DETERMINATION OF DISCHARGE AUTHORIZATIONS FOR FRENCH BASIC NUCLEAR INSTALLATIONS[58] AND PUBLIC INFORMATION

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Abstract - The determination of discharge authorized limits for a French nuclear site is initiated by the request of the operator, based on the maximum nuclear and chemical inventory that could be released during normal operating conditions, accompanied with justifications. Request and justifications are analyzed and discussed by the ASN and the IRSN, taking into account nuclear and chemical inventories expected inside BNI, current regulations (BNI specific regulation, environment code, public health code), operating feedback (release feedback for an operating BNI, feedback coming from other nuclear sites or installations, etc.) and best available technologies that can be used to treat liquid or gaseous waste before release. After taking into account potential suggestions coming from public information or public enquiry concerning the operator request, the discharge authorized limits are settled down in specific ASN prescriptions that have to be ratified by the State secretaries in charge of nuclear safety. The whole process runs through 2 or 3 years to be achieved.

Communication has revealed to be quite an uneasy task, even for administrative procedures. This aspect is mostly tested while communicating about events. Consequences of this communication can hardly be foreseen because of multiple external parameters like : news on the front pages at the same moment ; historic communication difficulties still in the public mind ; technical vocabulary not easily understood ; public fear of things being hidden ; power of ecologist or nongovernmental associations.

Introduction

In application of the first French regulation concerning basic nuclear installations (BNI), the decree Nr 63-1228 of the 11 December 1963 [1], nuclear installations operators had to ask for discharge authorizations. These demands were based on an envelope calculation of the potential maximum impact the BNI or the nuclear site could have on the environment. In the 1980s it appeared that the release authorized limits settled down on the basis of this approach were much too higher than the real releases: in fact, BNI and nuclear sites only used a few percents of these limits (less than 10%), mostly because these limits were determined taking into account some incidental conditions in addition to

[58] Basic nuclear installation = facility containing amounts of radioactive substances or of fissile materials greater than the thresholds defined in the decree Nr 2007-830 of the 11 May 2007

[59] ASN : Autorité de sûreté nucléaire = French nuclear safety authority
DRC : ASN directorate in charge of nuclear waste, research facilities (including research reactors) and fuel cycle facilities

normal operating conditions. Moreover it appeared that authorized limits omitted some chemical parameters that could have an impact on water quality (drinkable or underground waters) and that were already regulated for chemical industries through the environment code.

In order to deliver more realistic and more complete authorized limits, a new regulation was settled down in the 1990s: the decree Nr 95-540 of the 4 May 1995 [2] and its application order of the 26 November 1999 [3]. This regulation is still applying and will be abrogated when the new regulation (mostly the BNI order – see Bibliography), implementing the TSN law [7], will be emitted, probably at the end of 2011.

1. Basic data for determining discharge limits

Discharge limits are suggested by an operator on the basis of the maximum potential inventory, radiological and chemical, that can be released in the environment by its nuclear site during normal operating conditions (including some foreseen and usual degraded operating conditions, like maintenance operations). As a consequence discharge limits are close to routine discharges.

The maximum inventory is used to calculate the impact on environment and the sanitary impact (chemical and radiological) of the considered nuclear site. Because this maximum inventory is based on the normal operating conditions, the calculated sanitary impact on the reference groups for any French nuclear site is very weak: usually less than 10 µSv/year for radiological issues, and under all prescribed limits for chemical substances.

This impact is controlled through numerous measures in the environment by operators, which results are sent to the ASN. Some of these measures are part of the release authorization. And the ASN controls the operators on this subject through specific inspections, eventually by sampling on the ground.

2. French regulation concerning BNI discharges – the TSN law, the Procedures decree, the decree of the 4 May 1995 and the order of the 26 November 1999

The TSN law [7] requires to take into account all the risks generated by a BNI, radiological and non-radiological. It also requires an integrated approach for all aspects related to the creation and the operating or dismantling of a BNI, in order to protect public security, public health, public safety and environment protection.

But the implementing regulation of the TSN law [7] is still not complete: in fact quite only the Procedures decree [8] is in force, which describes procedures to follow. As there is not yet new regulatory text describing the content of discharge authorizations, this content is settled by an old regulation, still in force: the decree of the 4 May 1995 [2] and the order of the 26 November 1999 [3].

As a consequence the current regulation concerning BNI discharges can be described as follows:

The Procedure decree [8] gives minimum requirements concerning the content of the operator request for discharges:

- For liquid discharges : types of waste to be treated, origins of these waste, quantities, physical characteristics, chemical and radiological composition, planned treatment processes, conditions of discharge in the receiving environment, composition of treated liquid waste before discharge, incidence of the discharges on the water resources, on the aquatic environment, on the water flows, quality and level;

- For gaseous discharges : all gaseous releases, including aerosols, dusts and their ground deposition ; incidence on air quality and soils quality;
- Public exposure due to all the discharges and the radionuclides transfers, including food chain;
- Compliance with the local water uses plans (see § 3 below);
- Means planned by the operator to prevent, limit or compensate the facility nuisances, with the corresponding estimated costs;
- The administrative procedure to follow is settled down by the Procedures decree [8];
- The administrative form of the discharge authorization is settled by the TSN law [7] and the Procedures decree [8] : ASN prescriptions countersigned by ministers in charge of nuclear safety;
- The content of the discharge authorization is described by the article 11 of the decree of the 4 May 1995 [2] and its application order, the order of the 26 November 1999 [3].

The decree of the 4 May 1995 [2] used to settle down the general regulation concerning discharges of civil BNI:

- Its article 1 requires specific authorizations for gaseous and liquid radioactive discharges;
- Its article 2 settles down specific rules for parts of BNI or installations classified for the environment protection (ICPE)[60] operating inside nuclear sites, that are submitted to the ICPE regulation which is part of the environment code [4]. This article 2 deals in fact with some chemical risks (the most important ones);
- The article 5 indicates that there is only one demand of discharge authorization for one nuclear site with one operator, including discharges of all the installations existing on the site (BNI and ICPE) and run by the same operator. As a result, a discharge authorization is global for one nuclear site, in order to take into account all its possible impacts on environment;
- The article 7 of the decree of the 4 May 1995 says that radioactive and non radioactive liquid releases of some substances into underground waters are forbidden;
- The article 11 requires that the discharge authorization deals with : limits for discharges and for water supplies ; means of analysis, measures and controls ; operator reports concerning discharges and water supplies ; and public information;
- The rest of the decree describes administrative procedures that had to be followed to deliver a discharge authorization, and that were abrogated by the TSN law [7].

The order of the 26 November 1999 [3] settles down the content of limitations concerning water supplies and liquid and gaseous releases of nuclear sites:

- Article 1 clearly says that limits concerning ICPE existing inside nuclear sites must be in accordance with the prescriptions of the environment code ;
- Title II – articles 3 to 7 – deals with water supplies;

[60] installations using or storing chemical substances. These installations are divided in different types according to their potentially dangerous aspects: the less dangerous installations are “declared installations” ; the other ones are “authorized installations”, inside which the higher possible classifications are the “SEVESO type” and the “SEVESO II type”.

- Title III – articles 8 to 14 – deals with gaseous releases, radiological and non-radiological ones:
  - Article 8: uncontrolled gaseous releases are not allowed;
  - Article 8 also: installations must be designed, run and maintained in order to limit releases. Gaseous waste must be captured at their production sources as much as possible, canalized and, if possible, treated before release, and the releases must be as low as possible. The release authorization settles down limits on the basis of the best available practices, taking into account costs of these practices and specificities of the environment around the considered nuclear site;
  - Article 9: limits must be put, when it is accurate, on the following radiological parameters : tritium, gaseous iodine, rare gas, carbon 14, other beta-and-gamma-emitting radionuclides, and alpha emitting radionuclides;
  - Article 10: limits must be put on chemical releases when these releases are submitted to authorization in accordance with the decree of the 4 May, that is to say releases coming from an activity classified as ICPE inside the nuclear site;
  - Article 11: gaseous releases must come out a facility through chimneys, except very specific justifications ; and all radioactive gaseous releases must be treated or filtrated before release;
- Title IV – articles 15 to 23 – deals with liquid releases, radiological and non-radiological ones :
  - Article 15: installations must be designed, run and maintained in order to limit releases. Liquid waste must be captured at their production sources as much as possible, canalized and, if possible, treated before release, and the releases must be as low as possible. The release authorization settles down limits on the basis of the best available practices, taking into account costs of these practices and specificities of the environment around the considered nuclear site. Limits must be in accordance with the quality objectives of the receiving waters, with their fish vocation and with the water-uses management planning;
  - Article 16: limits must be put, when it is accurate, on the following radiological parameters : tritium, radioactive iodine, carbon 14, other beta-and-gamma-emitting radionuclides, and alpha emitting radionuclides;
  - Article 17: limits must be put on the acceptable pH for receiving waters. Choice of parameters to limit must be made on the basis of fluxes and toxicity of released substances. The releases should generate neither smell nor color in receiving waters. The releases must not generate any harm to fish populations ; they must not contain enough hydrocarbons to generate an oil film on the water surface ; and their temperature must be acceptable for the receiving waters;
- Title V – articles 24 to 26 – deals with global means that the operator has to have on its site (sampling and analysis means) and records that the operator has to put in place and to update;
- Title VI – articles 27 to 30 – deals with the information that the operator must provide to authorities, and with the controls that the authorities can make;

The regulation in force concerning BNI discharges settles down the radiological parameters to examine while determining the discharge authorization (tritium, radioactive iodine, rare gas, carbon

14, other beta-and-gamma-emitting radioelements, and alpha emitting radioelements). It requires also to examine chemical parameters, but mostly refers to other regulations on this subject: the environment code and the water-uses planning.

The regulation under development is expected to replace the previous still-in-force regulation, and to require that every discharge prescriptions list precisely all substances, chemical and radiological, that have to be surveyed, and not only groups of substances.

3. Others regulation that have to be taken into account: the environment code, the water-uses planning and the public health code

The environment code [4] regulates the ICPE, that is to say the chemical industries, and chemical pollutions. As it was said before, releases coming from parts of nuclear sites submitted to the ICPE regulation must comply with the environment code.
Moreover, as it determines maximum acceptable release limits for each chemical substance classified as possibly dangerous for health or environment, the environment code gives reference values that can be compared with the chemical limits suggested by the operators.

The environment code introduces also ***the water-uses plans***. These plans were created in the 1990s in order to limit and prevent water pollution and to coordinate water uses. A plan concerns a geographic water-side basin, and determines water-quality objectives for each river inside the considered water-side basin. Every installation that releases substances in waters has to be in accordance with the concerned water-uses plan.

Moreover, as most BNI release substances in waters that can be used for human activities (potable waters, leisure activities), they have also to comply with ***the public health code*** [5] that determines acceptable limits of concentrations of chemical substances in waters that can be used as potable waters or for leisure activities.

The use of limits contained in the environment code [4] and in the public health code [5] has lead in the 2000s to precise parts of discharge orders concerning chemical releases : compared to discharge orders enacted before 2000, the last orders list precisely the chemical elements and/or substances to survey, and not only groups of substances.

At last, some nuclear sites can be submitted to the specific regulation concerning greenhouse effect, which is composed by orders limiting releases of greenhouse-effect gases [6]. The concerned French nuclear sites are the La Hague site and the Grenoble CEA site, because of their boilers.

4. Methodology for determining regulatory limits on routine releases

As it was said before, the operator proposes discharge limits based on the maximum potential inventory, radiological and chemical, that can be released in the environment by its nuclear site during normal operating conditions (including some foreseen and usual degraded operating conditions, like maintenance operations). This request can be of different types:

- for a new facility : a global request for discharge limits, proposed with the request of the BNI authorization creation in application of the Procedures decree [8];
- for an operating BNI or nuclear site : a global revision of previous limits, or a change for some limits.

According of the type of the request, it can include all or parts of the following parameters:

- Radiological releases, liquid and gaseous, with precise list of concerned radionuclides, or accurately chosen inside the following list : tritium, radioactive iodine, rare gas, carbon 14, other beta-and-gamma-emitting radionuclides, and alpha emitting radionuclides;
- Chemical releases, on the basis of the activities run inside the nuclear site, and in accordance with the environment code and, when necessary, with the public health code;
- Biological releases when it is accurate, mostly when the BNI cooling system includes cooling-towers because of the legionella risk. This risk is regulated by the public health code.

The operator request and its justifications are then analyzed by the ASN and the IRSN, and discussed between the operator, the ASN and the IRSN.

For operating BNI or nuclear sites, the discussion is based on:

- The experience feedback concerning the actual releases measured during the 10 last years at least;
- The best available technologies allowing better treatments before release or allowing less releases;
- The comparison with the limits granted to similar BNI and with actual releases of similar BNI;
- The comparison with the limits for chemical releases settled down by the environment code and the public health code.

For new facilities, that sometimes have no equivalent in France and sometimes none elsewhere, the discussion is based on:

- The nuclear and chemical inventories expected in the new facility;
- The feedback concerning mostly French facilities that can have some similarities with the planned plant, concerning the nuclear or chemical inventories, the process or the releases;
- The best available technologies that can be used to treat liquid or gaseous waste before release;
- The limits for chemical releases settled down by the environment code and the public health code.

The process of analysis and discussion can be long, up to 2 or 3 years.

In parallel with these analysis and discussion, the administrative procedure requires:

- For new BNI, or for BNI requesting modifications of their discharge authorizations in parallel with modifications of their decrees : a public enquiry covering all the requested modifications;
- For operating BNI requesting modifications of their discharge authorizations only: a public enquiry or a public information, if the modifications are limited.

The law of the 12 July 2010 known as the “Grenelle 2 law” [9] now requires public information for any small increment in discharge limits.

Public enquiries or public information should allow to present to the public the operator request, and should allow the public to ask questions and to tell concerns. The results of these procedures can lead to modify or lower limits concerning radiological or chemical substances.

The draft of discharge limits is submitted to the examination of the Departmental Council for environment and for technical and sanitary risks.

At the end, the new discharge limits are settled down into ASN prescriptions that have to be countersigned by ministers in charge of nuclear safety. These limits can only be equal or lower than the limits suggested by the operator, and cannot regulate releases that were not in the operator request.

As the process for officially settling down discharge limits is quite long, discharge limits are not often changed. That is why operators have to integrate the foreseen modifications of their facilities when they request a modification in the discharge limits.

The BNI order, which is still under writing, is expected to concatenate and update the regulation above.

5. Example of discharge authorized limits: the La Hague site

The discharge authorization for the La Hague site is the order of the 10 January 2003, modified by the order of the 8 January 2007 [10]. This order is representative of the improvement process that has been at work since the beginning of the 2000s, in order to settle down discharge authorization closer to routine releases, particularly in terms of listed substances and of level of authorized limits.

5.1.Limits settled down for gaseous discharges

The radiological substances are the same as those listed in the order of the 26 November 1999 [3]:

- Tritium;
- Iodine;
- Radioactive rare gas;
- Carbon 14;
- Other artificial beta-and-gamma emitting radionuclides;
- Artificial alpha-emitting radionuclides.

But, concerning chemical gaseous discharges, all chemical components or elements are clearly listed.

The other improvement is the detailed list of points of surveillance or of analysis, that indicates which type of radionuclides is measured at each point and whether the measures are continuous or offline.

5.2.Limits settled down for liquid discharges

Radiological liquid waste must be stored in specific tanks before release. The authorized limits concern liquid waste radiological activity measured at the tank exit at the time of release.

The radiological substances are more detailed than for the gaseous discharges: in addition of the 6 groups listed in order of the 26 November 1999 [3], and because of the feedback of the routine releases of the site, there are:

- Strontium 90;
- Cesium 137;
- Cesium 134;
- Ruthenium 106;
- Cobalt 60.

Chemical liquid waste are released at several outlets. Consequently limits are settled down for each outlet.

Chemical substances are also detailed, in order to take into account all the chemical products used on the site and all their derivatives that can be traced in liquid waste.

Moreover the parameters listed below have to be surveyed:

- pH ;
- Color;
- Odor;
- Temperature;
- Toxic substances able to kill fishes or ruin flora;
- Dissolved oxygen;
- Detergents;
- Hydrocarbons;
- Bacteriological quality, especially Escherichia coli and enterococcus.

These parameters are surveyed in application of the article 17 of the order of the 26 November 1999 [3]. The list is inspired by discharge authorizations for ICPE and parameters figuring in the environment code [4] or in the public health code [5].

5.3.Environment surveillance plan

The discharge authorization settles down minimum measures in the site environment (article 14 for gaseous discharges; article 27 for liquid discharges):

- A minimum number of surveillance points is clearly defined, eventually grouped by types;
- List of parameters to survey, for each surveillance point or group of points ;
- Sampling frequency.

Article 30 indicates what minimum means the operator has to have to perform the discharges surveillance.

5.4.Information concerning discharges

The discharge authorization requires that the operator sends an annual report concerning routine discharges. This report can be communicated to the public. It contains elements concerning at least :

- Recall of the discharge authorization ;

- Balance sheet of the water supplies ;
- Balance sheet of discharges ;
- Balance sheet of environment surveillance measures ;
- When it is pertinent, the exceptional works that made the operator used chemical substances that were traced in the discharges ;
- Balance sheet of the discharges effects, chronicle or accidental, on air, water and soils ;
- Estimation, the more realistic as possible, of doses to people due to discharges ;
- Description of maintenance works done on equipments part of water-supplies or discharges circuits ;
- Description of events that occurred during the past year, and concerning water supplies or discharges ;
- Evolution of water supplies and of discharges over several years ;
- Description of actions done by the operator in favor of environment protection.

6. Communication / public information

Public information, whatever form it takes, is required for some administrative procedures concerning BNI: creation of a BNI, significant modifications, determination or modification of discharge limits, decommissioning authorization. Most of the time in the case of BNI, this public information is made with a public enquiry that is regulated by the environment code.

But public information does not only deal with administrative procedures. It usually has to be done after an incident and has revealed to be not an easy task. Communication was previously the prerogative of the French government. But since the TSN law (2006), the ASN is in charge of the communication to the public on nuclear activities.

First, the focus of the public on events is difficult to anticipate, because it partly depends on the media background and on the other news that will place at the same moment. Example: at the end of December 1999, two big storms touched France, one in the north part, the other in the south part. They seriously damaged significant parts of the electricity network, provoking electricity breakdowns in hundreds of thousands homes. At the same time, the Blayais nuclear site was flooded because of the combination of the storm in the south part of France and of high tide. It was the first time since years that the national nuclear crisis system was activated. But news did not talk about the Blayais crisis; they focused on electricity breakdowns.

Second, public still keeps in mind historic communication difficulties of the French government, and often fears that the nuclear industry and the government are hiding or minimizing the events. The origin of this suspicion is clearly the Tchernobyl accident and the rather poor management of the sanitary aspects by the French government at the time.

Third, this aspect is strengthened by the almost technical aspects of the nuclear industry. As a result, the technical terms used to describe a facility or a process are understood with difficulty by the public and must be clearly explained in order to prevent any reaction implying that something is hidden behind the technical vocabulary.

And four, there are in France some powerful ecologist associations and nongovernmental organizations (NGO), some of them requiring France to abandon nuclear industry, as for example Greenpeace or Sortir du Nucléaire.

Example: the event that occurred on the 7 July 2008 in the SOCATRI facility:

The SOCATRI facility is located in the Tricastin site, and treats uranium liquid waste for the Eurodif and the GB II plants.

In 2008 the SOCATRI facility was under big modifications, in order to modernize its installations. In particular important works were in progress in its tanks rooms. On the 7 July 2008, a liquid waste transfer was ordered between 2 old tanks, not modernized. But, because of a switch error, the waste were sent to another tank, still quite full, that was quickly overflowed. The liquid waste felt then in the tank retention that was unconfined and close to an open wall because of modification works. As a consequence the liquid waste came out of the building polluting both the soil and the river "La Gaffière" that received about 30 m^3 of liquid waste containing about 75 kg of natural uranium. No significant consequences on the environment or on the public health occured.

As the operator and the ASN gave information on this incident classified on level 1 of the INES scale, the event became of public concern and was subject to many press releases, mainly because it took place during holidays at a time without any other significant topic.

This event revealed the gaps of the media culture concerning nuclear industry: media persisted in showing the Eurodif cooling-towers that are near the SOCATRI facility, and were talking of the Tricastin NPP instead of the waste treatment facility of Socatri. As a consequence, the operator and the ASN had to explain, during several days, what was the SOCATRI facility. But their explanations were not necessarily taken into account, because the Eurodif cooling-towers were more photogenic than the SOCATRI building.

Moreover the event occurred only a few days after that an existing uranium pollution, located in the south of the site, with no identified cause, was revealed. This pollution was announced to the local stakeholders. Precise public information was given in a meeting on the 4 July 2008, but did not get significant media coverage at this time. The SOCATRI event of the 7 July 2008 suddenly increased the media coverage.

In these circumstances all the events that occurred in the Tricastin site facilities during July and August 2008, whoever the operator was, were highlighted by the media, even those rated at level 0 of the INES scale. The operators were suspected of hiding things since years.

Moreover the Government representative, the ASN and the IRSN had to explain and justify how they had managed the historic pollution, how they had informed the public and how they had taken decisions in time concerning protection measures for the public after the releases of the 7 July 2008.

The media pressure became lesser on August 2008, because of the Olympic games, went up at the beginning of September 2008 because of the occurrence of a new event in the EDF Tricastin site (a fuel assembly that kept hanged on the vessel cap during the opening of the vessel), and disappeared after the treatment of this last event (November 2008). The Tricastin nuclear site has not been of media interest since this time.

7. Conclusion

The determination of release authorized limits for a French nuclear site is initiated by the request of the operator, based on the maximum nuclear and chemical inventory that could be released during normal operating conditions, accompanied with justifications. Request and justifications are analyzed and discussed by the ASN and the IRSN, taking into account nuclear and chemical inventories

expected inside BNI, different regulations (BNI specific regulation, environment code, public health code), operating feedback (release feedback for an existing BNI, feedback coming from other nuclear sites or installations, etc.) and best available technologies that can be used to treat liquid or gaseous waste before release. After taking into account potential suggestions coming from public information or public enquiry concerning the operator request, the release authorized limits are settled down in specific ASN prescriptions that have to be ratified by the State secretaries in charge of nuclear safety. The whole process can need 2 or 3 years to be achieved.

The BNI order is expected to be issued at the end of the year. It will update the French regulation concerning release authorized limits, in the following aspects:

- Settling down proceedings to follow to determine new release limits for a facility or a nuclear site;
- Regulating water supplies;
- Requiring the collect and the treatment of all effluents before release;
- Regulating gaseous and liquid releases;
- Settling down minimum survey of the environment;
- Requiring nuisances prevention.

Communication has revealed to be quite an uneasy task, even for administrative procedures. This aspect is mostly tested while communicating about events. Results of this communication can hardly be foreseen because of multiple external parameters as news on the front pages at the same moment ; historic communication difficulties still in the public mind ; technical vocabulary not easily understood ; public fear of things being hidden ; power of ecologist or nongovernmental associations. Lessons have already been learned, mostly in France from the Tchernobyl accident and the SOCATRI event of the 7 July 2008. But as communication is quite a new prerogative of the ASN in France, there are still many lessons to learn, as for example from the 2011 Fukushima accident.

References

[1] Decree Nr 63-1228 of the 11 December 1963 dealing with general regulation concerning basic nuclear installations

[2] Decree Nr 95-540 of 4 May 1995 concerning releases of basic nuclear installations

[3] Order of the 26 November 1999 concerning water supply and liquid and gaseous releases of basic nuclear installations

[4] Environment code:
- articles L.212-1 to L.212-1 concerning water-uses planning
- article L.213-10 concerning license fee for water pollution or for some water uses
- articles L.218-73 to L.218-80 concerning harmful releases in seas
- articles L.219-1 to L.219-18 concerning protection of sea environment
- articles L.222-1 to L222-8 concerning air protection
- articles L.229-1 to L.229-54 concerning greenhouse effect
- articles L.300 to L.350 concerning specific protected sites because of their environmental interest
- articles concerning installations classified for environment protection : especially articles L.511, L.512 (general regulation), L.515-8 to L.515-12 (installations requiring constraints of public utility, L.515-15 to L.515-26 (installations submitted to a plan for technological risks prevention)
- articles L.123-1 to L.123-16 concerning public enquiry
- articles L..124-1 to L.124-8 concerning public right of information concerning environment
- articles L.125-1 to L.125-9 concerning of other means of public information

[5] Public health code:
- articles R.1321-1 to R.1322-4 concerning quality of drinkable waters, quality of underground waters
- articles L.1321-1, L.1321-4, L.1335-2, R.1321-1, R.1321-2 and R.1321-46 concerning the legionella risk
- articles L.1333-1 to L.1333-20 concerning radioactive radiations

[6] Orders concerning quotas for gaseous releases having an impact on greenhouse effect, and concerning some nuclear sites:
- order of the 22 March 2007 concerning the Grenoble CEA site
- order of the 17 March 2008 concerning the La Hague site

[7] Law Nr 2006-686 of the 13 June 2006 concerning transparency and nuclear safety, known as the “TSN law”

[8] Decree Nr 2007-1557 of the 2 November 2007 concerning basic nuclear installations, known as the “Procedures decree”

[9] Law of the 12 July 2010, known as the “Grenelle 2 law”

[10] Order of the 10 January 2003, modified by the order of the 8 January 2007, concerning water supplies and discharges of the La Hague site

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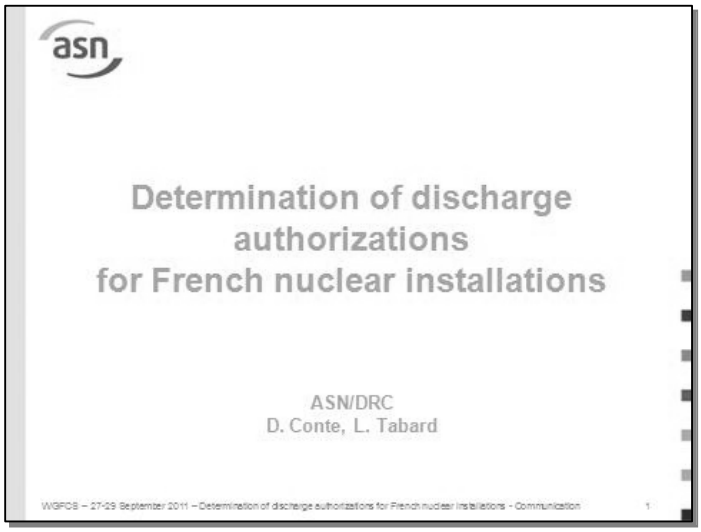
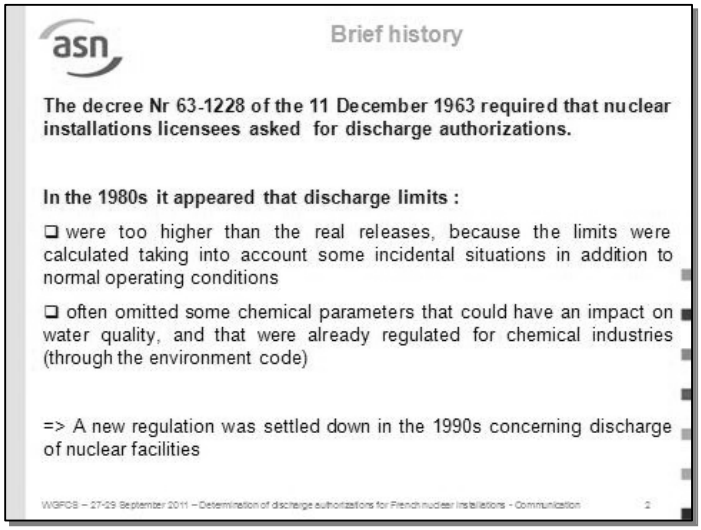
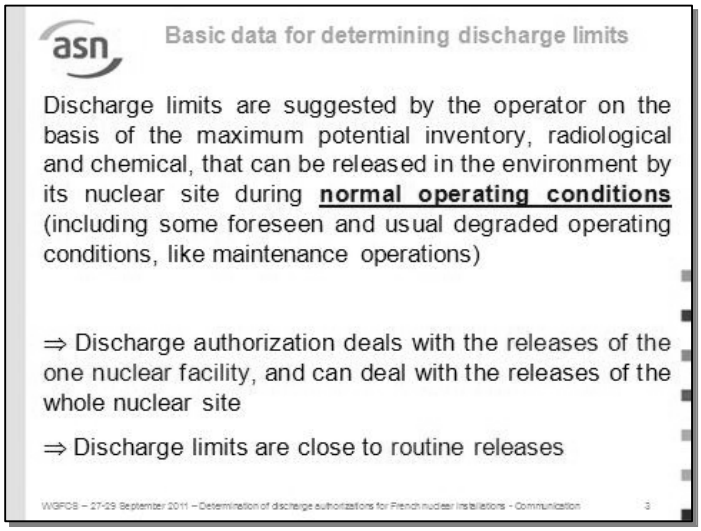
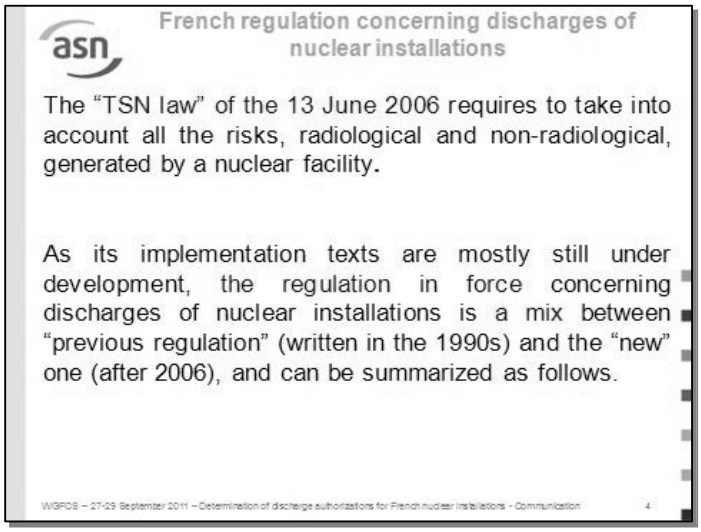
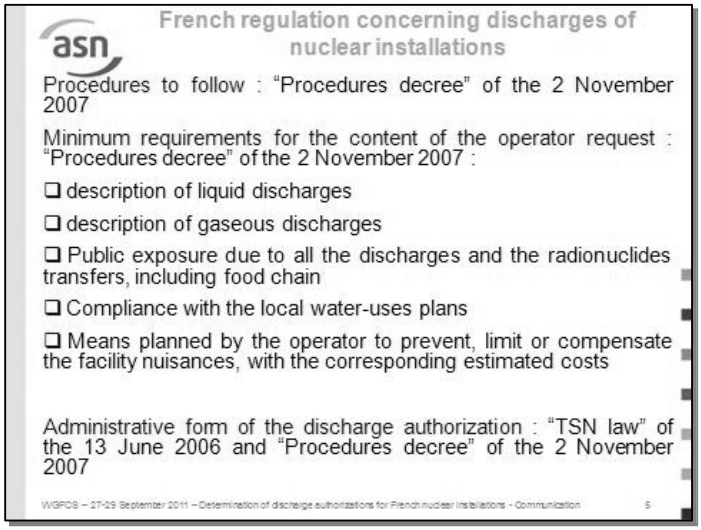

Determination of discharge authorizations for French nuclear installations
ASN/DRC
D. Conte, L. Tabard
WGFCS – 27-29 September 2011 – Determination of discharge authorizations for French nuclear installations - Communication 1


Brief history
The decree Nr 63-1228 of the 11 December 1963 required that nuclear installations licensees asked for discharge authorizations.
In the 1980s it appeared that discharge limits :
were too higher than the real releases, because the limits were calculated taking into account some incidental situations in addition to normal operating conditions
often omitted some chemical parameters that could have an impact on water quality, and that were already regulated for chemical industries (through the environment code)
=> A new regulation was settled down in the 1990s concerning discharge of nuclear facilities
WGFCS – 27-29 September 2011 – Determination of discharge authorizations for French nuclear installations - Communication 2


Basic data for determining discharge limits
Discharge limits are suggested by the operator on the basis of the maximum potential inventory, radiological and chemical, that can be released in the environment by its nuclear site during normal operating conditions (including some foreseen and usual degraded operating conditions, like maintenance operations)
⇒ Discharge authorization deals with the releases of the one nuclear facility, and can deal with the releases of the whole nuclear site
⇒ Discharge limits are close to routine releases
WGFCS – 27-29 September 2011 – Determination of discharge authorizations for French nuclear installations - Communication 3


French regulation concerning discharges of nuclear installations
The "TSN law" of the 13 June 2006 requires to take into account all the risks, radiological and non-radiological, generated by a nuclear facility.
As its implementation texts are mostly still under development, the regulation in force concerning discharges of nuclear installations is a mix between "previous regulation" (written in the 1990s) and the "new" one (after 2006), and can be summarized as follows.
WGFCS – 27-29 September 2011 – Determination of discharge authorizations for French nuclear installations - Communication 4


French regulation concerning discharges of nuclear installations
Procedures to follow : "Procedures decree" of the 2 November 2007
Minimum requirements for the content of the operator request : "Procedures decree" of the 2 November 2007 :
❑ description of liquid discharges
❑ description of gaseous discharges
❑ Public exposure due to all the discharges and the radionuclides transfers, including food chain
❑ Compliance with the local water-uses plans
❑ Means planned by the operator to prevent, limit or compensate the facility nuisances, with the corresponding estimated costs
Administrative form of the discharge authorization : "TSN law" of the 13 June 2006 and "Procedures decree" of the 2 November 2007
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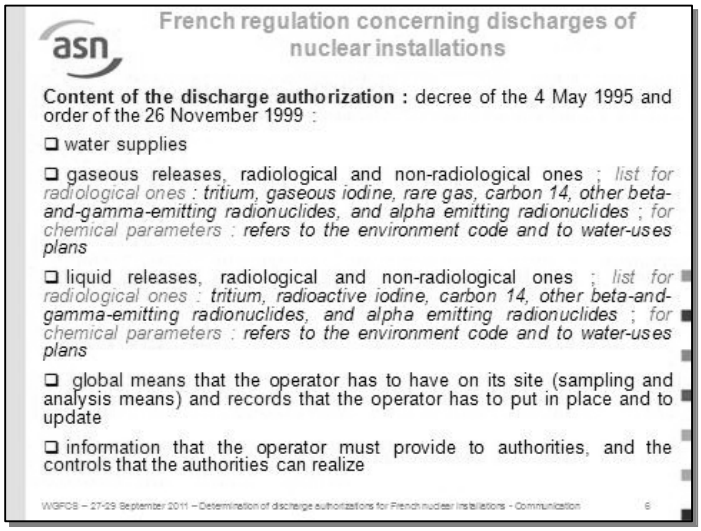
French regulation concerning discharges of nuclear installations
Content of the discharge authorization : decree of the 4 May 1995 and order of the 26 November 1999 :
❑ water supplies
❑ gaseous releases, radiological and non-radiological ones ; list for radiological ones : tritium, gaseous iodine, rare gas, carbon 14, other beta-and-gamma-emitting radionuclides, and alpha emitting radionuclides ; for chemical parameters : refers to the environment code and to water-uses plans
❑ liquid releases, radiological and non-radiological ones ; list for radiological ones : tritium, radioactive iodine, carbon 14, other beta-and-gamma-emitting radionuclides, and alpha emitting radionuclides ; for chemical parameters : refers to the environment code and to water-uses plans
❑ global means that the operator has to have on its site (sampling and analysis means) and records that the operator has to put in place and to update
❑ information that the operator must provide to authorities, and the controls that the authorities can realize
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French regulation concerning discharges of industrial installations

The environment code :

- regulates discharges of chemical industries
- determines maximum acceptable release limits for each chemical substance classified as possibly dangerous for health or environment

The water-uses plans :

- introduced by the environment code
- determine water-quality objectives for each river inside the considered water-side basin

French regulation concerning discharges

The public health code :

- determines acceptable limits of concentrations of chemical substances in waters that can be used as drinkable waters or for leisure activities

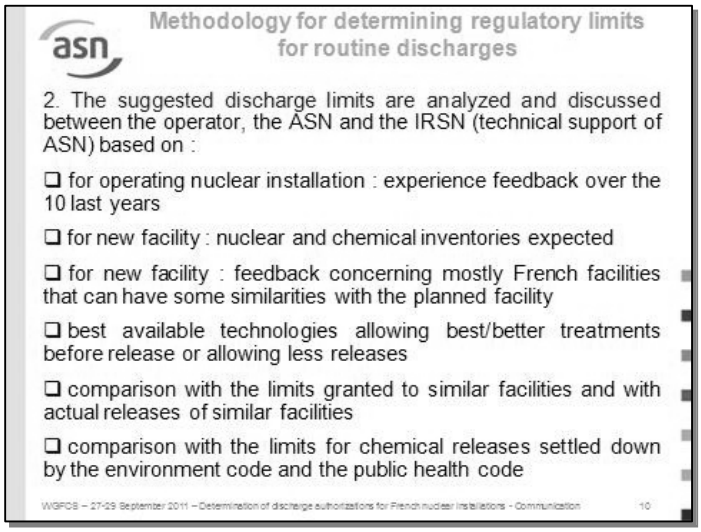
Specific regulation concerning greenhouse effect :

- orders limiting releases of greenhouse-effect gases
- the La Hague site and the CEA Grenoble site are submitted to.

Methodology for determining regulatory limits for routine discharges

1. The operator suggests discharges limits based on the maximum potential inventory, radiological and chemical, that can be released in the environment by its nuclear site during normal operating conditions

- global request or change of some limits (for operating nuclear installation)
- can deal with radiological, chemical or biological releases
- suggested limits must be justified and accompanied by impact calculations on people


Methodology for determining regulatory limits for routine discharges
2. The suggested discharge limits are analyzed and discussed between the operator, the ASN and the IRSN (technical support of ASN) based on :
❑ for operating nuclear installation : experience feedback over the 10 last years
❑ for new facility : nuclear and chemical inventories expected
❑ for new facility : feedback concerning mostly French facilities that can have some similarities with the planned facility
❑ best available technologies allowing best/better treatments before release or allowing less releases
❑ comparison with the limits granted to similar facilities and with actual releases of similar facilities
❑ comparison with the limits for chemical releases settled down by the environment code and the public health code
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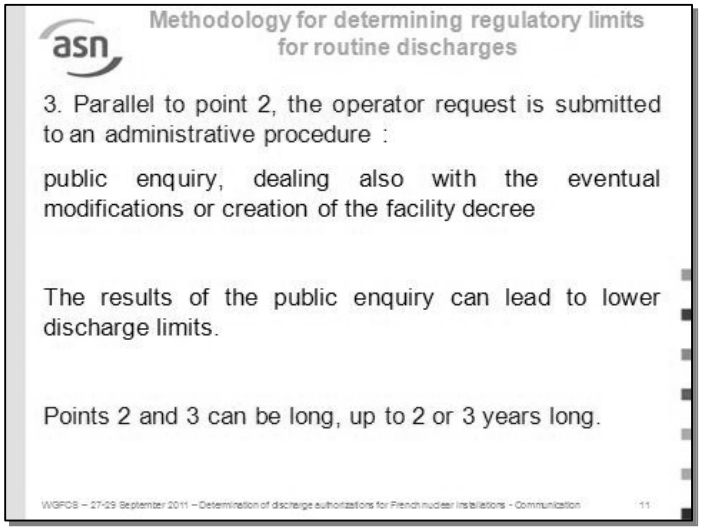
Methodology for determining regulatory limits for routine discharges
3. Parallel to point 2, the operator request is submitted to an administrative procedure :
public enquiry, dealing also with the eventual modifications or creation of the facility decree
The results of the public enquiry can lead to lower discharge limits.
Points 2 and 3 can be long, up to 2 or 3 years long.
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Methodology for determining regulatory limits for routine discharges
4. The draft of discharge limits is submitted to the examination of the Departmental Council for environment and for technical and sanitary risks.
5. The new discharge limits are settled down into ASN prescriptions that have to be countersigned by ministers in charge of nuclear safety.
These limits can only be equal or lower than the limits suggested by the operator, and cannot regulate releases that were not in the operator request.
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Perspective

The order concerning general regulation for nuclear installations will update the French regulation concerning release authorized limits, in the following aspects :

- The settling down proceedings to be followed to determine new release limits for a facility or a nuclear site
- The regulation of water supplies
- The requirements concerning the collect and the treatment of all effluents before release
- The regulation of gaseous and liquid releases
- The minimum survey of the environment
- The nuisances prevention

EXAMPLE : discharge limits for the La Hague site

Discharge authorization = order of the 10 January 2003, modified by the order of the 8 January 2007

List of installations on the site only submitted to the environment code regulation (chemical installations - ICPE)

Water supplies :

- List of supply points : sea, groundwater, brook "Les Moulinets", brook "Froide Fontaine"
- maximum quantities
- supply conditions

EXAMPLE : discharge limits for the La Hague site

Gaseous discharges :

- Place and height of all chimneys ; origins of releases for each chimney
- limits for a list of radionuclides = list existing in the order of the 26 November 1999 : tritium, iodine, radioactive rare gas, carbon 14, beta and gamma emitters, alpha emitters
- limits for a large list of chemical substances : SO2, dusts, NOx, CO, cadmium, mercury, thallium, arsenic, lead, cobalt, copper…

EXAMPLE : discharge limits for the La Hague site

Liquid discharges :

- ❑ radioactive waste must be stored before release
- ❑ points of discharges
- ❑ limits for a list of radionuclides = list existing in the order of the 26 November 1999 (tritium, iodine, carbon 14, beta and gamma emitters, alpha emitters) + strontium 90, cesium 137, cesium 134, ruthenium 106, cobalt 60 (*feedback of the routine releases of the site*)
- ❑ limits for a large list of chemical substances : SO_2, dusts, NOx, CO, cadmium, mercury, thallium, arsenic, lead, cobalt, copper…
- ❑ other regulated parameters : pH, color, odor, temperature, toxic substances, dissolved oxygen, detergents, hydrocarbons, bacteriological quality

EXAMPLE : discharge limits for the La Hague site

Environment surveillance plan :

- ❑ Minimum number of surveillance points is clearly defined, eventually grouped by types
- ❑ List of parameters to survey, for each surveillance point or group of points
- ❑ Sampling frequency

EXAMPLE : discharge limits for the La Hague site

Annual report :

- ❑Recall of the discharge authorization
- ❑Balance sheet of the water supplies
- ❑Balance sheet of discharges
- ❑Balance sheet of environment surveillance measures
- ❑When it is pertinent, the exceptional works that made the operator used chemical substances that were traced in the discharges
- ❑Balance sheet of the discharges effects, chronicle or accidental, on air, water and soils
- ❑Estimation, the more realistic as possible, of doses to people due to discharges
- ❑Description of maintenance works done on equipments part of water-supplies or discharges circuits
- ❑Description of events that occurred during the past year, and concerning water supplies or discharges
- ❑Evolution of water supplies and of discharges over several years
- ❑Description of actions done by the operator in favor of environment protection

COMMUNICATION

PUBLIC INFORMATION

Regulatory context

Before 2006 : communication was the prerogative of the French government.

The ASN was a directorate of the ministry of industry.

Since the effectiveness of the "TSN law" of the 13 June 2006, the ASN is an independent administrative authority = it is no more a directorate of a ministry

=> The ASN is free to communicate independently of ministries, and has to.

ASN observations

Public information : through public enquiry for creation or big modifications of a facility, and for discharge limits

But it is an "administrative" and formal way of communication.

Actual issue : to communicate out of administrative procedures, mostly on nuclear incidents or accidents and/or on public / journalists requests

ASN observations

Communication is a hard task because :

- very difficult to anticipate the focus of the public and of the journalists
- suspicion of the public because of the poor management of the sanitary consequences of the Tchernobyl accident
- suspicion of the public due to the very specific language => fear that something is hidden behind this language
- powerful environmental associations or non-governmental organizations in France

EXAMPLES

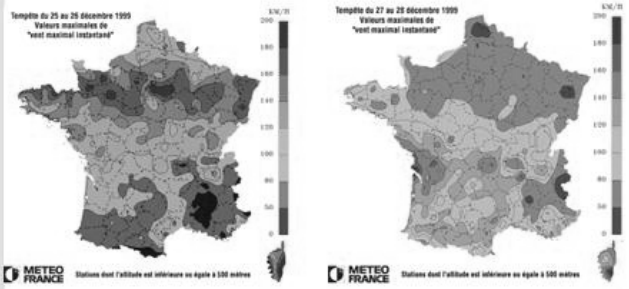
Flooding of the EDF Blayais site (December 1999)

- **What happened ?**

On the 26 and 27 December 1999 France was crossed by 2 major storms

EXAMPLES

Storms of December 1999



EXAMPLES

Flooding of the EDF Blayais site (December 1999)

- Consequences :
  - significant parts of the French electricity network seriously damaged
  - The Blayais site flooded => emergency shutdown of the reactors + basements flooded => activation of emergency plans and of crisis centers

- **News and public focused on the electricity breakdowns**

EXAMPLES

Consequences of the storms of December 1999




EXAMPLES

Consequences of the storms of December 1999 :
the Blayais site

EXAMPLES

Uncontrolled uranium liquid releases from the SOCATRI facility (7 July 2008)

- ***What happened ?*** A liquid radioactive waste transfer was ordered but unfortunately sent to the wrong tank (switch error). This tank was already quite full => it quickly overflowed in a retention that was unconfined and close to an open wall because of modification works => the liquid waste came out of the building polluting both the soil and the river "La Gaffière"
- **Consequences :**
  - the river "La Gaffière" received about 30 m3 of liquid waste containing about 75 kg of natural uranium
  - No significant consequences on the environment or on the public health

EXAMPLES

Uncontrolled uranium liquid releases from the SOCATRI facility (7 July 2008)

- there were no other news of importance at the moment => journalists focused on the event
- By ignorance, journalists first talked about the Tricastin NPP, because EDF is more well-known as the Socatri society.
- The journalists kept on showing pictures of the Eurodif cooling towers, because they were more photogenic than the SOCATRI square buildings.

EXAMPLES

Photos in the media in 2008

EXAMPLES

Photos in the media in 2010,

at the moment of the trial court concerning the water pollution offense and delay in notification of the event

EXAMPLES

Lessons learned :

- for journalists, nuclear facilities = NPP ; and it is very hard to disabuse them
- journalists are looking for photogenic or symbolic shots => they prefer cooling towers or reactor buildings
- ASN press releases have to be very clear and understandable (no technical vocabulary, or the less as possible), to prevent journalists from giving wrong information.

EXAMPLES

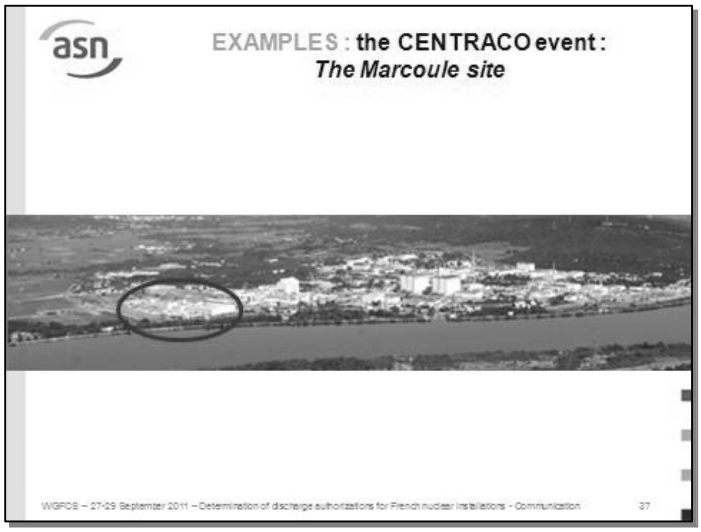
Furnace explosion at the CENTRACO facility (12 September 2011)

CENTRACO facility = incinerator of slightly contaminated waste

=> 2 furnaces : one for waste containing liquid elements (including oils) ; one for metallic items

EXAMPLES : the CENTRACO event : *The Marcoule site*

EXAMPLES : the CENTRACO event : *The Marcoule site*


EXAMPLES : the CENTRACO event :
The Marcoule site
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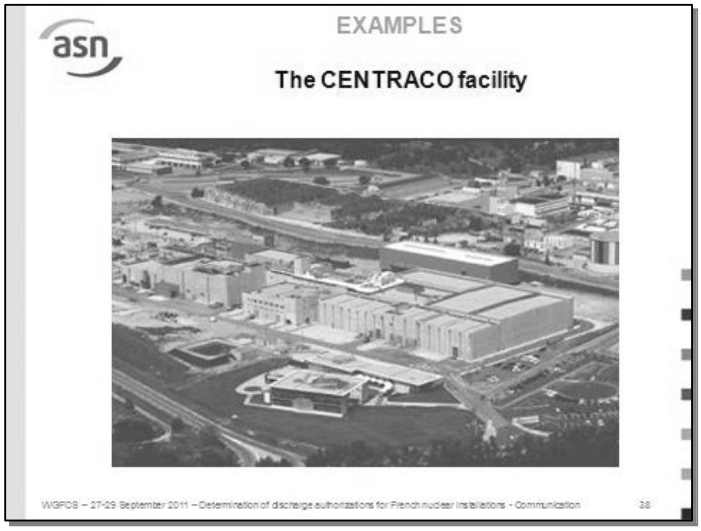
EXAMPLES
The CENTRACO facility
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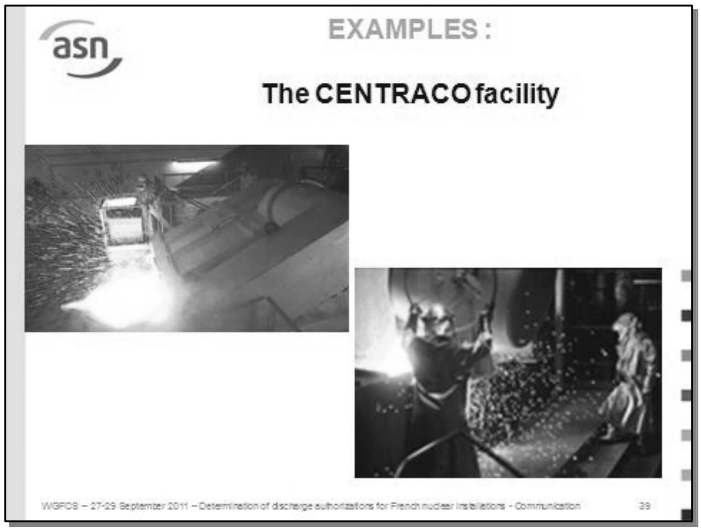
EXAMPLES :
The CENTRACO facility
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EXAMPLES

Furnace explosion at the CENTRACO facility (12 September 2011)

❑ ***What happened ?*** Known elements (investigations still in progress) : metallic items were under melting inside the melting furnace. But the melting could not be done. Two workers came inside the furnace room, opened the furnace, and one of them tried to mix the metallic items with a perch. A very few seconds later, liquid melted metal spread out of the furnace.

EXAMPLES

Furnace explosion at the CENTRACO facility (12 September 2011)

Consequences :

- One dead worker (the one who was using the perch), the other seriously injured (burned up to 80%)
- The pressure wave blown up the furnace room door and injured 3 more workers (that were in the next room)
- There were only 67 kBq inside the furnace + ventilation was still operating + no damage on the building

⇒ no contamination of the installation or of the workers + no measurable release in the environment

Provisional INES rating : level 1

EXAMPLES

Furnace explosion at the CENTRACO facility (12 September 2011)

Communication :

- ASN, IRSN and CEA provided press releases in the 12 September 2011 afternoon => it could not prevent journalists from talking of "an explosion at the Marcoule reactor"
- Journalists still prefer photogenic or symbolic images => 2 kinds of images in the news : emergency evacuation of the seriously-injured worker // various photos of the Marcoule site, not linked to the CENTRACO facility
- Content of the press articles were quite good : they resume the ASN, IRSN and CEA press releases


EXAMPLES
Gard Exclusif : le grand brûlé dans l'explosion de Marcoule transféré à Paris
13/09/2011, 15 h 39 | Mis à jour le 13/09/2011, 16 h 03
23 réactions
Facebook
Twitter
Envoyer par mail
Imprimer
A+ grand A+ petit
PARTENARIATS
Midi Libre
Présente les 100 métiers qui recrutent en Languedoc-Roussillon vidéos et fiches métiers
Gravement brûlé dans l'explosion du four de Centraco sur le site de Marcoule, le jeune homme a été héliporté au CHU Lapeyronie à Montpellier et vient d'être transféré en région parisienne. (Midi Libre Bagnols)
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MARCOULE (GARD)
Explosion sur un site nucléaire: un mort mais pas de fuite radioactive
Partagez
Outils
It is a photo of the Phenix reactor…
L'usine de retraitement des déchets nucléaires Centraco (centre nucléaire de traitement et de conditionnement) à Marcoule. Photo Archives DL
WGFCS – 27-29 September 2011 –


EXAMPLES : the CENTRACO event
Site nucléaire de Marcoule : "l'accident est terminé", affirme l'ASN
Un mort et quatre blessés, dont un grave, sont à déplorer. L'explosion du four n'aurait pas provoqué de fuite radioactive, selon le gouvernement.
Le site nucléaire de Marcoule (AFP)
Accident de Marcoule: L'ASN n'établit pas de lien avec les lacunes de sûreté
Le site nucléaire de Marcoule, le 12 septembre 2011. (dr)
A Plus gros Plus petit
NUCLEAIRE - Malgré des manquements de sécurité constatés en 2008, l'ASN ne privilégie aucune piste pour expliquer l'accident de lundi...
A LIRE AUSSI
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