, and identifying potential solutions) have since been completed.

During the analyses that were conducted for the review of means of communication for operational organisation in case of increased radioactivity (EOR), and also during the Strategic Management Exercise in 2009 (SFU 09), it was ascertained that the availability of the telecommunications equipment used at present would be inadequate in case of a major event. Key operational elements can, in some cases, only be activated via public mobile telephony networks. Communication between the authorities and the nuclear power plants is only possible via public networks which would – at best – only function for a few more hours in case of a power outage. At present, the operators of nuclear power plants and ENSI are no longer connected to the existing crisis-resistant telecommunications networks, such as the Automatic Telecommunications Network (AF network).

The omissions that have been identified should be remedied in the medium term during the third phase of the project (implementation) on the basis of the ongoing POLYCOM and POLYALERT projects, and the new POLYDATA and POLYCONNECT projects. However, the Federal Office for Civil Protection does not yet have sufficient financial and human resources at its disposal to implement the last two projects.

In case of an event, it is important that measurement systems both inside and outside the plants, and also forecasting systems, should be redundant and fail-safe in order to assess potential radiological effects on Switzerland. However, no uniform requirements are in place for this purpose at present.

Summary, conclusions and consequences

- **Organisational measures**
  - DDPS/FOCP is mandated to define, by 31 December 2012, the necessary requirements regarding the redundancy and safety against failure of the communication systems in cooperation with the involved Federal agencies and the cantons.
  - DDPS/FOCP is mandated to implement, by 31 December 2016, the project on "Measures to Optimise Communications relating to Operational Organisation in case of Increased Radioactivity (EOR)", taking account of ongoing projects such as POLYALERT, POLYDATA, POLYCONNECT, POLYCOM, IBBK (provision of information to the population by the Federal government via radio in crisis situations) and satellite links.
  - DDPS/FOCP is mandated and is bindingly obliged to clarify, by 31 December 2012, the issue of financing these systems on the basis of agreements between the Federal government, the cantons and the operators of plants with NBC hazard potential, and to apply immediately for the necessary financial resources.
  - DDPS/FOCP is mandated to examine, by 31 December 2012, possible alternative transitional solutions in order to close temporary gaps.
  - ENSI is mandated to draft, by 31 December 2012, the necessary requirements regarding the redundancy and safety against failure of measurement and forecasting systems for nuclear power plants in cooperation with the FOCP, MeteoSwiss and the nuclear

power plant operators.

➢ **Legislative measures**

- DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for the necessary additions to the NBCN Operations Ordinance regarding responsibilities, and regarding redundancy and safety against failure in the area of communication and transmission systems.
- DETEC/SFOE is mandated to apply to the Federal Council, by 31 December 2013, for the necessary additions to the Emergency Preparedness Ordinance regarding requirements for redundant and fail-safe measurement and forecasting systems.

3.7. Status and implementation of Master Plan "A" ("nuclear")

3.7.1. Bases

The preparations undertaken by the responsible bodies in the Federal government and the cantons are currently restricted to emergency management, i.e. coping with the situation in the first hours or days after an accident in a Swiss nuclear power plant (the "cloud phase"). By and large, there are no concepts or specific preparations for the crisis management phase ("soil" or "ground phase"). For example, there are no clear arrangements for the decontamination of contaminated areas and the medical treatment of contaminated individuals, or for dealing with the medium- to long-term consequences of an accident at a nuclear power plant, such as issues of liability and compensation.

3.7.2. Deficiencies and shortcomings in the current situation

The conceptual and organisational omissions from arrangements to deal with accidents in Swiss nuclear power plants require the revision or drafting of numerous basic documents. These different activities should be coordinated and controlled according to a "Master Plan A". "Master Plan A" was initiated before the NBCN Operations Ordinance came into force. It is managed by the National NBC Protection and Coordination Office together with the responsible bodies at Federal government and cantonal levels.

A precautionary process was initiated and was approved by BST ABCN in connection with the project to "Set up and Develop the Federal NBCN Crisis Management Board". This precautionary process should develop into a rolling five-year plan, allowing all the participating bodies at cantonal and Federal level to establish key points for the content and to prepare themselves accordingly.

Summary, conclusions and consequences

➢ **Organisational measures**

- BST ABCN is mandated to establish the Master Plan "A" as the interdepartmental control instrument in the FOCP by 31 December 2012.
- BST ABCN is mandated to prioritise, by 31 December 2012, the various NBCN hazards under the auspices of BST ABCN so that the members of BST ABCN can consist-

ently focus their resources on those scenarios assessed as critical.

- BST ABCN is mandated to define, by 31 December 2012 on the basis of Article 5 of the NBCN Operations Ordinance and the prioritisation decisions of BST ABCN, the specific planning of content and timing for the outstanding work in area A ("nuclear") in Master Plan "A".
- BST ABCN is mandated to compile, by 31 December 2013 on the basis of the same procedure as was used in area "A" under the auspices of BST ABCN, corresponding Master Plans for hazards in areas "B" (biological), "C" (chemical) and "N" (natural).

4. Optimisation of Warning and Alarm Systems (OWARNA)

The Federal Office for the Environment (FOEN) submitted the report for this chapter in accordance with the mandate issued at the first meeting of IDA NOMEX.

4.1. Background

4.1.1. OWARNA measures and knowledge gained from Fukushima

The 2005 flooding claimed six lives in Switzerland and caused damage costing CHF 3 billion. In order to improve systems for issuing warnings and alarms to the population in case of natural events, the Federal Council therefore decided on 30 May 2007 to implement numerous measures grouped together in a project named **OWARNA** (**O**ptimisation of **War**ning **a**nd **A**larm Systems), and it assigned related tasks to six different Federal agencies and offices in DETEC, the FDHA and the DDPS.

In order to create a suitable structure to coordinate this work, the directors of the participating Federal agencies and offices (the Federal Office for Civil Protection (FOCP), the Federal Office for the Environment (FOEN), the Federal Office of Meteorology and Climatology (MeteoSwiss), the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), the WSL Institute for Snow and Avalanche Research (SLF), the Swiss Seismological Service (SED) at the Swiss Federal Institute of Technology, Zurich (ETHZ), and the Federal Chancellery (FCh)) decided in 2008 to set up the Steering Committee for Intervention against Natural Hazards (LAINAT). LAINAT has an office which is affiliated to the FOEN.

The OWARNA measures adopted by the Federal Council include improvements to forecasts and information, especially as regards flooding forecasts, and a Joint Information Platform on Natural Hazards (GIN) for the authorities. All the participating Federal agencies and offices must create conditions so that in case of an event such as flooding, 24-hour forecasting and an expert advisory service for the Federal government are guaranteed at all times (Business Continuity Management, BCM).

On 26 May 2010, the Federal Council approved the OWARNA follow-up report which includes additional measures such as the development of measuring networks (weather radar and ground-based measurement stations), training for local advisors on natural hazards, improved information for the population and the establishment of a specialist Federal staff unit to deal with natural hazards.

The events at Fukushima confirmed the findings and objectives stated in the OWARNA reports, as well as the necessity and urgency of the measures that were adopted.

4.1.2. Implementation status

The OWARNA follow-up report envisages the implementation of the OWARNA measures in the period from 2011 to 2018. The implementation of all the measures that were adopted is proceeding according to the schedule.

The establishment of the specialist staff unit to deal with natural hazards has now been completed by the FOEN, MeteoSwiss, the WSL/SLF and the SED. The specialist unit issues joint warnings

and is also the technical sub-unit of the Federal NBCN Crisis Management Board[4] in case of natural events or combined events (such as Fukushima).

The distribution of tasks between the Federal government and the cantons was discussed and specified in detail at numerous workshops and meetings between technical and managerial bodies at Federal and cantonal level.

4.1.3. Requirements for action and planned measures

From the technical viewpoint, the major shortcomings are still those present in the forecasting systems. Improvements are mainly required here in connection with flooding and – insofar as is technically possible – sudden local storms. There is also a significant need to take action as regards providing information to the population. The training of local natural hazard advisors should be extended to all the cantons and should be implemented in the cantons.

The development of measuring networks for meteorological purposes and of forecasting systems, for flooding in particular, must be continued in accordance with the objectives and the schedule described in the OWARNA follow-up report. It is planned to expand the meteorological measurement network and to set up a national flood forecasting system in the next three years. At the same time, support will be given to the cantons with setting up regional forecasting systems from which data can then be integrated into the national system.

Development of the Joint Information Platform (GIN) will continue. Key elements of this ongoing development include the integration of additional data (meteorological data, flooding data and seismic data, etc.) from bodies at Federal, cantonal and commune level as well as from private sources. Interfaces with other information systems will also be developed, in particular with the Electronic Situation Reporting facility (ELD) of the National Emergency Operation Centre (NEOC).

To improve the supply of information to the population, a natural hazards portal will be set up in 2012 and 2013; this will provide publicly accessible information about hazard situations and events, hazard processes and behaviour patterns that can reduce damage.

Based on experience gained from pilot courses, the training of local natural hazard advisors is to be augmented in all cantons over the next five years. In this regard, the Federal government will focus on training cantonal specialists who, in turn, will train advisors at the regional and communal level.

The basis for the improved warning and alarm systems was created in particular by the Alarms Ordinance (see chapter 7). Key elements, such as the Steering Committee for Intervention against Natural Hazards, the specialist staff unit to deal with natural hazards and the Joint Information Platform (GIN) are specified in the NBCN Operations Ordinance, which does not need amendments in respect of these points.

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[4] **NBCN events**: increased radioactivity, damaging biological or chemical events, and natural events. A Federal Crisis Management Board (BST ABCN) is deployed to ensure cooperation in case of such events and to coordinate operations (Article 2, paragraph 1, NBCN Operations Ordinance, SR [Systematic Collection of Federal Law] 520.17).

Expenditure on the OWARNA measures adopted at Federal level is estimated at CHF 13 million to CHF 17 million per year from 2011 to 2018, and this is included in the financial plans of the participating Federal agencies and offices. However, this expenditure does not take account of measures relating to the communications infrastructure. Suitable measures are currently being investigated and planned (POLYCOM, POLYDATA, etc.), and are likely to entail significant investments (also see chapter 3.6). In some cases, the necessary decisions on implementation have not yet been made.

As well as the Federal measures that are yet to be implemented, the cantons and communes also have to undertake numerous pending tasks in order to improve the warning and alarm systems, as well as measures regarding the intervention forces and the population in case of natural events. Expenditure on these items is estimated at CHF 40 to 50 million per year.

4.2. Summary

In order to reduce risks on an integrated and effective basis, there is a need not only for preventive and interventive measures, but also for measures to assist with reconstruction after events. The forecasting of events and the issuance of warnings and alarms are measures that will improve intervention. The shortcomings and the need for action to improve warning and alarm systems in case of natural events have been identified, and the necessary measures have been adopted by the Federal Council. The objective of these measures is to reduce damage caused by a natural event by 20%. For this purpose, measures to issue warnings and alarms in case of natural events are an efficient means of complementing the preventive measures. The costs incurred by the Federal government for these purposes have been estimated for the years from 2011 to 2018, and they amount to approximately CHF 13 to 17 million per year. The participating Federal agencies and offices have incorporated the relevant requirement for resources into their financial planning.

In addition, significant investments will be necessary in the communications infrastructure; the amount of such investments is not yet known, and no decision has so far been taken to implement them.

The cantons and communes must implement measures costing CHF 40 to 50 million per year in order to ensure optimal warnings, alarms and interventions in case of natural events. Most cantons have already initiated appropriate measures.

5. Emergency Preparedness Ordinance

At the first meeting of IDA NOMEX, the Working Group on the Emergency Preparedness Ordinance was set up under the lead management of the Swiss Federal Office of Energy (SFOE). In addition to the SFOE, the following bodies were represented in the Working Group:

- the Federal Office of Public Health (FOPH)
- the Federal Office for the Environment (FOEN)
- the Federal Office of Transport (FOT)
- the Swiss Federal Nuclear Safety Inspectorate (ENSI)
- the Federal Office for Civil Protection (FOCP)
- the Cantonal NBC Coordination Platform (KPNBC)

5.1. Background

The allocated subjects were distributed as follows in this Working Group: ENSI was given lead management for the reference scenarios and the zoning concept; the other areas covered by the Working Group on the Emergency Preparedness Ordinance were assigned to the FOCP/NEOC.

This report by the Working Group on the Emergency Preparedness Ordinance contains a detailed examination of the bases for emergency preparedness in Switzerland. Following a technical assessment of potential accident sequences, it is necessary to examine the legislative and organisational measures that are required within the scope of application of the Emergency Preparedness and Iodine Tablets Ordinances as consequences of the accident at the Fukushima Dai-ichi nuclear power plant. In parallel, it is necessary to review the emergency preparedness measures for which provision has already been made, such as precautionary and subsequent evacuation, distribution of iodine tablets, etc.

The proposals introduced by the FOCP, FOPH, ENSI and the KPNBC relate to the following subject areas:

- Review of reference scenarios
- Review of the zoning concept
- Safety against failure/redundancy of key systems
- Evacuation
- Preparation of emergency preparedness measures outside of the alarm zones that have been prepared at present
- Necessary equipment, materials and personnel for emergency preparedness
- Potassium iodide tablets (cf. chapter 6, "Iodine Tablets Ordinance")

5.2. Review of reference scenarios

5.2.1. Knowledge gained from Fukushima

A planning zone of 10 km was defined in the area surrounding the Fukushima Dai-ichi nuclear power plant, but this proved to be inadequate. After the earthquake and the tsunami on 11 March 2011 and following several massive escapes of radioactivity, people were evacuated from areas up to 20 km away from the location of the accident. People were also ordered to stay in their houses within a radius of up to 30 km. In addition, the authorities decided that the evacuation zone for certain areas where the population would accumulate a dose of more than 20 mSv by March 2012 would be extended beyond the radius of 20 km. Some of the affected communes are up to 40 km away from the Fukushima Dai-ichi nuclear power plant. In the zone between 20 and 30 km from the

site, residents were recommended to leave the area. At individual places in other adjacent areas where an annual dose of over 20 mSv would be accumulated, the authorities recommended people to take special precautionary measures or to leave the affected location.

The IAEA reaches the following conclusion regarding emergency zones in its report issued in mid-June 2011: "Use of a nuclear emergency planning system as suggested by the respective IAEA requirements, guides and technical documents may further enhance the capabilities of the emergency preparedness and response organizations in Japan. In this context, definition and introduction of various emergency planning zones and the preparation of emergency response plans accordingly might reduce the burden on the response organizations in the early phase of an emergency."

The objective now is to clarify whether the planning zones envisaged in Switzerland and the existing assumptions regarding emissions of radioactivity are still valid, or whether and to what extent this basis needs to be adapted.

5.2.2. Bases

The determination of zones where an increased level of preparation for measures to protect the population is appropriate and reasonable takes account of the entire range of possible incidents, including those with a very low likelihood of occurrence.

ENSI has defined three representative reference scenarios[5] for events at nuclear power plants. The quantitative risk evaluation takes account of many different causes of accidents, such as system outages, human failure or natural disasters such as floods and earthquakes.

At Fukushima, however, larger quantities of radioactive substances reached the environment than was previously assumed in the reference scenarios. For this reason, ENSI advanced the planned periodic review of these reference scenarios under the auspices of IDA NOMEX. Although reference scenario A3 already corresponds to a severe and infrequent accident, source terms with larger releases are being considered, and the level of coverage for them is being determined with the help of up-to-date probabilistic safety analyses. Knowledge gained from PEGASOS[6] will also be incorporated into the new analyses.

The results of this review to date, and the discussions conducted in this connection, indicate that there is further need for coordination between the emergency preparedness partners of the Federal government and the cantons, and the operators of nuclear power plants. Moreover, the operators of the nuclear power plants must carry out new calculations and must supply additional information by 30 September 2012.

Summary, conclusions and consequences

- **Organisational measures**
  ENSI is mandated to review, by 31 December 2012 in cooperation with the FDHA/FOPH, DDPS/FOCP and the cantons, the reference scenarios and their assumptions for emergency preparedness in the areas surrounding nuclear power plants.

[5] ENSI, Reference Scenarios for Emergency Preparedness in the Areas Surrounding Swiss Nuclear Power Plants, Edition 2, October 2006

[6] ENSI, Redefinition of the Seismic Hazard at Nuclear Power Plant Sites in Switzerland (PEGASOS project), June 2007

5.3. Review of the zoning concept

The emergency preparedness measures in Switzerland are based on the recommendations of the ICRP (International Commission on Radiological Protection) and the IAEA (International Atomic Energy Agency). Their purpose is to prevent acute radiation damage, as well as to minimise late radiation damage and genetic defects among the affected population.

The Emergency Preparedness Ordinance (Article 3, paragraph 1, NFSV) specifies two zones for each nuclear power plant. Zone 1 comprises an area with a radius of 3 – 5 km. Zone 2 adjoins Zone 1 and has a radius of about 20 km. These zones cover the area where rapid measures to protect the population may be necessary during the passage of a radioactive cloud.

A clear sequence of warnings and alarms is defined in these zones. The cantons must ensure that the sirens in these zones can be triggered centrally by remote control (Article 17, paragraph 5, Alarms Ordinance).

The zoning concept for emergency preparedness planning in the areas surrounding nuclear power plants requires critical analysis. This should also take account of the recommendations of international bodies such as HERCA (Heads of European Radiological Protection Competent Authorities), the IAEA and the ICRP. It should be noted that these recommendations were reviewed after Fukushima, so they already include any related consequences.

Summary, conclusions and consequences

- **Organisational measures**
  ENSI is mandated, together with the DDPS/FOCP and the cantons, to review the zoning concept in the areas surrounding nuclear power plants with a view to amending the Emergency Preparedness Ordinance by 30 June 2013.

- **Legislative measures**
  DETEC/SFOE is mandated, in cooperation with the cantons, to draft an amendment (if required) to the Emergency Preparedness Ordinance regarding emergency preparedness zones (Article 3 and Annexes 2 and 3), and to submit an application to the Federal Council in respect thereof by 31 December 2013.

5.4. Safety against failure/redundancy of key systems

This subject area was dealt with by the Working Group on the NBCN Operations Ordinance and the Emergency Preparedness Ordinance, and is covered in chapter 3.6, "Telematics in all situations and fail-safe/redundant means of communication".

5.5. Large-scale evacuation

5.5.1. Knowledge gained from Fukushima

About 80,000 persons were evacuated in the first days following the events at Fukushima Dai-ichi.[7]

On 15 March 2011, the population within a radius of 20 - 30 km was also ordered to remain sheltered at home. It was not until 22 April 2011 that the Japanese government decided to extend the evacuation subsequently to about 50 km in a north-westerly direction, after weeks of remaining at home had become unacceptable, and pressure from the public was increasing.

The combined extreme event in Japan shows that measures in areas at distances of up to several tens of kilometres around nuclear plants may be necessary for lengthy periods. Operations that require large quantities of resources may continue for months. It is necessary to plan beyond the acute phase, taking account of measures that are also acceptable over a lengthy period (e.g. evacuation instead of weeks of remaining sheltered at home).

5.5.2. Bases

Until now, the primary protective measure that was prepared in case of an accident at a nuclear power plant was for people to remain sheltered at home (staying inside their houses, in the basement or in a civil defence shelter). After the NBCN Operations Ordinance and the revised Emergency Preparedness Ordinance were brought into force on 1 January 2011, precautionary evacuation in zone 1 must be planned and prepared in order to avoid higher doses. According to Article 11, letter c of the Emergency Preparedness Ordinance, the FOCP is obliged to draft standard requirements for the precautionary evacuation of the population in zone 1. The cantons must draw up a concept for precautionary evacuation based on these standard requirements (Article 12, letter c, Emergency Preparedness Ordinance).

5.5.3. Ongoing work and shortcomings / deficiencies in the current situation

The FOCP has initiated two projects for evacuations in case of accidents at nuclear power plants:

- On the one hand, a research project with the Swiss Federal Institute of Technology, Zurich (ETHZ) has been in progress since the start of 2010; with the help of computer models, this project simulates large-scale evacuations in the areas surrounding nuclear power plants. The purpose of this project is to provide more accurate statements about the progression of large-scale evacuations and the time requirements for them, so that conclusions can be drawn about how such evacuations can be controlled by management organisations and intervention forces. The project is scheduled to last a total of three years and is controlled by a project committee comprising representatives of the FOCP, ENSI, the cantons and the ETH Zurich.
- On the other hand, the FOCP recently launched a project to develop standard requirements for large-scale evacuations in case of accidents at nuclear power plants. This is being undertaken in compliance with the mandate as per Article 11, letter c of the Emergency Preparedness Ordinance. However, the project also aims to take account of evacuations from areas in zone 2, including precautionary measures as well as those implemented following a release of radioactivity. A first meeting of the project committee – comprising representatives of the FOCP, SFOE, FOPH, the Federal Office for National Economic Supply (FONES), ENSI, the CTE Steering Committee on the Coordination of Transport in the Event of Disasters and

[7] Report of the Japanese Government to the IAEA Ministerial Conference on Nuclear Safety, June 11, 2011.

Emergencies (SC CTE) and the cantons – took place in October 2011. The purpose of the project is to enable the submission of a consolidated document on standard requirements to the cantons by the end of 2012.

The requirements specified in the Emergency Preparedness Ordinance (Article 11, letter c and Article 12, letter c) in connection with precautionary evacuation must be reviewed and generalised to cover all evacuations. Consideration should also be given in this context to the new reference scenarios, the new zoning concept and the "Dose Measures Concept".

Summary, conclusions and consequences

- **Organisational measures**
  The DDPS/FOCP is mandated to draft, by 31 December 2012 together with the cantons, a basic document containing standard requirements for the planning of large-scale precautionary evacuations and evacuations subsequent to events.

- **Legislative measure**
  DETEC/SFOE is mandated to draft, together with the DDPS/FOCP and the cantons, the changes to the Emergency Preparedness Ordinance regarding the planning of precautionary and subsequent evacuations, and to apply to the Federal Council for such changes by 31 December 2013.

5.6. Preparation of emergency preparedness measures outside of the alarm zones that have been prepared at present

5.6.1. Bases

According to Article 14 of the Emergency Preparedness Ordinance, responsibility for planning, preparing and implementing special emergency preparedness measures lies solely with the cantons where communes in zones 1 and 2 are located. No requirements of this sort are stipulated for the cantons in zone 3 (the rest of Switzerland) in the Emergency Preparedness Ordinance.

5.6.2. Deficiencies in the current situation

In case of extreme events, it may be necessary for the authorities to take protective measures and consequently to issue prompt warnings to the authorities, and alarms to the population outside of zone 2. Therefore, planning for zone 3 cannot be totally disregarded at the Federal government and cantonal level. On the basis of the revised reference scenarios, it may prove necessary (in addition) to extend or expand the existing alarm zones in which emergency preparedness measures are required.

Fukushima clearly showed that in the event of an accident at a nuclear power plant, certain tasks may need to be performed in more distant areas that are not directly at risk; these include the accommodation of evacuees and the management of traffic and transport, etc. The relevant requirements are not stated in the Emergency Preparedness Ordinance.

It is therefore necessary to clarify the distance at which such plans and preparations must be made for the purposes of emergency management, and which plans and preparations are involved. It is also necessary to define where preparations must be made for warnings by authorities, the issuance of alarms to the population and orders for protective measures (e.g. definitions of decision-making processes, measures, requirements for the remote control of sirens, etc.).

Clarifications and binding definitions are also required with regard to the tasks of cantons, regions and communes that are not directly affected in connection with the reception of evacuees and the provision of support for them.

Summary, conclusions and consequences

- **Organisational measures**
  - The DDPS/FOCP is mandated to define, by 31 December 2013 together with the FDHA/FOPH and the cantons, which plans and preparations for emergency preparedness are required in which areas, and whether there is any need to adapt the Alarms Ordinance. On this basis, the DDPS/FOCP will revise the emergency preparedness concept for nuclear power plants.
  - The DDPS/FOCP is mandated to draft, by 31 December 2013 together with the cantons, standard requirements for the reception of evacuees and for the provision of support to them by cantons that are not directly affected by an event. On this basis, the DDPS/FOCP will revise the emergency preparedness concept for nuclear power plants.

- **Legislative measures**
  - The DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for any necessary amendments to Article 17, paragraph 5 of the Alarms Ordinance with regard to the remote control of sirens.
  - DETEC/SFOE is mandated to draft, together with the DDPS/FOCP and the cantons, the changes to the Emergency Preparedness Ordinance regarding the reception of evacuees and the provision of support to them by cantons that are not directly affected by an event (Articles 12 - 15), and to apply to the Federal Council for these changes by 31 December 2013.

6. The Iodine Tablets Ordinance

This subject area was covered by the Working Groups on the Radiation Protection Ordinance (RPO/StSV) and the Emergency Preparedness Ordinance (EPO/NFSV).

Potassium iodide tablets were issued in Switzerland to all households, businesses, schools, administrative bodies and other public and private organisations in zones 1 and 2. In zone 3 (the rest of Switzerland), potassium iodide tablets are distributed and stored in the cantons on a decentral basis. The preparations for ongoing distribution in case of an event have proven to be heterogeneous and problematic. It must be assumed that it is impossible to distribute the iodine tablets in many zone 3 cantons within the stipulated timeframe. The cantons asked the Federal government for a basic distribution concept. The Potassium Iodide Unit then searched for suppliers who would be able, as service providers, to handle distribution within the specified periods in case of an event. However, this search proved fruitless.

The current arrangements for issuing potassium iodide tablets outside of the prepared alarm zones in case of an event must be reviewed to determine the requirements, the ability to implement the arrangements, and the timeframe available for this purpose. If necessary, alternative solutions must be developed. This process should also take account of the reference scenarios made available by BST ABCN for precautionary planning purposes. It should be noted in this context that taking potassium iodide tablets can never be ordered as the primary or the only measure as they merely afford protection against the inhalation of radioactive iodine. This measure only makes sense in combination with an order to remain in a protected place.

Summary, conclusions and consequences

- **Organisational measures**
  FDHA/FOPH is mandated to review, by 30 June 2013 together with DDPS/FOCP and the cantons, the distribution concept for potassium iodide tablets outside of the specified alarm zones.

- **Legislative measures**
  FDHA/FOPH is mandated to apply to the Federal Council, by 31 December 2013, for an amendment to the Iodine Tablets Ordinance. The cantons must be involved as appropriate. The amendment must be coordinated with the adaptation of the Emergency Preparedness Ordinance.

7. The Alarming Ordinance

The Federal Office for the Environment (FOEN) has submitted the report for this chapter in accordance with the mandate issued at the first meeting of IDA NOMEX.

7.1. Background

7.1.1. The Alarming Ordinance and knowledge gained from Fukushima

For a long time, various specialist units at Federal government level have been mandated to continuously monitor the situation regarding natural hazards and, if there is a threat of danger, to issue appropriate warnings to the relevant authorities, including in particular the cantonal management and operational organisations responsible for civil protection.

The storms and flooding events seen in recent years have shown that the population must be better informed and warned as necessary about extreme events of this sort. Improvements to the arrangements for warning the population about natural hazards formed a major component of the OWARNA package of measures (see chapter 4). For this purpose, a complete revision of the Alarming Ordinance (AV, SR 520.12) was undertaken; in parallel, the relevant adaptations were made to the Radio and Television Ordinance (RTVV, SR 784.401) and the DETEC Ordinance regarding Radio and Television dated 5 October 2007 (SR 784.401.11). The ordinances containing the relevant revisions have been in force since the start of 2011. The objective is for the population to improve its protection against recognisable major natural hazards so as to prevent or limit personal injuries and damage to property.

The events at Fukushima have confirmed these objectives and the necessity for the revisions that were implemented.

7.1.2. Implementation

The revised versions of the Alarming Ordinance, the Radio and Television Ordinance and the DETEC Ordinance regarding Radio and Television have been in force since the start of 2011. Warnings can now be declared as subject to mandatory dissemination, so they must be communicated not only to the authorities but also directly to the affected population if a hazard is assessed as "major" or "very major". This corresponds to levels 4 or 5 on a uniformly defined five-stage hazard scale.

Warnings about natural hazards that require mandatory distribution are issued by the following specialist bodies:

- Federal Office of Meteorology and Climatology (MeteoSwiss)
  - Warnings about dangerous weather events
- Federal Office for the Environment (FOEN)
  - Warnings about flooding and associated landslides
  - Warnings about forest fires
- WSL Institute for Snow and Avalanche Research (SLF)
  - Warnings about avalanches
- Swiss Seismological Service at the Swiss Federal Institute of Technology, Zurich (ETHZ) (SED)
  - Reports about earthquakes

The SRG[8] channels and all concessionaire local radio and regional television broadcasters with performance mandates are obliged to broadcast warnings by authorities about imminent natural hazards if such warnings relate to their broadcasting areas. In these cases, the hazard warnings are clearly identified as warnings from the Federal government and are broadcast on all channels in a standard form, with identical text, identical maps and identical acoustic and visual characteristics for identification purposes.

As the hub, the National Emergency Operation Centre (NEOC) within the Federal Office for Civil Protection (FOCP) ensures rapid, secure and coordinated transmission of warnings by the specialist units to the broadcasters obliged to transmit them. NEOC also ensures that the content and timing of the warnings to the population are coordinated with the warnings issued to the authorities.

The first storm warning for mandatory distribution was issued by MeteoSwiss on 26 August 2011.

7.2. Requirements for action

Investigations are currently in progress to standardise the structure of the content and presentation of warnings to the authorities (levels 2, "moderate" and 3, "substantial" hazards) among the various specialist units. Likewise, the regions covered by warnings will be harmonised among the specialist units insofar as possible. By the end of 2012, an EDP tool will be developed in a process managed by the National Emergency Operation Centre (NEOC) in order to provide support for the specialist units with compiling and disseminating warnings to the authorities and the population.

The revised version of the Alarming Ordinance brought into force at the start of 2011 has so far proven its merits. No further legislative measures are required.

7.3. Summary

The revisions of the Alarming Ordinance and the Radio and Television Ordinance have made it possible for direct warnings to be issued to the authorities − and now to the population as well − in case of major or very major hazards. Warnings to the population are broadcast quickly, and in a targeted manner, via radio and television. Prompt warnings to the population can prevent or at least reduce damage. The work on implementing the revised ordinances has been completed or is at an advanced stage. No further measures appear to be necessary at present.

[8] Switzerland's radio and TV broadcaster.

8. International aspects

8.1. Bilateral agreements with neighbouring countries

The next section addresses the question as to the scope of action required at the bilateral and multilateral levels for the purpose of cooperation and in order to specify responsibilities.

8.1.1. Nuclear information agreements

Switzerland has concluded bilateral agreements regarding the exchange of information about nuclear safety, radiation protection or radiological emergency situations with Germany, France, Italy and Austria. These are as follows:

- Agreement of 31 May 1978 between the Swiss Federal Council and the government of the Federal Republic of Germany regarding radiological emergency preparedness (SR 0.732.321.36); came into force on 10 January 1979;
- Agreement dated 5 December 1988 between the Swiss Federal Council and the government of the French Republic regarding cooperation on the peaceful use of nuclear energy (SR 0.732.934.9); came into force on 1 December 1990;
- Correspondence dated 30 November 1989 between Switzerland and France regarding the formation of a "Mixed Swiss-French Commission for Nuclear Safety" (SR 0.732.934.93); came into force on 30 November 1989;
- Agreement dated 30 November 1989 between the Swiss Federal Council and the government of the French Republic regarding the exchange of information in case of incidents or accidents which could have radiological effects (with correspondence, SR 0.732.323.49); came into force on 18 January 1990;
- Correspondence dated 5/20 November 2008 between the Swiss Federal Council and the government of the French Republic regarding the scope and details of alarms and/or the transmission of information in case of minor events or accident situations at the Fessenheim nuclear power plant or in the Swiss nuclear power plants at Beznau, Gösgen, Leibstadt and Mühleberg (SR 0.732.323.491); came into force on 20 November 2008;
- Agreement dated 19 March 1999 between the Swiss Federal Council and the government of the Republic of Austria regarding the prompt exchange of information relating to nuclear safety and radiation protection ("Nuclear Information Agreement" between Switzerland and Austria, SR 0.732.321.63); came into force on 1 January 2001;
- Agreement dated 15 December 1989 between the Swiss Federal Council and the government of the Italian Republic regarding the prompt exchange of information in case of nuclear incidents (SR 0.732.324.54); came into force on 26 February 1990.

The German-Swiss Commission for the Safety of Nuclear Installations (DSK) meets annually in order to implement the agreement with Germany. The Swiss delegation is chaired by ENSI, and the German delegation is chaired by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The following bodies are represented on the DSK: ENSI, SFOE, FDFA, FOPH, FOCP and the canton of Aargau. There are also four working groups which meet annually: "Plant safety", "Emergency preparedness", "Radiation protection" and "Disposal of radioactive waste". The Swiss delegations in the Working Groups are each chaired by ENSI. In the working group on emergency preparedness, Germany is represented by the District Administration

Office of Waldshut, the Freiburg Regional Council and the Ministry of the Environment of Baden-Württemberg.

The agreements with France are implemented under the auspices of the Commission Franco-Suisse de sûreté nucléaire et de radioprotection (Franco-Swiss Commission on Nuclear Safety and Radiation Protection, CFS). This commission was set up on the basis of correspondence relating to the 1988 agreements regarding cooperation on the peaceful use of nuclear energy. In practice, however, it also deals with the issues regulated by the 1989 nuclear information agreement. Correspondence regarding the latter agreement designates NEOC as the Swiss authority responsible for notification in case of nuclear accidents. At the request of the cantons in the north-west of Switzerland, a regional nuclear information agreement was also concluded in 2008 relating to the Fessenheim nuclear power plant. The following bodies are represented on the CFS: ENSI, SFOE, FDFA, FOPH and FOCP, and there is also a representative of the cantons. ENSI chairs the Swiss delegation. The FOCP chairs the Swiss delegation to the CFS "Crise nucléaire" ("Nuclear crisis") subcommission. The CFS meets annually and the sub-commission meets twice per year.

The bilateral meeting of nuclear experts from Switzerland and Austria also takes place once per year. SFOE is lead manager for the Swiss side. The other participating Federal bodies are ENSI, FDFA and the FOCP. The meetings focus on the safety of nuclear plants, the storage of radioactive waste, monitoring of radiation and emergency planning.

In addition to the agreement with Italy, which does not make provision for regular meetings of experts, an agreement between ENSI and the Istituto Superiore per la Protezione a la Ricerca Ambientale (ISPRA) was concluded in 2011. The objective is an annual exchange of information from 2012 onwards. ENSI is the lead manager for Switzerland; other representatives are sent by SFOE, FDFA, FOPH and FOCP.

There is no agreement on nuclear information with the Principality of Liechtenstein because Swiss legislation on radiation protection is applicable in Liechtenstein on the basis of the 1923 customs treaty (SR 0.631.112.514), and the Principality has close ties with Switzerland on the basis of the agreement dated 14 September 2010 between the Swiss Federal Council and the Government of the Principality of Liechtenstein regarding cooperation on radiation protection (with annexes, SR 0.814.515.141).

8.1.2. Agreements regarding disaster relief

Switzerland has also concluded bilateral disaster relief agreements with Germany, France, Italy, Austria and the Principality of Liechtenstein which apply to mutual assistance in case of disasters of all types and severe accidents. These are as follows:

- Agreement dated 28 November 1984 between the Swiss Confederation and the Federal Republic of Germany regarding mutual assistance in case of disasters or serious accidents (SR 0.131.313.6); came into force on 1 December 1988;
- Agreement dated 14 January 1987 between the Swiss Federal Council and the French Republic regarding mutual assistance in case of disasters or serious accidents (SR 0.131.334.9); came into force on 1 April 1989;
- Exchange of notes dated 28 February/25 June 2007 between Switzerland and France regarding the latter agreement (SR 0.131.334.91); came into force on 25 June 2007;
- Agreement dated 22 March 2000 between the Swiss Confederation and the Republic of Austria regarding mutual assistance in case of disasters or serious accidents (SR 0.131.316.3);

came into force on 1 March 2000;

- Agreement dated 3 March 2011 between the Swiss Confederation and the Republic of Austria regarding the facilitation of ambulance and rescue flights (SR 0.131.316.31); came into force on 1 November 2011;
- Agreement dated 2 May 1995 between the Swiss Confederation and the Italian Republic regarding cooperation on risk precautions and prevention and mutual assistance in case of disasters caused by natural or human activities (SR 0.131.345.4); came into force on 26 May 1998;
- Agreement dated 2 November 2005 between the Swiss Confederation and the Principality of Liechtenstein regarding mutual assistance in case of disasters or serious accidents (SR 0.131.351.4); came into force on 1 December 2006.

In addition to mutual assistance in case of an event, these agreements also make provision for other forms of cooperation (measures to prevent disasters and accidents, exchange of information, meetings, research programmes, technical courses and joint exercises by auxiliary forces on the territories of the two parties to the agreements). In this context, for example, cross-border exercises have taken place involving Switzerland and France in the Geneva region; involving Switzerland, France and Germany in the Upper Rhine region; and involving the Principality of Liechtenstein, Switzerland and Austria in Liechtenstein.

8.1.3. Summary

A complete network of nuclear information and disaster relief agreements is in place with Switzerland's neighbour countries, under the terms of which regular exchanges of information and exercises, etc., take place. The organisations and individuals involved know one another, which is especially valuable in case of an event. The IAEA team assessed this as a "Good Practice" during the IRRS mission to ENSI: "Good coordination and cooperation between Federal and cantonal organizations involved in the national nuclear emergency preparedness and response system as well as with the neighbouring countries."

"Mutual assistance in case of accidents and disasters" is also one of the subjects of the European Council Outline Convention on Transfrontier Cooperation between Territorial Communities or Authorities dated 21 May 1980 (SR 0.131.1), which came into effect for Switzerland on 4 June 1982 (with an additional protocol and protocol no. 2), and to which all Switzerland's neighbouring countries have also acceded (cf. section 4 of the preamble). However, this Madrid Convention, as it is known, leaves specific implementation up to the parties to the agreement, so it is primarily a political instrument to promote cooperation in Europe.

8.2. Cooperation with the IAEA

The following agreements are especially relevant in connection with radiological events such as the one at Fukushima:

- "Convention on Early Notification of a Nuclear Accident" dated 26 September 1986 (SR 0.732.321.1); came into effect for Switzerland on 1 July 1988;
- "Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency" dated 26 September 1986 (SR 0.732.321.2); came into effect for Switzerland on 1 July 1988.

These two conventions were given more specific form by the aforementioned nuclear information agreements between Switzerland and its neighbour countries, as stipulated in Article 9 of the Convention on Early Notification of a Nuclear Accident.

SFOE is the official channel for contact with the IAEA in Switzerland. Moreover, the message regarding the IAEA conventions implicitly designated the FOCP (NEOC) as the body responsible for international and bilateral exchanges of information in case of an event. The FOCP (NEOC) therefore acts as the competent authority and is responsible for the "Unified System for Information Exchange in Incidents and Emergencies (USIE)". ENSI provides the INES officer and the Swiss delegates (each appointed for four years) to the Nuclear Safety Standards Committee (NUSSC, reactor safety), the Radiation Safety Standards Committee (RASSC, radiation protection), the Waste Safety Standards Committee (WASSC, dealing with radioactive waste) and the Transport Safety Standards Committee (TRANSSC, transportation of nuclear products).

During the IAEA's IRRS mission to ENSI, it was repeatedly stressed that Switzerland is not a member of the "Response and Assistance Network (RANET)". IDA NOMEX considers that action must be taken on this matter, and it advises taking the steps required for Switzerland to become a member of RANET.

Summary, conclusions and consequences

- **Organisational measures**
  DDPS/FOCP is mandated to take the necessary steps for Switzerland to become a member of RANET within the IAEA as from 30 June 2013.

8.3. Cooperation with the European Commission

The network of the European Commission, ECURIE (European Community Urgent Radiological Information Exchange), also plays a key role in connection with nuclear and radiological events in the European region. This network was created in parallel with the IAEA network as a consequence of the accident at the Chernobyl nuclear power plant, and it imposes stricter criteria for the time as from which other countries must receive immediate information. The scope of the information to be exchanged in case of an event is also more comprehensive. Switzerland has been part of this network since 1995. The FOCP (NEOC) has also been designated as the responsible body in this case. By joining ECURIE, Switzerland has been integrated into the European warning and information network. There is no need for any action regarding cooperation with the EU that can be attributed to the events in Japan.

8.4. Cooperation with the WHO (World Health Organization)

The following agreement is highly relevant in connection with radiological events that could pose potential health risks on an international scale, such as the event at Fukushima:

- International Health Regulations (2005) dated 23 May 2005 (IHR; SR 0.818.103); came into effect for Switzerland on 15 June 2007

As the national point of contact for the IHR, the FOPH is the official channel for contact with the WHO in Switzerland. In this regard, particular reference should be made to the WHO-IAEA publication, "Generic procedures for medical response during a nuclear or radiological emergency" (April 2005) and also to the REMPAN network (Radiation Emergency Medical Preparedness and Assistance Network) of the World Health Organization (WHO). The countries adopting the IHR have stated their readiness for international cooperation on medical measures in case of radiation accidents. Switzerland is not a member at present.

Significant progress had been made on identifying and treating acute radiation syndrome in recent years. With the support of the European Union, this has led to concerted action referred to as "METREPOL" (Medical Treatment Protocols for Radiation Accident Victims), thereby creating a systematic procedure for diagnostics in case of radiation accidents, and regarding the derivation of recommendations for treatment depending on a classification of the level of severity and complexity of the radiation damage. This makes it possible to take steps to implement therapeutic measures at an early stage. International cooperation on medical measures in case of radiation accidents is indispensable to scientific progress, and is essential in order to guarantee professional care for those affected. Switzerland's participation in the REMPAN network of the WHO for medical care and assistance in case of radiation accidents would be a first step in this direction.

Summary, conclusions and consequences

- **Organisational measures**
  FDHA/FOPH is mandated to examine, by 30 June 2013, whether a medical centre in Switzerland can participate as a collaboration centre within REMPAN.

8.5. EU stress test

Nuclear energy legislation stipulates an obligation to carry out a new review of safety at all Swiss nuclear power plants following significant incidents abroad. For this reason, ENSI issued corresponding rulings on 18 March, 1 April and 5 May 2011. By 31 March 2012, the operators had to prove in two stages that no impermissible releases of radioactivity would occur even in the case of very infrequent seismic and flooding events.

Moreover, Switzerland is taking part in the EU Stress Test, which also focuses on extreme natural events and on the consequences of a loss of power and cooling water supplies, as well as the effectiveness of emergency preparedness measures in case of severe accidents. ENSI submitted the Swiss national report to the EU on time at the end of 2011, and is taking part in the review process for the other national reports.

V. Resources and passing on costs

1. Resources

This report proposes a series of organisational and legislative measures. The responsibility for implementing each planned measure lies with the Federal agencies and offices within whose scope of competence it falls. As they continue processing a project, these agencies and offices must estimate the human and financial resources required, and must quantify them as part of the relevant application to the Federal Council. At present, it is impossible to assess the total of human and financial resources that will necessary in order to implement the measures now being proposed.

2. Passing on costs, costs-by-cause principle

The issue of passing costs on to the parties who cause them – in particular, the owners of nuclear plants – was also discussed as part of the work undertaken by IDA NOMEX.

Specifically, the relevant bases for passing on costs are to be found in the following legislative instruments:

- Nuclear Energy Act (NEA/KEG, SR 732.1)
- Emergency Preparedness Ordinance (NFSV, SR 732.33)
- Ordinance concerning Fees and Supervisory Levies in the Energy Sector (GebV-En, SR 730.05)
- Radiation Protection Act (RPA/StSG, SR 814.50)
- Iodine Tablets Ordinance (SR 814.52)
- Alarming Ordinance (AV, SR 520.12)

In respect of the Federal government, Article 83, paragraph 1 of the NEA establishes the principle that the responsible authorities shall levy fees on operators of nuclear plants and shall require compensation for expenditure from them. Pursuant to Article 84, letter a, NEA, the cantons may require fees and compensation for expenditure from the owners of nuclear plants, nuclear products and radioactive waste, particularly for the purposes of planning and implementing emergency preparedness measures. Article 17 of the Emergency Preparedness Ordinance also incorporates this concept.

In case of an event that may result in a hazard due to radioactive iodine, the Iodine Tablets Ordinance regulates how the population is to be supplied with tablets containing iodine salts. The relevant costs are split between the operators of nuclear power plants, the Federal government, the cantons and the communes as per Article 13 of the Iodine Tablets Ordinance. In zones[9] 1 and 2, the operators of nuclear power plants pay all the costs of the precautionary procurement and distribution, inspection, replacement and disposal of the tablets after they have reached their expiration dates, and for providing information to the population and the specialists, and they pay half of the aforementioned costs in zone 3. They reimburse expenditure incurred by the cantons and communes for the distribution, storage and dispensing of tablets in zones 1 and 2 on a flat-rate basis. These flat-rate amounts are stipulated by the Armed Forces Pharmacy.

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[9] Zones as per Art. 3, Emergency Preparedness Ordinance (NFSV).

Pursuant to Article 22, RPA/StSG (Emergency Preparedness), operational facilities from which escapes of hazardous quantities of radioactive substances into the environment cannot be ruled out must be obliged, as part of the licensing procedure:

a) to set up an alarm system for the endangered population at their own cost, or to participate proportionately in the costs of a general alarm system;
b) to participate in the preparation and implementation of emergency preparedness measures.

Practice in these respects is to be reviewed in connection with the forthcoming implementation of the emergency preparedness measures. As regards the siren location in the canton of Bern, it should be noted that the Mühleberg nuclear power plant paid for setting up the sirens in alarm zone 1. Further measures to consolidate the siren locations were paid for by the FOCP as the sirens were also used for alarms regarding hazards that do not emanate from a nuclear power plant.

The Alarming Ordinance includes special provisions for hazards that emanate from nuclear plants and dams (Article 11 ff.). The allocation of costs is specifically regulated in Article 21 as regards the Federal government, the cantons and the operators of dams.

Article 4 of the RPA/StSG establishes the costs-by-cause principle: "Any party which causes measures pursuant to this Act shall bear the costs thereof". According to the costs-by-cause principle, any costs which can be objectively justified may be transferred. The specific costs which can be transferred must be verified in each individual case.

In respect of passing on costs in the future, the definition of costs in Article 13 of the Iodine Tablets Ordinance can in fact be regarded as implementing the costs-by-cause principle in practice. A change to the allocation of zones in the Emergency Preparedness Ordinance would have a direct impact on the allocation of costs stipulated in the Iodine Tablets Ordinance. In the first instance, it is necessary to wait and see whether the existing zone allocation will be changed and if so, to what extent. The next step would be to adapt the Iodine Tablets Ordinance if necessary (e.g. to stipulate who should bear which proportion of the costs).

Otherwise, it is only possible to make specific statements about costs that should be levied once the measures and the requisite resources have been defined.

VI. Effects on the cantons

In order to implement the knowledge gained as described above, cooperation between the Federal government and the cantons is required in many cases. Provision is therefore made for the cantons to collaborate on drafting many of the measures. The cantons are directly impacted by measures associated with the following issues:

- Support from the Federal government in case of an event (chapter 1.3).
- Provision of protective equipment and operational systems (chapter 1.4).
- Equipment, material and personnel required for emergency preparedness (chapter 1.6).
- Sampling and measurement organisation (chapter 2.2).
- Assessing the radiological situation and ordering measures (chapter 2.3).
- Information and support for concerned / affected persons (chapter 2.7).
- Conversion of the "Dose Measures Concept" (DMK) into a "Measures Concept" (MK) (chapter 3.4).
- Specification of the interfaces between the Federal government and the cantons, and clarification of the roles of BST ABCN and the Swiss Safety Alliance (SVS), and of cooperation between these bodies (chapter 3.5).
- Telematics in all situations and redundancy of means of communication (chapter 3.6).
- Review of the zoning concept (chapter 5.3).
- **Fehler! Verweisquelle konnte nicht gefunden werden.** (chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**).
- Preparation of emergency preparedness measures outside of the alarm zones that have been prepared at present (chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**).
- The Iodine Tablets Ordinance (chapter 6).

It is currently impossible to arrive at a more accurate estimate of the overall impact, as is also the case with the resources (see sub-section V 1). This will only be possible once the envisaged measures are specified more precisely as work on them continues.

VII. Further procedure

1. Probable milestones

The following milestones are derived from the overview of measures shown in the Annexe:

- 31 December 2012:
  - Organisational measures relating to personnel, equipment and material
  - Organisational measures relating to the Radiation Protection Ordinance
  - Organisational measures relating to the NBCN Operations Ordinance
  - Organisational measures relating to the Emergency Preparedness Ordinance
- 31 December 2013:
  - Organisational and legislative measures relating to personnel, equipment and material
  - Organisational and legislative measures relating to the Radiation Protection Ordinance
  - Organisational and legislative measures relating to the NBCN Operations Ordinance
  - Organisational and legislative measures relating to the Emergency Preparedness Ordinance
  - Organisational and legislative measures relating to the Iodine Tablets Ordinance
- 31 December 2014:
  - Legislative measures relating to the NBCN Operations Ordinance
- 31 December 2016:
  - Organisational measures relating to the NBCN Operations Ordinance

2. Future review of emergency preparedness measures in Switzerland

As a consequence of the in-depth consideration of the events in Japan, it can be expected that further new knowledge will be acquired in the area of emergency preparedness. Moreover, as the organisational and legislative measures requested in this report are implemented, it can be expected that there will be an ongoing need to review and adapt emergency preparedness measures in Switzerland. In connection with the future procedure, the question arises as to the framework within which this ongoing review and adaptation process should be carried out.

The analysis of activities by the various specialist bodies in Switzerland in the light of events in Japan has shown that an interdepartmental organisation is required in order to cope with an extreme event in Switzerland. A coordination body of this sort has been created in the form of BST ABCN and its permanent core element. This instrument must be utilised and strengthened for the purpose of dealing with events and in order to take precautions against them.

IDA NOMEX also examined whether its work should be continued under the auspices of KKM SVS. According to the 2010 report on safety policy (SIPOL B) by the Federal Council, KKM SVS was to be set up in order to consolidate the joint processing of safety policy issues by the Federal government and the cantons. The Federal government and cantonal delegate for this purpose was elected at the end of February 2012. KKM SVS is in the process of being set up. The timeframe for the further procedure cannot be assessed at present.

Accordingly, consideration is being given to two alternatives for a coordinated approach in the future:

- Continuation of IDA NOMEX: the Interdepartmental Working Group continues to exist. The members of the IDA will meet as required in the future in order to discuss issues related to emergency preparedness and to propose further organisational and legislative measures as appropriate.
- IDA NOMEX is disbanded: the respective departments carry out their mandates and the Interdepartmental Working Group is disbanded. Further interdepartmental issues will be coordinated and clarified under the auspices of BST ABCN in the future.

Once this report has been approved, the review of emergency preparedness measures in Switzerland should be continued under the auspices of BST ABCN (especially as this body combines almost all the members of the IDA) and of KKM SVS. In addition, BST ABCN is to compile a final report in 2014 which will describe the implementation of the measures proposed by IDA NOMEX.

Annexe 1

Overview of organisational and legislative measures

The following schedule is intended to provide an overview of the measures listed in the report by IDA NOMEX. The list of measures is arranged according to their planned implementation dates, subject areas, types and, finally, according to the sequence of the measures in the report.

31 December 2012

Personnel, equipment and material

Organisational measures

1. DETEC/SFOE is mandated to examine, by 31 December 2012 together with the responsible Federal agencies and offices, whether the basic legislation is adequate in order to impose obligations on public transport enterprises.

2. The DDPS is mandated to examine, by 31 December 2012, the conditions under which and the extent to which units of the Armed Forces and the civil defence forces can be deployed.

3. FDHA/FOPH is mandated to compile, by 31 December 2012, a concept for the dosimetry of persons subject to obligations and for the registration of personal doses (possibly with the involvement of the Group of Experts on Personal Dosimetry of the Federal Commission for Radiation Protection and Radioactivity Monitoring (KSR)).

4. DDPS/FOCP is mandated to clarify, by 31 December 2012 and in cooperation with the operators of nuclear power plants, ENSI, MeteoSwiss and the cantons, the responsibilities for providing equipment, material and personnel for emergency preparedness purposes, and to develop proposals to rectify deficiencies in the situation regarding personnel, equipment and material.

Radiation Protection Ordinance

Organisational measures

5. ENSI is mandated to compile, by 31 December 2012 and in cooperation with FDHA/FOPH, SUVA and the cantons, a report on the existing situation regarding assistance and treatment for persons with severe radiation exposure, to draw up agreements with the plants, and to suggest specific alternative solutions.

6. DDPS/FOCP is mandated to review, by 31 December 2012 in collaboration with the cantons, the "Contact Point" concept for providing individual assistance and information to concerned individuals, and to define the responsibilities.

NBCN Operations Ordinance

Organisational measures

7. DDPS/FOCP is mandated to define, by 31 December 2012, the necessary requirements regarding the redundancy and safety against failure of the communication systems, in cooperation with the involved Federal agencies and the cantons.

8. DDPS/FOCP is mandated and is bindingly obliged to clarify, by 31 December 2012, the issue of financing communication systems on the basis of agreements between the Federal government, the cantons and the operators of plants with NBC hazard potential, and to apply immediately for the necessary financial resources.

9. DDPS/FOCP is mandated to examine, by 31 December 2012, possible alternative transitional solutions in respect of communication systems in order to close temporary gaps.

10. ENSI is mandated to draft, by 31 December 2012, the necessary requirements regarding the redundancy and safety against failure of measurement and forecasting systems for nuclear power plants, in cooperation with the FOCP, MeteoSwiss and the nuclear power plant operators.

11. BST ABCN is mandated to establish the Master Plan "A" as the interdepartmental control instrument in the FOCP by 31 December 2012.

12. BST ABCN is mandated to prioritise, by 31 December 2012, the various NBCN hazards under the auspices of BST ABCN so that the members of BST ABCN can consistently focus their resources on those scenarios assessed as critical.

13. BST ABCN is mandated to define, by 31 December 2012 on the basis of Article 5 of the NBCN Operations Ordinance and the prioritisation decisions of BST ABCN, the specific planning of the content and timing for the outstanding work in area A ("nuclear") in Master Plan "A".

Emergency Preparedness Ordinance

Organisational measures

14. ENSI is mandated to review, by 31 December 2012 in cooperation with FDHA/FOPH, DDPS/FOCP and the cantons, the reference scenarios and their assumptions for emergency preparedness in the areas surrounding nuclear power plants.

15. DDPS/FOCP is mandated to draft, by 31 December 2012 together with the cantons, a basic document containing standard requirements for the planning of large-scale precautionary evacuations and evacuations subsequent to events.

30 June 2013

Personnel, equipment and material

Organisational measures

16. The DDPS is mandated to clarify, by 30 June 2013 in connection with the "Concept for Event Control at National Level" and in collaboration with the cantons under the auspices of KKM SVS, issues relating to support from the Federal government for the cantons in the form of personnel, equipment and material. Likewise, further aspects should be regulated in connection with assistance to be provided in case of an event, e.g. as regards financing, management responsibility, the authorities and responsibilities of the Federal agencies and offices involved, and the responsibilities regarding offers of aid from other countries.

NBCN Operations Ordinance

Organisational measures

17. The DDPS is mandated to work towards defining, by 30 June 2013 in cooperation with KKM SVS and the responsible Federal agencies and offices as well as the cantons, principles according to which the Federal government and cantons can cooperate for the purpose of dealing with extreme events.

Emergency Preparedness Ordinance

Organisational measures

18. ENSI is mandated, together with DDPS/FOCP and the cantons, to review the zoning concept in the areas surrounding nuclear power plants with a view to amending the Emergency Preparedness Ordinance, by 30 June 2013.

Iodine Tablets Ordinance

Organisational measures

19. FDHA/FOPH is mandated to review, by 30 June 2013 together with DDPS/FOCP and the cantons, the distribution concept for potassium iodide tablets outside of the specified alarm zones.

International aspects

Organisational measures

20. DDPS/FOCP is mandated to take the necessary steps for Switzerland to become a member of RANET within the IAEA as from 30 June 2013.

21. FDHA/FOPH is mandated to examine, by 30 June 2013, whether a medical centre in Switzerland can participate as a collaboration centre within REMPAN.

31 December 2013

Personnel, equipment and material

Organisational measures

22. DDPS/FOCP is mandated, by 31 December 2013 and in cooperation with KKM SVS, to define principles according to which the Federal government and the cantons will regulate the financing and provision of protective equipment and operational systems in case of extreme NBCN events.

23. The DDPS is mandated to set up, by 31 December 2013, a rapidly available reserve of equipment and material (such as measuring instruments, dosimeters and iodine tablets) to provide support for Swiss citizens abroad.

Legislative measures

24. FDHA/FOPH, DDPS and DETEC/SFOE are mandated to initiate, by 31 December 2013, the necessary adaptations regarding the imposition of obligations on individuals as required (cf. sub-sections 1 - 3).

25. DDPS/FOCP is mandated to submit to the Federal Council, by 31 December 2013, the necessary additions to the NBCN Operations Ordinance in order to ensure the operational readiness and resilience of the Federal agencies and offices represented in BST ABCN.

26. The DDPS is mandated to apply to the Federal Council, by 31 December 2013, for an Ordinance relating to the use of DDPS resources in favour of BST ABCN, and to adapt the Ordinance relating to NEOC Military Staff (Stab BR NAZ) as required.

27. The DDPS is mandated to stipulate, by 31 December 2013, the scope, financing and management of the reserve of equipment and material as per sub-section 23 under the terms of the Ordinance relating to the Deployment of the DDPS in favour of BST ABCN (see sub-section 26).

Radiation Protection Ordinance

Organisational measures

28. DDPS/FOCP is mandated to develop, by 31 December 2013 in collaboration with FDHA and DETEC, specific triggering criteria for ordering immediate measures which could form the basis of a new "Measures Concept". The cantons should be involved as appropriate.

29. FDHA/FOPH is mandated to examine, by 31 December 2013 and in collaboration with ENSI, which limits and reference values should be adapted or accepted in the legislation on radiation protection, in connection with the overall revision of the Radiation Protection Ordinance.

Legislative measures

30. FDHA/FOPH is mandated to draft, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance and in collaboration with DDPS/FOCP, internationally harmonised reference values for emergency exposure situations together with regulations on long-lasting exposure situations.

31. FDHA/FOPH is mandated to target, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance, harmonisation with the European values and those of the ICRP, insofar as is possible and appropriate.

32. FDHA/FOPH is mandated to apply, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance and in cooperation with Federal Department of Finance (FDF)/Directorate General of Customs (DGC), and with the Swiss Accident Insurance Fund (SUVA) and the cantons as appropriate, for an amendment to Article 138 of the Radiation Protection Ordinance which would stipulate the responsibilities and obligations of the customs authorities, training for the customs organisations assigned to these tasks, the legislative basis for procuring and maintaining measuring equipment, and cooperation with the FOPH in normal circumstances, in case of unusual radiological events and in case of increased radioactivity.

33. FDHA/FOPH is mandated to examine, by 31 December 2013 in connection with the overall revision of the Radiation Protection Ordinance and in cooperation with the cantons, the possible introduction of a new provision on the treatment of radiation victims.

34. DDPS/FOCP is mandated to review, by 31 December 2013 in collaboration with the cantons, the possibility of introducing a new provision regarding the provision of information and support to concerned and affected persons into the NBCN Operations Ordinance or the Emergency Preparedness Ordinance.

NBCN Operations Ordinance

Organisational measures

35. KKM SVS and BST ABCN are mandated to regulate their cooperation and to communicate the results by 31 December 2013.

36. BST ABCN is mandated to review and (as appropriate) clarify, by 31 December 2013, the responsibilities and tasks of the Federal agencies and offices involved in the various phases of an event.

37. DDPS/FOCP is mandated to draft, by 31 December 2013 in cooperation with the affected Federal agencies and offices, the basis for converting the "Dose Measures Concept" into a "Measures Concept" (MK). For this purpose, consideration should be given to the scenarios for combined events to be compiled in advance by BST ABCN together with the responsible departments in each instance, to ENSI's revised reference scenarios, and to international standards. The cantons should be involved as appropriate.

38. BST ABCN is mandated to compile, by 31 December 2013 on the basis of the same procedure as was used in area "A" under the auspices of BST ABCN, corresponding Master Plans for hazards in areas "B" (biological), "C" (chemical) and "N" (natural).

39. The DDPS is mandated to work towards adopting, by 31 December 2013 in cooperation with KKM SVS and together with the responsible Federal agencies and offices, a comprehensive "Concept for Event Control at National Level" (cf. sub-section 17).

Legislative measures

40. DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for incorporation into the NBCN Operations Ordinance of the necessary specific details regarding:
    a) the role of BST ABCN Board in connection with the decision to deploy;
    b) the criteria for the activation of BST ABCN;
    c) designation of the chair in case of an event;
    d) notification obligations incumbent upon Federal agencies and offices;
    e) the tasks of the core element of BST ABCN in connection with ongoing tracking of the situation;
    and
    f) further development of BST ABCN into the key instrument to prepare for and deal with extreme events.

41. DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for the necessary changes to the NBCN Operations Ordinance regarding the composition of BST ABCN and its Board.

42. DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for the necessary additions to the NBCN Operations Ordinance regarding the procedure and responsibilities within BST ABCN for accepting aid from abroad in case of an event.

43. DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for the necessary additions to the NBCN Operations Ordinance regarding responsibilities, and regarding redundancy and safety against failure in the area of communication and transmission systems.

44. DETEC/SFOE is mandated to apply to the Federal Council, by 31 December 2013, for the necessary additions to the Emergency Preparedness Ordinance regarding requirements for redundant and fail-safe measurement and forecasting systems.

Emergency Preparedness Ordinance

Organisational measures

45. DDPS/FOCP is mandated to define, by 31 December 2013 together with FDHA/FOPH and the cantons, which plans and preparations for emergency preparedness are required in which areas, and whether there is any need to adapt the Alarming Ordinance. On this basis, DDPS/FOCP will revise the emergency preparedness concept for nuclear power plants.

46. DDPS/FOCP is mandated to draft, by 31 December 2013 together with the cantons, standard requirements for the reception of evacuees and for the provision of support to them by cantons that are not directly affected by an event. On this basis, DDPS/FOCP will revise the emergency preparedness concept for nuclear power plants.

Legislative measures

47. DETEC/SFOE is mandated, in cooperation with the cantons, to draft an amendment (if required) to the Emergency Preparedness Ordinance regarding emergency preparedness zones (Article 3 and Annexes 2 and 3), and to make an application to the Federal Council in respect thereof by 31 December 2013.

48. DETEC/SFOE is mandated to draft, together with DDPS/FOCP and the cantons, the changes to the Emergency Preparedness Ordinance regarding the planning of precautionary and subsequent evacuations, and to apply to the Federal Council for such changes by 31 December 2013.

49. DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2013, for any necessary amendments to Article 17, paragraph 5 of the Alarming Ordinance with regard to the remote control of sirens.

50. DETEC/SFOE is mandated to draft, together with DDPS/FOCP and the cantons, the changes to the Emergency Preparedness Ordinance regarding the reception of evacuees and the provision of support to them by cantons that are not directly affected by an event (Articles 12 - 15), and to apply to the Federal Council for these changes by 31 December 2013.

Iodine Tablets Ordinance

Legislative measures

51. FDHA/FOPH is mandated to apply to the Federal Council, by 31 December 2013, for an amendment to the Iodine Tablets Ordinance. The cantons must be involved as appropriate. The amendment must be coordinated with the adaptation of the Emergency Preparedness Ordinance.

30 June 2014

Radiation Protection Ordinance

Organisational measures

52. FDHA/FOPH is mandated to review, by 30 June 2014 in collaboration with DDPS/FOCP and ENSI under the auspices of BST ABCN and in cooperation with the cantons, the establishment of a platform to handle the technical and organisational coordination of the sampling and measurement organisation for events with increased radioactivity, and to develop a proposal on this subject.

31 December 2014

Personnel, equipment and material

Organisational measures

53. On the basis of the requirements stated in sub-section 22, DDPS/FOCP is mandated to conclude, by 31 December 2014, suitable service agreements between the partners in the Swiss Safety Alliance (Sichertheitsverbund Schweiz).

NBCN Operations Ordinance

Legislative measures

54. Depending on the results of the review of responsibilities and tasks, the responsible Federal agencies and offices will adapt the relevant legislative bases in their areas of responsibility as of 31 December 2014 (cf. sub-section 356).

55. DDPS/FOCP is mandated to apply to the Federal Council, by 31 December 2014, for the necessary changes to Annexe 1 ("Dose Measures Concept" (DMK)) to the NBCN Operations Ordinance, in accordance with the bases to be developed for the "Measures Concept" (MK) (cf. sub-section 37).

31 December 2016

NBCN Operations Ordinance

Organisational measures

56. DDPS/FOCP is mandated to implement, by 31 December 2016, the project on "Measures to Optimise Communications relating to Operational Organisation in case of Increased Radioactivity (EOR)", taking account of ongoing projects such as POLYALERT, POLYDATA, POLYCONNECT, POLYCOM, IBBK (provision of information to the population by the Federal government via radio in crisis situations) and satellite links.

Annexe 2

List of abbreviations

NBCN event	Damaging event due to increased radioactivity, or of a biological or chemical nature, natural event
BCM	Business Continuity Management
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BSS	Basic Safety Standards
BST ABCN	Federal NBCN Crisis Management Board
DMK	"Dose Measures Concept"
EOR	Operational organisation in case of increased radioactivity
FCA	Swiss Federal Customs Authority
IAEA	International Atomic Energy Association
ICRP	International Commission on Radiological Protection
KKM SVS	Consultation and Coordination Mechanism of the Swiss Safety Alliance (Sicherheitsverbund Schweiz)
NPP	nuclear power plant
KSD	Coordinated Medical Services
KSR	Federal Commission for Radiation Protection and Radioactivity Monitoring
mSv	millisievert (unit of measurement for weighted doses of radiation)
OWARNA	Optimisation of Warning and Alarm Systems
REMPAN	Radiation Emergency Medical Preparedness and Assistance Network
SUVA	Swiss Accident Insurance Fund
WHO	World Health Organization