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DEVELOPMENT IN FRANCE OF NUCLEAR SAFETY TECHNICAL
REGULATIONS AND STANDARDS
USED IN THE LICENSING PROCEDURE

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DEVELOPMENT IN FRANCE OF NUCLEAR SAFETY TECHNICAL
REGULATIONS AND STANDARDS USED IN THE LICENSING PROCEDURE

by Mr. Lebouleux

ABSTRACT

Initially, the Commissariat à l'Energie Atomique was the overall structure which encompassed all nuclear activities in France, including those connected with radiological protection and nuclear safety. As other partners appeared, the Authorities have laid down national regulations relative to nuclear installations since 1963. These regulations more particularly provide for the addition of prescriptions with which the applicant must comply to obtain the necessary licenses and the establishment of General Technical Regulations pertaining to nuclear safety.

The technical regulation related to nuclear safety in France is made of a set of regulation texts, of a different nature, that define the requirements for the construction, commissioning and operation of nuclear facilities.

Simultaneously, the safety authorities (Service Central de Sûreté des Installations Nucléaires : SCSIN) issue recommendations or guides which are not strictly speaking regulations in the juridical sense; they are called "Règles Fondamentales de Sûreté" (RFS).

The RFS set up and detail the conditions, the respect of which is deemed to be complying with the French regulation practice, for the subject to which they relate. Their purpose is to make known rules judged acceptable by safety authorities, thus making the safety review easier.

A RFS - or a letter - can also give the result of the examination of the constructor and operator codes (RCC) by safety authorities.

FOREWORD

Within a general regulation defining a licensing procedure particularly rigorous, safety evaluation of the first nuclear installations built in France required special investigation of all technical difficulties. A number of references were, however, available: regulatory documents and publications outlining good engineering practice for comparable industrial activities, as well as foreign regulations and codes.

The increase in the number of nuclear installations controlled and particularly the implementation of the French nuclear power program demonstrated the multiple needs for safety requirements which exhibit the two main features of any regulations; definition of basic rules unrelated to any specific project ; uniformity of measures adopted for comparable projects. The raw material for this approach was provided by the lessons learned from early experience and the findings of initial investigations.

The scope of regulatory actions to be accomplished was considerable. To date, some progress has been made and it was considered preferable to avoid performing this work in a systematic manner. The capabilities unmobilized for such priority tasks as licensing and safety research and development were thus focussed on those areas which could most benefit from rapid preparation of regulatory tools.

I. - HISTORICAL BACKGROUND

1. Established in 1945, the Commissariat à l'Energie Atomique (CEA) or French Atomic Energy Commission was initially responsible for all national-level activities related to nuclear energy. In addition to research and development on nuclear energy, one of its tasks was to propose and help implement measures to protect individuals and objects against the effects of atomic energy. Thus, from the early stages of nuclear research and industrial development in France, radiological protection and nuclear safety were prime concerns of French Authorities.

In 1957, Electricité de France (EDF) and French Industry entered the nuclear field initially to develop gas-graphite, natural uranium-fueled reactors. This was followed in 1970 by a large-scale nuclear plant construction program based on pressurized water reactor (PWR) technology developed through a license agreement with an American firm. Also during this period, various French associates began to work on fast breeder reactors in cooperation with international partners.

The increasing nuclear development efforts in France were accompanied by the establishment of statutory measures to ensure the safety of nuclear installations. First, in 1960, the Atomic Installations Safety Commission was established at the CEA together with specialized subcommissions, including one on nuclear reactors. The Commission's tasks encompass overseeing the safety criteria used for nuclear installations, in cooperation with qualified domestic and international organizations, as necessary, issuing safety certificates for the construction of reactors and other nuclear installations, granting operating licenses for reactors and other nuclear installations at the time of their commissioning, etc.

A summary description of a nuclear reactor Safety Analysis Report is enclosed with the attached notes on creation of the Atomic Installations Safety Commission and its subcommissions.

The Commission is a CEA in-house organization and consequently has no supervisory control over EDF installations. The Safety Analysis Reports for the first gas-graphite plants were, however, unofficially transmitted to

the CEA's Reactor Safety Subcommittee.

2. In 1963, by the means of a decree the French government set up national-level regulations pertaining to nuclear installations. These regulations make in particular the following provisions :

- authorization of Basic Nuclear Installations, i.e. reactors and other major nuclear facilities, is granted in a Decree issued by the Prime Minister subsequent to a report by the Minister of Industry, following an opinion by the Interministerial Commission on Basic Nuclear Installations (CIINB) established by the same Decree, and concurrence of the Minister of Health;

- the Authorization Decree establishes the characteristics of the installation and specific requirements to be fulfilled by the Operator, in addition to implementation of the relevant general regulations;

- the General Technical Regulations (GTR) pertaining to the safety of Basic Nuclear Installations are issued in Orders signed by the Minister of Industry;

- the surveillance of Basic Nuclear Installations is made by a body of inspectors.

The Service Central de Sûreté des Installations Nucléaires (SCSIN) or Central Office for Safety of Nuclear Installations ⁽¹⁾, is the agency at the Ministry of Industry in charge of activities related to the safety of nuclear installations, particularly the preparation of General Technical Regulations. In addition to compliance with technical regulations, all nuclear installations must be subjected to individual evaluations to determine whether their safety is adequate. The SCSIN thus subjects each installation to a technical evaluation on the basis of the Preliminary Safety Analysis Report submitted by the Operator.

(1) Created by a Decree of 1973 in conjunction with a Senior Council of Nuclear Safety appointed by the Prime Minister.

These technical evaluations are conducted by the Nuclear Safety Department at the CEA (Institut de Protection et de Sûreté Nucléaire or Radiological Protection and Nuclear Safety Institute). This Department reports its findings to a group of experts (Groupe Permanent) appointed by the Minister of Industry. After review, the Groupe Permanent issues an opinion in conjunction with proposed technical requirements. The Authorization Decree is then prepared in view of the Groupe Permanent's observations and proposals. In most cases, the requirements in the Decree are detailed or supplemented by observations transmitted to the Operator with notice of the Decree.

3. Three further considerations on the background of technical nuclear regulations in France are as follows :

- a) the regulations set forth rules which are basically of a technical nature. Although considered necessary, they are not always adequate to achieve a satisfactory degree of safety. The constructors and Operators are responsible for taking the measures necessary to achieve the required degree of safety and demonstrate this to Safety Authorities.
- b) the validity of these rules must be substantiated through safety analyses, safety testing and operating experience.
- c) to enable constructors and Operators to exercise their responsibilities freely, without hindering development of a technology subject to further improvement, the regulations issued in France are basically aimed at establishing objectives rather than imposing means to attain them. The choice of the means used is thus in most cases left to the constructors and Operators, although the regulations may exclude certain measures.

II. - STATUS OF GENERAL TECHNICAL REGULATIONS

1. Protection Against Ionizing Radiation and Liquid and Gaseous Radioactive Waste Release Hazards

Although regulations in this area are not part of the General Technical Regulations pertaining to nuclear safety, they cannot be overlooked in the light of safety objectives. The main statutory texts

relevant to these concerns are as follows :

- Protection Against Ionizing Radiation Hazards
 - . Decree 66-450 dated June 20, 1966 defines the Maximum Permissible Dose Equivalents for radiation workers, persons not directly involved in radiation work, the public and population at large; and sets forth general protection and surveillance principles.
 - . Decree 75-306 dated April 28, 1975 pertaining to the protection of workers against ionizing radiation hazards in Basic Nuclear Installations defines the administrative, medical and other relevant measures concerning personnel in controlled areas.

It should be noted that both documents were prepared in accordance with the recommendations of the International Commission on Radiological Protection.

They are, moreover, to be revised to take into account the latest ICRP recommendations, particularly Publications 22 and 26.

- Radioactive Liquid and Gaseous Waste Releases
 - . Decree 74-945 dated November 6, 1974 pertaining to radioactive gaseous waste releases.
 - . Decree 74-1181 dated December 31, 1974 pertaining to radioactive liquid waste releases.

These documents establish the required conditions for radioactive liquid and gaseous releases, indicate the studies to be submitted to government authorities to obtain the necessary authorizations, and prescribe the inspection and surveillance means.

The general documents described above stipulate that the authorization establishing release limits should be granted for each reactor in the form of a joint Order issued by the Ministries concerned, notably the Ministry of Industry and the Ministry of Health.

2. General Technical Regulations For Nuclear Reactor Safety

French Safety Authorities (SCSIN) designated a Working Group to determine the basic framework for General Technical Regulations. This Working Group suggested a three-level division of the documents according to their degree of generality and the scope of their applicability (General - serie of plants - particular plants). Some examples of such documents are given here after

-Level 1 : Basic Safety Principles

The above-mentioned Working Group prepared a draft document which presently provides the basis for the documents of other levels. The document prepared pertains to design, quality, risk acceptance, site selection and obligations of constructors and Operators. In particular, it sets forth the following general principles : "all effects, particularly biological, of ionizing radiation emitted by a nuclear reactor and the radioactive products of such reactors should be controlled at all times. To achieve this objective, measures ensuring the containment of radioactive products and the attenuation of ionizing radiation should be implemented during design, construction, commissioning, operation, and decommissioning of the nuclear installations". In connection with risk acceptance, it also stipulates the following : "During normal operation, the dose equivalents potentially received by workers at the installation, the public and population should not under any circumstances exceed the allowable limits established by competent authorities. The risk of an accident having consequences more serious than during normal operation should be limited so that the improbability of an accident is commensurate with the seriousness of subsequent damage. Acceptance should be based on risks of all types accepted in common activities of society".

(See appendix I)

-Level 2 : Safety Criteria or Directives

a) Documents published in the form of Orders

- Prestressed concrete nuclear reactor vessels

An Order dated June 15, 1970 pertaining to prestressed concrete nuclear reactor vessels used for gas-cooled reactors sets forth the relevant safety objectives and stipulates that the constructor's

technical options adopted should be justified. This Order includes recommendations pertaining to design, construction, testing and inservice surveillance of reactor vessels.

- Pressurized water nuclear reactors

Water Nuclear reactors are pressure vessels and are consequently governed by special regulations in addition to more general nuclear safety regulations. One of these special regulations is the Order dated February 26, 1974 pertaining to the main primary systems of pressurized water nuclear reactors, which sets forth the safety objectives related to design, construction, testing and surveillance of main primary systems in water reactors. The Directions Interdépartementales de l'Industrie (Interdepartmental Industry Directorates) are in charge of monitoring compliance with pressure vessel regulations, while the Direction de l'Industrie (Industry Directorate) of Bourgogne-France-Comté is responsible for checking conformance with the Order dated February 26, 1974 on construction of pressurized water nuclear reactors through their Bureau de Contrôle de la Construction Nucléaire (BCCN) or Nuclear Construction Inspection Office. If difficulties arise regarding conformance with regulations, the inspection agencies can refer the matter to the Pressure Vessel Commission, which has chartered its Standing Nuclear Section to handle matters related to compliance of nuclear reactors with pressure vessel regulations. If necessary, the Minister of Industry may be requested to act as arbitrator.

b) Directives

Mention should also be made of a particular approach used to prepare level 2 documents, although this approach is less conventional compared with other regulatory methods. Thus, in a letter dated September 3, 1979, the Minister of Industry transmitted directives to the Managing Director of Electricité de France (EDF) concerning the main safety requirements and features to be provided for future units equipped with pressurized water nuclear reactors in the 1300 MWe range. Enclosed with this letter is an Attachment which stipulates for each important topic at a very early stage the main features recognized acceptable in principle and the associated main safety requirements.

As part of the applicable regulatory process, EDF is required to specify and justify for each 1300 MWe unit the detailed technical measures adopted or proposed, particularly regarding the safety requirements. Additionally, after making any necessary alterations, EDF must demonstrate the compatibility of the aforementioned main features with the proposed site, and specify and justify the measures implemented to ensure the design, construction and operational quality of each unit.

The attachment addresses the following topics:

- General Provisions
 - . Design Conditions
 - . Typical Design and External Phenomena Hazards
- Special Provisions
 - . Plot plan
 - . Establishment of building levels
 - . Fuel assemblies and reactor internals
 - . Fuel building
 - . Main primary system
 - . Reactor coolant activity level and health physics
 - . Containment and main steam and feedwater pipe outlets
 - . Equipment layout and access to reactor buildings
 - . Nuclear auxiliary building, safeguard auxiliary building and waste auxiliary building
 - . Power removal capabilities
 - . Emergency core cooling system
 - . Electric power supply of safety-related auxiliaries
 - . Electrical equipment rooms and remote shutdown capabilities

A similar procedure is planned for specification of the main safety requirements and features for the fast breeders built after completion of the Creys-Malville plant.

-Level 3 : Special Technical Requirements

Typical level 3 requirements are the technical requirements included in the Decree of authorization of creation of each plant as also the observations transmitted to the Operator with notice of the Decree.

III. - THE BASIC SAFETY RULES

Simultaneously with the regulatory effort recalled above, the safety authorities (Service Central de Sûreté des Installations Nucléaires "SCSIN") issue recommendations or guides which are not strictly speaking regulations in the juridical sense; they are called "Règles Fondamentales de Sûreté" (RFS).

The RFS set up and detail the conditions, the respect of which is deemed to be complying with the French regulation practice, for the subject to which they relate. Their purpose is to make known rules judged acceptable by safety authorities, thus making the safety review easier. They aim to benefit from the advantages offered by standardization while being open to technical advances.

A basic safety rule applies in principle to any nuclear facility for which the decree authorizing the construction is issued more than one year after the rule publication. Owing to the interest of standardization, this period is extended to three years, except if otherwise mentioned, if the considered unit is identical to one unit whose construction has already been permitted.

As the safety fundamental rules are also established with an aperture to technical advance, the publication of a rule does not result in an obligation of modification or of additional justification for the facilities, either operating, or being built, except when otherwise stated.

Moreover, the Service Central de Sûreté des Installations Nucléaires keeps the right to modify at any time, if deemed necessary, any basic safety rule, and to detail the conditions of application if the case may be.

Besides, taking into account the RFS does not decrease the utility's responsibility, in particular as regards the regulatory requirements in effect. Under these circumstances, an utility may be able not to apply one RFS if it demonstrates that the safety objectives of the rule are

achieved by other means that it proposes within the frame of regulatory procedures.

For PHRS, a RFS program is under way according to a plan given in appendix II with the main following scopes :

- general plant design and installation general principles;
- general design of the elementary systems;
- interface rules;
- rules applying to operation study;
- general rules relative to various systems, structures or equipments.

The present work does not intend to fill exhaustively this plan, but is focused on the subjects where the prompt obtention of regulatory tools seems to have the most efficient effect.

As for now, sixteen RFS have been published by SCSIN or are being revised by the Groupe Permanent; The rules published to day or being published are given by the appendix III. Other rules are being written according to the working schedule given in appendix IV which includes in particular rules concerning safety classes and design of materials.

IV. - EXAMINATION OF THE COMPATIBILITY OF CODES BY SAFETY AUTHORITIES

At the suggestion of governmental authorities, the French nuclear installations constructors and operators have undertaken to compile a collection of the rules used for design and construction of pressurized water reactor nuclear power plants. This document headed "Recueil des règles de conception et de construction" - RCC - (Collection of design and construction rules) is limited to the Nuclear Island and includes several parts :

Nuclear Island Process Design Rules

This document specifies : general criteria applied to the entire nuclear island; design criteria applicable to each system; rules for layout of systems and interfaces between the nuclear steam supply system

and other parts of the plant; rules used for operating design studies and rules pertaining to protection of personnel against ionizing radiations hazards.

Electrical Equipment Design and Fabrication Rules

This document contains the rules for design, fabrication, qualification and testing of electrical equipment.

Mechanical Equipment Design and Fabrication Rules

This document comprises five volumes. Volume 1 contains general provisions pertaining to such matters as design, fabrication, inspection and testing of components. The other volumes contain rules governing various technical areas : procurement, destructive and nondestructive examination methods, welding and other fabrication operations.

Civil Works Design and Construction Rules

This document defines the design and construction criteria applicable to the reactor building and other nuclear island buildings. It also details testing conditions for the containment.

Fuel Design and Fabrication Rules

This document gives the rules of conception and realisation of fuel rods and fuel assemblies.

Fire Prevention and Protection Rules

This document defines fire prevention and protection rules for nuclear power plants.

Safety authorities do not participate directly to the writing of those texts, the general scope of which goes beyond the strict frame of safety concerns.

After appropriate revision and examination of their compatibility with the licensing regulatory practices by safety authorities,

the codes can supplement the technical regulation.

A RFS or a letter is a means to give the result of the examination and to define the conditions for which the use of these codes is accepted.

Presently, the RCC-P (900 MWe) has been the subject of a letter and other RCC of a RFS ; (see appendix V)

V. - STANDARDS PREPARED BY THE ASSOCIATION FRANCAISE DE NORMALISATION (AFNOR)

Procedures were established several years ago to enable preparation of national standards pertaining to nuclear energy-related areas. Focused mainly on protection against ionizing radiation, these standardization efforts produced a number of French standards covering such areas as laboratory and plant containment structures, sealed and non-sealed radiation sources, detectors and dosimeters, etc.

In the field of power generation, all matters related to electrical materials, their implementation (e.g., welding) and electrical components, as well as construction materials, must conform to applicable standards. In addition, an important standard now on file entitled "Sheet Metal for Boilers and Pressure Vessels. High Yield Stress Alloy Steels," includes in its scope the steels used for fabrication of reactor vessels. Also noteworthy because of their nuclear safety impact are the standards pertaining to nondestructive testing now being prepared.

Special efforts have been devoted to developing standards on preventive measures for seismic hazards. An example of this is the document entitled "Guide for Equipment Seismic Design Testing" established by the Union Technique de l'Electricité (UTE), the electrical branch of AFNOR. Designed to meet the needs of manufacturers, users and test laboratories, this document concerns the qualification testing of electrical equipment. Plans call for ensuring its compatibility with a similar document prepared by the IEC Technical Committee No. 50 (Environmental Testing) at the appropriate time.

VI. - TECHNICAL REGULATIONS AND THE LICENSING PROCESS

As mentioned, the licensing procedure includes a technical review of each Basic Nuclear Installation to be built. This technical review is based on the following main items :

- preparation of the Safety Analysis Reports by the future installation Operator (EDF for nuclear power reactors)
- technical evaluation of the Safety Analysis Reports by the Nuclear Safety Department (IPSN at CEA)
- review of the Safety Analysis Reports by the aforementioned Groupe Permanent on the basis of the DSN's Safety Evaluation Report and transmittal of the Groupe Permanent's opinion to the SCSIN.

The above-mentioned technical reviews are more than just simple verifications of compliance. They are based on the General Technical Regulations and, insofar as necessary, on other reference documents, some of which have been mentioned above.

It should also be noted that some other reference documents can be used such as Groupe Permanent opinions or recommendations and insofar as necessary, for pressurized water reactors, foreign references in connection with any safety assessment difficulties.

VII. - CONCLUSION

In France, the General Technical Regulations pertaining to safety were derived more specifically in the areas where nuclear energy development had benefited from previous experience, as is the case for the main primary system of pressurized water reactors in relation to pressure vessel regulations.

Concurrently, at the suggestion of governmental authorities, efforts were made to develop :

- on one hand, more detailed codes and standards to specify the rules applicable to the systems and components in nuclear power plants.

- on an other hand, basic safety rules, focussed on those areas which could most benefit from rapid preparation of regulatory tools.

This situation should be seen in the perspective of French safety practice, which encompasses two essential aspects :

- a highly stringent licensing process based on individual review of nuclear installations at various stages of their development

- technical safety analysis described else where

It can be expected that these efforts will be continued in the future. Moreover, French Safety Authorities, the CEA and EDF attach great importance to their pursuit and are actively participating in international efforts to develop nuclear safety recommendations.

APPENDIX I

BASIC SAFETY PRINCIPLES APPLICABLE
TO NUCLEAR REACTORS (draft)

GENERAL PRINCIPLE

1. - There must be permanent control of the effects, particularly the biological effects, of ionizing radiation emitted by a nuclear reactor and the radioactive products therein.

To this end, measures must be adopted during the design, construction, commissioning, operation and decommissioning of the installation, to confine radioactive substances and attenuate ionizing radiation.

DESIGN PRINCIPLES

2. - Protection against the effects of contamination by radioactive substances shall be provided by the interposition of several successive barriers whereby these products can be confined.

Protection against the effects of ionizing radiation shall be provided by the concurrent or non-concurrent use of appropriate devices such as interposed screens, delimited zones, shortened exposure time and removal from the radiation source.

3. - Radioactive substances shall be confined and ionizing radiation attenuated by a set of measures allowing to achieve progressive safety levels, whose effectiveness shall have been demonstrated under all plausible normal and accidental circumstances; this shall be done on the basis of :
 - preventive measures so that a high quality level of design and performance and adequate safety margins can be achieved.

- means of supervision whereby any incursion within these margins can be detected;
- means of action whereby the development of accidental conditions can be prevented and, faulting that, any harmful consequences which may ensue can be contained.

QUALITY ASSURANCE PRINCIPLE

4. - The quality of the plant - in other words, its capacity to satisfactorily operate in compliance with the principles set out above - and the detection and rectification of any errors that would appear at any step of design, construction, operation and temporary or final shutdown of the plant shall be rendered effective by the application of a controlled set of planned, systematic measures of a statutory, administrative or technical nature, based on written, filed procedures.

RISK ACCEPTANCE PRINCIPLES

5. - During normal operation, the dose equivalents that might be received by plant workers, members of the public and the population shall under no circumstances exceed the permissible limits prescribed by the competent authorities.
6. - The risks of accidental conditions leading to effects greater than those permitted under normal operation shall be limited as follows: the more serious the harm that would ensue from an accidental condition is the more improbable it shall be, with risk acceptance being determined by reference to the other risks of all types accepted in the everyday activities of society.

SITE ACCEPTANCE PRINCIPLE

7. - A site may be accepted for the setting up of a reactor only if the different interactions that may occur between the nuclear reactor and its environment put no obstacle in the way of the application of the general principles stated above. In site evaluating, allowance shall be made for the predicted evolution in the characteristic data linked with

human and demographic activity around the site over the whole plant life; it shall be possible to monitor any significant deviation from the predictions by appropriate statutory means.

PRINCIPLES DEFINING THE OPERATOR'S AND THE CONSTRUCTORS' OBLIGATIONS

8. - The purpose of the general technical regulations is to lay down the measures that should be taken by the nuclear plant operator and constructors, in pursuance of international conventions and national legislation, in order to ensure the safety of that plant within the context of the principles set out above.

The Authority shall ensure that these regulations are carried out.

Without prejudice to the application of these provisions, it shall be the operator's responsibility to ensure that the basic safety principles are implemented, arranging for any additional measures he deemed to be advisable, especially in the contracts he places with, the constructors.

Without prejudice to the application of the general technical regulations and the provisions of contracts by which they are committed to the operator, it shall be the constructors' responsibility in the light of the information at their disposal to draw the operator's attention to all those measures which they feel might help to implement the basic principles applying to their supply.

APPENDIX IITABLE OF CONTENTS OF SAFETY FUNDAMENTAL RULES

(Nuclear Power plant units equipped with a pressurized water reactor)

I - GENERAL DESIGN AND INSTALLATION PRINCIPLES OF THE PLANT

- 1.1. General plant layout description
- 1.2. Protection against externally generated hazards
- 1.3. General design and installation principles

II - BASIC STRUCTURES AND SYSTEMS DESIGN

II.1 Successive barriers against the release of radioactive products

- II.1.1. Fuel cladding
- II.1.2. Reactor coolant system
- II.1.3. Containment barrier
- II.1.4. Other barriers

II.2 Engineered safety features

- II.2.1 Emergency core cooling system
- II.2.2 Containment spray system
- II.2.3 Containment atmosphere control system
- II.2.4 Steam generator auxiliary feedwater system

II.3 Auxiliary systems

- II.3.1 Fuel handling and storage system
- II.3.2 Refueling and storage pools cooling and water treatment system
- II.3.3 Ventilation systems
- II.3.4 Residual heat removal system
- II.3.5 Chemical and volume control system and reactor boron and water make-up system
- II.3.6 Component cooling water system and essential cooling water system
- II.3.7 Radioactive waste treatment systems

II.4 Electrical systems

II.4.1 Instrumentation and control systems

II.4.2 Electrical power

III - INTERFACE CRITERIA

III.1 Installation criteria

III.2 Nuclear steam supply system and structures interface

III.3 Nuclear steam supply system and other balance of plant systems interface

IV - OPERATING CONDITION AND ANALYSIS CRITERIA

IV.1 Equipment classification

IV.2 Equipment operating conditions

IV.3 Reactor coolant system (main primary circuit) operating conditions

IV.4 Accident analysis

V - GENERAL RULES APPLICABLE TO CERTAIN SYSTEMS, STRUCTURES AND COMPONENTS

V.1 Radiation protection

V.2 Other general rules

APPENDIX III

"REGLES FONDAMENTALES DE SURETE" published or
being published on Dec 31th 1982 (PHRs)

Number	Title	date of application
I.2.a	Hazards related to aircraft crashes	Aug 5, 1980
I.2.b	Risks of emission of missiles following bursting of turbine - generator set	Aug 5, 1980
I.2.c	Determination of seismic displacements to be taken into account for safety	Oct 1, 1981 (provisional)
I.2.d	Hazards related to industrial environment and communication ways	Mai 7, 1982
I.2.e	Flood hazards	being presented to "Permanent Group"
I.3.a	Application of the single failure criterion in safety analysis	Aug 5, 1980
I.3.b	Seismic instrumentation	being presented to "Permanent Group"
II.2.2.a	Design of the containment spray system	Aug 5, 1980
V.1.a	Determination of the activity released out of the fuel	Janv 18, 1982
V.1.b	Meteorological measurements	Jun 10, 1982
V.2.a	General provisions on quality assurance	Nov 1 st , 1981 (provisional)
V.2.b	General rules applicable to civil engineering works	Jul 30, 1981
V.2.c	General rules applicable to the construction of mechanical materials	Apr 8, 1981
V.2.d	General rules applicable to the construction of electrical materials	Dec 28, 1982

V.2.e	General rules applicable to the construction of fuel assembly	Dec 28, 1982
V.2.f	General rules applicable to fire protection	Dec 28, 1982

APPENDIX IV

"REGLES FONDAMENTALES DE SURETE"
being written (PWRs)

Chapter 1.2

- Rules relative to earthquakes
 - . building behaviour
 - . equipment behaviour

Chapter IV

- Rules relative to safety classes of mechanical and electrical materials.
- Rules relative to seismic classes of materials.
- Rules relative to design of mechanical materials, of civil engineering works, of supports, of electrical materials.
- Rules relative to in service monitoring and inspection.

Chapter V

- Rules relative to the radioactivity inventory to be taken into account in accident studies : supplementary rule relative to radioactivity transport.

APPENDIX V

EXAMINATION OF COMPATIBILITY OF CODES

Codes	Reference text	Date
RCC-P (900 MWe)	letter SIN n° Z 3229-80	Aug 01, 1980
RCC-M	RFS V.2.c	Apr 08, 1981
RCC-G	RFS V.2.b	Jul 30, 1981
RCC-E	RFS V.2.d	Dec 28, 1982
RCC-I	RFS V.2.f	Dec 28, 1982
RCC-C	RFS V.2.e	Dec 28, 1982