



**ASN resolution 2012-DC-0297 of 26 June 2012 instructing the French atomic energy and alternative energies commission (CEA) to comply with requirements applicable to basic nuclear installation (BNI) 40 (Osiris) in the light of the conclusions of the Complementary Safety Assessment (CSA)**

The Nuclear Safety Authority (ASN),

**Having regard to the Environment Code, in particular its articles L. 592-20 and L. 593-10;**

**Having regard to the Public Health Code;**

**Having regard to** the decree of 8 June 1965 authorising the creation by CEA of a nuclear reactor and its critical mock-up in the Saclay nuclear research centre.

**Having regard to** decree 2005-1158 of 13 September 2005 relative to the off-site emergency plans concerning certain structures or fixed installations and taken in application of article 15 of Act 2004-811 of 13 August 2004 relative to the modernisation of the civil security services;

**Having regard to** decree 2007-1557 of 2 November 2007 amended, relative to basic nuclear installations and to the regulation of the transport of radioactive substances in terms of nuclear safety;

**Having regard to** the order of 10 August 1984 relative to the quality of design, construction and operation of BNIs;

**Having regard to** the order of 31 December 1999 amended, setting the general technical regulations intended to prevent and mitigate off-site detrimental effects and risks resulting from the operation of BNIs;

**Having regard to** the order of 7th February 2012 setting out the general rules for BNIs;

**Having regard to** the interministerial directive of 7 April 2005 on the action of the public authorities in the case of an event leading to a radiological emergency situation;

**Having regard to** ASN resolution 2008-DC-0113 of 16 September 2008 concerning BNI 40, named OSIRIS, and in particular the end of its operating life;

**Having regard to** ASN resolution 2011-DC-0224 of 5 May 2011 instructing CEA to conduct a Complementary Safety Assessment (CSA) of its BNIs in the light of the accident which occurred on the Fukushima Daiichi nuclear power plant (NPP);

**Having regard to** the CEA/DEN/DANS/11-42 CSA report of 13 September 2011;

**Having regard to** IRSN report 679 evaluating the licensee reports submitted on 4 November 2011;

**Having regard to** the CODEP-MEA-2011-063263 opinion dated 10 November 2011 by ASN's Advisory Committees for reactors and for laboratories and plants concerning all these CSAs;

**Having regard to** the ASN report of December 2011 on the CSAs;

**Having regard to** ASN opinion 2012-AV-0139 of 3 January 2012 on the CSAs;

**Having regard to** CEA letter AG 2012/126 of 17 April 2012 in response to the consultation concerning the planned requirements;

**Whereas**, following the CSAs on the priority nuclear facilities, their continued operation requires that their robustness to extreme situations be increased as rapidly as possible beyond their existing safety margins,

**Whereas**, it is necessary for the facility to be shut down no later than in 2015;

**Whereas**, the CSA approach, initiated firstly for the 59 electrical power generating reactors in operation or under construction and the 20 other nuclear facilities considered to be priorities, is the first step in the process to incorporate the experience feedback from the Fukushima Daiichi accident;

**Whereas**, social, organisational and human factors, which are key elements in safety, received particular attention during the CSAs,

### **Hereby issues the following resolution:**

#### **Article 1<sup>er</sup>**

Following analysis of the CSA report for the facility, this resolution stipulates additional requirements to be met by CEA, hereinafter referred to as “the licensee”, with registered offices in Bâtiment Le Ponant D - 25 rue Leblanc in PARIS (75015), with regard to the operation of BNI 40 on the Saclay site (Essonne département).

These requirements are defined in the appendix to this resolution.

#### **Article 2**

This resolution takes effect as of its notification to the licensee.

#### **Article 3**

The ASN Director General is tasked with implementation of this resolution, which shall be published in the ASN Official Bulletin.

Signed in Paris on 26 June 2012.

The ASN Commission,

*Signed*

**André-Claude LACOSTE**

**Marie-Pierre COMETS**

**Jean-Jacques DUMONT**

**Michel BOURGUIGNON**

**Philippe JAMET**

**A. Reinforced material and organisational provisions**

**[CEA-INB40-ECS 01]: creation of a hardened safety core**

**I.**

Before 30 June 2012, the licensee shall propose to ASN a hardened safety core of robust material and organisational measures designed, for the extreme situations studied in the CSAs, to:

- a) prevent a severe accident or limit its progression,
- b) mitigate large-scale releases,
- c) enable the licensee to perform its emergency management duties.

On 30 June 2012, CEA identifies, with supporting evidence, any measures common to several BNIs. In this case, CEA shall describe these measures in detail on the occasion of submission of the CSA report, to be transmitted no later than 30 June 2013 in accordance with requirement [CEA-INB40-ECS 06].

**II.**

Within this same time-frame, the licensee shall submit to ASN the requirements applicable to this hardened safety core. In order to define these requirements, the licensee shall identify significant fixed margins in relation to the requirements applicable on 1 January 2012, in particular the regulation requirements, the basic safety rules and the existing rules of professional good practice. The systems, structures and components (SSCs) which are included in these measures shall in particular comply with the requirements thus defined for the extreme situations studied by the CSAs. These SSCs shall be protected against the on-site and off-site hazards induced by these extreme situations, for example: falling loads, impacts from other components and structures, fires, explosions.

**III.**

For this hardened safety core, the licensee shall install SSCs that are independent and diversified in relation to the existing SSCs, in order to limit common mode risks. As applicable, the licensee shall justify the use of undiversified or existing SSCs.

**IV.**

The licensee shall take all necessary steps to ensure that the emergency organisation and resources are operational, including in the event of an accident affecting all or some of the facilities on a given site.

To this end, the licensee shall therefore include these steps in the hardened safety core defined in I of this requirement and, in accordance with II of this requirement, shall issue stipulations concerning:

- the emergency situation management premises, so that they offer greater resistance to hazards and remain accessible and habitable at all times and during long-duration emergencies, including in the event of radioactive releases. These premises shall enable the emergency teams to diagnose the status of the facilities and control the resources of the hardened safety core;
- the availability and operability of the mobile devices vital for emergency management;
- the means of communication essential to emergency management, in particular comprising the means of alerting and informing the emergency teams and the public authorities and the arrangements for alerting the population if the off-site emergency plan reflex phase is triggered by order of the Prefect;
- The availability of parameters used to diagnose the status of the facility, as well as meteorological and environmental measurements (radiological and chemical, inside and outside the emergency situation

management premises) enabling the radiological impact on the workers and general public to be evaluated and predicted;

- the operational dosimetry resources, radiation protection measuring instruments and individual and collective protection resources. These resources shall be available in sufficient quantities.

#### **V.**

For the Osiris reactor, the following instrumentation is considered to be part of the hardened safety core for operation in an accident situation:

- natural convection devices position indication;
- temperature measurement of the water exiting the core or in the reactor pool;
- measurement of the level in the reactor pool.

No later than 30 June 2012, the licensee shall send ASN an assessment of the robustness of this instrumentation. In the light of the results of its assessment, it shall propose the necessary improvements to meet the requirements applicable to it.

### **B. Complements to the CSA reports**

#### **[CEA-INB40-ECS 02]: assessment of the robustness of the pile block**

No later than 31 December 2012, CEA shall send ASN an assessment of the pile block beyond the design basis earthquake along with any improvement proposals should they be necessary to avoid any cliff-edge effects.

### **C. Improvements to the robustness of the facilities**

#### **[CEA-INB40-ECS 03]: off-site hazard risks - earthquake**

No later than 31 December 2013, CEA shall perform Safe Shutdown Earthquake (SSE) reinforcement work on the metal floor at the +8 metres level in the reactor hall.

#### **[CEA-INB40-ECS 04]: risk of loss of electrical power supplies**

No later than 30 June 2013, CEA shall perform the modifications necessary to back up the electrical power supply to the emergency ventilation fan, which is situated at a height of two metres, along with the electrical power supply to the ventilation configuration equipment.

#### **[CEA-INB40-ECS 05]: risk of loss of coolant**

##### **I.**

No later than 31 December 2013, CEA shall implement a seismic-qualified system for making up the water when the Osiris reactor pool level is low. It shall decide on whether to incorporate this system into the hardened safety core defined in requirement [CEA-INB40-ECS 01].

##### **II.**

No later than 31 December 2013, CEA shall take steps to allow the positioning of gates to isolate any leak occurring in a pool or fuel storage channel, including after an earthquake. It shall therefore update the procedure describing the procedure to be followed in the event of a fall in the level of the water in the Osiris reactor pool.

#### **D. Management of emergency situations**

#### **[CEA-INB40-ECS 06]: report on emergency management in the CEA Centre in Saclay**

No later than 30 June 2013, CEA shall provide ASN with a report on emergency management in the CEA centre in Saclay. This report shall identify the reinforcements and improvements needed to attain the objectives specified in IV of requirement [CEA-INB40-ECS 01] and in requirement [CEA-INB40-ECS 07] of this resolution and shall propose a schedule for implementation.

Also no later than 30 June 2013, it shall propose the deadlines associated with the interim measures defined in requirement [CEA-INB40-ECS 08] of this resolution pending attainment of the objectives laid out in IV of requirement [CEA-INB40-ECS 01] and in requirement [CEA-INB40-ECS 07].

#### **[CEA-INB40-ECS 07]: definition of objectives to be attained**

##### **I.**

On its site, the licensee has the premises necessary for the control and monitoring of all of its facilities until a sustainable safe state is reached in the event of a criticality accident or releases of dangerous substances.

##### **II.**

The licensee shall reinforce its material and organisational measures to take account of accident situations simultaneously affecting all or some of the facilities on the site.

##### **III.**

The licensee shall take all possible steps, for example by means of agreements or detection and alert systems, to ensure that it is rapidly informed of any event liable to constitute an off-site hazard for its facilities, in order to protect its staff against these hazards and to ensure that emergency management is coordinated with the neighbouring licensees.

##### **IV.**

The licensee shall ensure that its agreements with neighbouring hospitals are updated every 5 years. These agreements shall be regularly tested during emergency exercises.

### **[CEA-INB40-ECS 08]: interim measures pending the implementation of the hardened safety core**

The licensee shall implement the following interim measures:

- ensure that the emergency situation management premises can withstand the safe shutdown earthquake (SSE) and flooding in the event of the flood safety margin level being reached. It shall present ASN with the conclusions of this verification and, as applicable, any envisaged modifications;
- deploy independent communication resources allowing direct contact between the site and the national emergency organisation defined in the above-mentioned interministerial directive of 7 April 2005.
- store its mobile resources necessary for emergency management in appropriate premises or zones able to withstand the SSE and to withstand flooding in the event of the flood safety margin level being reached.

### **[CEA-INB40-ECS 09]: integration of industrial neighbours**

No later than 30 June 2013, the licensee shall supplement its on-going studies with the inclusion of the risk created by activities taking place near the facilities, in the extreme situations studied by the CSAs and in conjunction with neighbouring licensees responsible for these activities (nuclear facilities, installations classified on environmental protection grounds or other facilities liable to constitute a hazard). At that time, the licensee shall propose any modifications to be made to its facilities or their operating procedures as a result of this analysis.

### **[CEA-INB40-ECS 10]: social, organisational and human factors**

No later than 30 June 2012, the licensee shall define the human actions required for management of the extreme situations studied in the CSAs. It shall check that these actions can effectively be carried out given the intervention conditions likely to be encountered in such scenarios. It shall for instance take account of the relief of the emergency teams and the logistics necessary for the interventions. It shall specify any material or organisational adaptations envisaged. By the deadline date, the licensee shall transmit the summary of this work and the envisaged measures.

No later than 30 June 2013, the licensee shall send ASN a list of the necessary emergency management skills, specifying whether these skills are liable to be held by outside contractors. The licensee shall provide proof that its organisation ensures the availability of the necessary skills in an emergency situation, including if outside contractors are used.

Before 30 September 2013, the licensee shall provide the personnel concerned with the training and preparation needed to enable them to respond to particularly stressful accident situations. It shall ensure that the outside contractors liable to intervene in management of the emergency adopt similar requirements concerning the preparedness and training of their own staff.

Before 30 September 2013, the licensee shall define the social and psychological care to be provided for the emergency teams, taking account of the family environment, implemented in a particularly stressful accident situation, to ensure working conditions allowing emergency management that is as effective as possible.