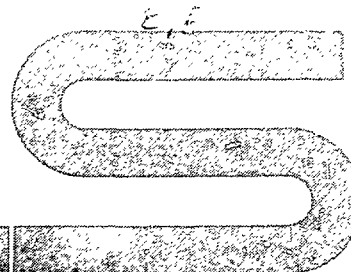


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**REGULATORY PROVISIONS AND ADMINISTRATIVE PRACTICE
CONCERNING
THE SAFETY OF NUCLEAR FACILITIES**

by J. Servant
Head of Central Service for Safety of Nuclear
Facilities
Secretary-General of the Interministerial Committee
on Nuclear Regulation

1 GENERAL - DEFINITIONS

A recent survey revealed that 93% of the French public consider 'desirable' the existence of organizations responsible for defending the population against the dangers and harmful effects of nuclear energy, and that 62% consider this existence 'highly desirable'. In addition, 70% feel that these organizations should be 'official'.

These results undoubtedly enable me to present, as a major subject, the current situation in France in matters of administrative organization and regulations concerning the safety of nuclear facilities and, in general, nuclear regulation. However, they do not enable me to state my clear satisfaction, because the 'show of confidence' granted to the various existing echelons of the administration do not place them in the foremost rank of organizations which are considered desirable It is also true that the same survey reveals that general information in the area needs to be broadly supplemented and improved. This may constitute an additional reason to discuss this subject today.

The dissemination of information is inconceivable without prior agreement on the meanings of words. I shall therefore begin by drawing vocabulary distinctions, which are especially necessary in an international conference.

The expression 'sécurité nucléaire' is used in France to denote the overall 'activities intended to ensure the protection of individuals and property against the dangers, harmful effects or disturbances of any type whatsoever resulting from the creation, operation and shutdown of nuclear facilities, stationary or mobile, as well as the storage, transportation, use and conversion of natural or artificial radioactive substances'. This very broad definition derives from

the terms of a Decree enacted in August 1975, which established in France an 'interministerial committee for nuclear regulation' to which I shall return later. The closest English expression for 'sécurité nucléaire' appears to me to be 'nuclear regulation', without implying a complete identity between the two notions.

The foregoing Decree provides a list - non-limitative - of the main areas of nuclear regulation¹:

- . protection of workers and of the public against ionizing radiation and measures to be taken in case of accident implying a radiological risk,
- . radioactive and nonradioactive releases, liquid and gaseous, as well as other harmful effects, pollutions and disturbances of any type whatsoever caused by nuclear facilities,
- . safety of nuclear installations, defined as the set of measures to be taken to ensure normal operation, to prevent accidents and sabotage, and to limit their effects,
- . control and regulation of nuclear materials during their production, storage, transportation and use, including artificial radioisotopes and wastes, in order to protect the public hygiene and health, and to prevent diversions for unauthorized purposes.

It is easy to pick out the classic disciplines of nuclear regulation, which can be given fairly safely in their English version:

- | | |
|--|--------------------------|
| . protection radiologique: | radiological protection, |
| . rejets d'effluents radioactifs: | radioactive releases, |
| . déchets radioactifs: | radioactive wastes, |
| . sûreté nucléaire: | nuclear safety, |
| . protection contre les actes de malveillance: | safeguards, |

¹ A more detailed discussion of the various fields of nuclear regulation may be found in 'Annales des Mines', March/April 1976. ('La sécurité nucléaire en France' par J. Servant.)

and especially:

- . protection physique: physical protection.

I shall nevertheless insist on two special points:

- . the harmful effects, pollutions and disturbances of non-nuclear origin (heating and chemical pollution of water, climatic effects, deterioration of sites, noise etc) are included within the scope of nuclear regulation if they are caused by nuclear facilities,
- . on the other hand, if the physical protection and control of nuclear materials to avoid diversion for unauthorized purposes form an integral part of 'nuclear regulation', the 'fabricated nuclear materials intended for national defense, together with nuclear facilities exclusively concerned with national defense and classified as secret' are covered by specific measures within a different framework. This also applies to matters of foreign policy associated with the non-proliferation of nuclear weapons.

2 ORGANIZATION AND ADMINISTRATIVE PROCEDURES

I have already had the opportunity to discuss in detail¹ the French organization governing licensing procedures and nuclear safety, resulting from the Decree of 13 March 1973 which created the central service for the safety of nuclear facilities, and a second Decree, dated 27 March 1973, which amended the basic regulations governing nuclear facilities.

Hence I shall merely recall the essentials in the form of two appended tables:

- . Appendix 1: Organizational chart of nuclear safety,

1 'Practice and evolution of licensing procedures and nuclear regulations in France' by J. Servant in 'Nuclear Energy Maturity' (Proceedings of the European Nuclear Conference, Paris, 21 to 25 April 1975).

Appendix 2: Diagram showing licensing procedure for basic nuclear facilities.

A third table (Appendix 3) relates to the procedure for 'declaration of public interest' which I shall discuss later (Section B), stressing its importance in terms of public information and environmental protection.

Appendix 4 illustrates the situation in February 1977 (with dates of official procedural decisions) of nuclear power utilities and fuel cycle plants established in France.

I shall also note below the supplements and regulatory amendments which have occurred since 1973 or are planned.

A

With respect to radioactive releases (gaseous and liquid), five interministerial enforcement orders for the two Decrees of 6 November 1974 and 31 December 1974 were signed on 10 August 1976: they set the conditions under which 'radioecological' studies are to be made, presented by operators in support of their release authorization requests, conditions governing the public inquiry, general rules applicable to the setting of limits and discharge procedures, to the choice of environmental monitoring measures and to control procedures. Two other orders, signed on the same day, set the specific rules governing nuclear power plants equipped with light water reactors.

B

With respect to the public inquiry, significant improvements were made by a Decree (and a set of guidelines established by the Prime Minister) of general scope, dated 14 May 1976, and by an instruction dated 24 August 1976 from the Minister of Industry and Research, specifically concerning thermal electric power plants, conventional and nuclear.

I shall note from the outset that it was decided to apply the procedure for 'declaration of public interest' systematically to all thermal

power plants (see Appendix 3) and that the public inquiry made on this occasion replaces, under certain conditions, which are generally satisfied, the local inquiry required by the licensing procedure for the creation of nuclear facilities (see Appendix 2).

The improvements made in the procedure succeed essentially in providing for more thorough information of the public and elected representatives concerning the establishment of the facilities, as well as more complete consideration of the various interests involved. Hence the file is now supplemented by:

- . a document concerning the architectural appearance of the planned facilities,
- . a study of impact on the environment, with a brief description of the state of reference, indication of the studies undertaken and a preliminary review of foreseeable occurrences associated with establishment of the power plant,
- . finally, for nuclear power plants, the main arrangements adopted in matters of safety and radiological protection, presented and scheduled according to a preestablished plan.

Furthermore, the file is widely circulated among the elected representatives, individuals and organizations concerned: the opening of an inquiry is announced not only in the regional and local press, but in newspapers with nationwide circulation. Finally, the conclusions of the inquiry commission are also widely circulated, not only in the town halls, sub-prefectures and prefectures involved, but by all appropriate means: press, radio, television.

It goes without saying that the procedure also enables the competent administrative services, on the local, regional and national levels, to act to safeguard the interests for which they are responsible. This is especially true for:

- . the Ministry of the Quality of Life, which subjects the study of environmental impact to scrutiny and may, at this stage, draft certain general requirements concerning environmental protection, observance of which will be considered in the final assessment of the 'public interest' of the power plant,

the Ministry of Public Health for radiological protection and radioactive releases (although, as shown above, the latter are

also covered by a distinct procedure and public inquiry),

- the Central Service for safety of nuclear facilities for all matters concerned with the safety of the facilities in the planned site (influences of external origin on the safety of the power plant and, conversely, potential effects of incidents or accidents on the environment of the power plant).

The above administrative bodies are thus able to voice their basic objections concerning the site planned for the prospective power plant. On the other hand, the absence of such objections, while enabling continued realization of the project, obviously cannot offset the conclusions of more intensive examinations which are made subsequently, especially in safety matters, as part of the licensing procedure for the creation of basic nuclear facilities.

C

It is also worthwhile mentioning a draft amendment to the latter regulations which, if adopted, will follow the same trend as the foregoing provisions, and will supplement them in connection with environmental protection:

- it shall henceforth be explicitly stipulated that the authorization to create a nuclear facility will establish requirements not only to ensure the safety of individuals and property, but also for the protection of nature and the environment,
- surveillance carried out by the inspectors of basic nuclear facilities (placed under the responsibility of the Central Service for safety of nuclear facilities) will deal particularly with observance of the obligations devolving on the operator with respect to protection of nature and the environment; effective instructions for this purpose will be drawn up by the Ministry of the Quality of Life.

3 OVERALL COORDINATION OF NUCLEAR REGULATION

A The Interministerial Committee for Nuclear Regulation

As I stated at the end of my paper in April 1975¹, 'the scope of the nuclear program, the diversity and extent of the impacts of nuclear energy on man and on the environment, and the sensitivity of public opinion call for a better coordination of the different activities of the authorities in the nuclear field'.

The corresponding measures were announced in the following month by the Minister of Industry and Research, on behalf of the Government, during the Parliamentary debates on energy policy.

In order for the nuclear program to be achieved in the best safety conditions, a consistent, cohesive administrative organization was necessary, together with close collaboration between the ministerial departments competent in various respects in this sector. Consequently a decision was made to create a Committee grouping, around the Prime Minister, all the ministers and secretaries of state involved: Interior, Economy and Finance, Defense, Territorial Development, Agriculture, Quality of Life, Labor, Health, Industry and Research, Transportation, and Government Spokesman.

The Interministerial Committee for Nuclear Regulation was established by a Decree on 4 August 1975. It is responsible for 'coordinating activities' designed to guarantee nuclear regulation (in the broad sense of the word as specifically embodied in the Decree). The Committee 'adopts or draws up general measures necessary for the accomplishment of this task'.

However, the accomplishment of this task of coordination and stimulation requires the performance of specific corollary tasks, of which the Decree of 4 August 1975 also established the main lines. The Committee 'coordinates the use of resources placed for this purpose at the disposal of the ministerial departments concerned and the organizations placed under their supervision. It examines the study and research program to be carried out each year by these ministries or organizations'.

¹ J. Servant (op.cit.)

Among these organizations, one that deserves special mention is the Commissariat à l'Energie Atomique, which, in application of the Decree of 20 September 1970, 'recommends measures designed to ensure the protection of individuals and property against the effects of atomic energy, and contributes to their implementation'. An important step was taken recently to make sure that this contribution, which is essential from the technical standpoint for the activities of the authorities, is made with the greatest objectivity and effectiveness. I shall return to this later.

Furthermore, 'the Committee prepares the positions of the Government in matters of nuclear regulation in international negotiations' and 'sets the general orientations concerning dissemination of information to the public and coordinates activities in this area'.

A secretary-general of the Committee, appointed by Decree, prepares the proceedings, suggests the necessary measures, and follows up the enforcement of the decisions taken.

'In emergencies he calls a meeting of the ministers concerned and, if applicable, takes the necessary measures after discussions with their representatives. He then reports to the Committee on this matter.'

'Within the framework of the guidelines adopted by the Committee, and after discussion with the ministries concerned, he notifies the public of matters of nuclear regulations common to several ministries.'

The Decree of 4 August 1975 specifies that the competent services of the different ministries, together with the establishments and companies involved, provide assistance to the general-secretariat.

In effect, regardless of the importance of its role, the latter has not been conceived as a new administrative body grouping the existing services and substituting for them, but - and this conforms with the task of the Committee itself - as a compact body coordinating the activities of the latter, facilitating the drafting and implementation of common and new activities, in one word, acting as a new element of unity and effectiveness in Governmental action.

The activities of the general secretariat of nuclear regulation have hitherto dealt mainly with areas in which improvements and

supplements appeared necessary and urgent:

- . protection of the environment (in particular with respect to non-nuclear harmful effects): contribution to the reforms discussed above (2B and 2C),
- . protection of facilities against sabotage,
- . physical protection of materials, especially during transportation,
- . auditing of nuclear material accounting.

Several of these activities are still under way and others have been initiated or planned, concerning naval nuclear propulsion, radioactive waste management, artificial and natural radioisotopes etc.

B The Nuclear Protection and Safety Institute

I have referred to the major role which has been assigned to the CEA, on the technical level, in matters of nuclear regulation.

On 2 November 1976, impelled by a desire to exploit this technical potential in the most effective conditions, while ensuring the independence of judgement expressed by competent specialists, the authorities created a 'Nuclear Protection and Safety Institute' grouping, within the Commissariat à l'Energie Atomique, all the investigative resources devoted to regulation (mainly concerning safety, health physics, physical protection and material controls).

Hence, to start with, the Institute provides direct technical support for the action of officials responsible for granting licences, drafting regulations and checking their enforcement. This function constitutes a sort of extension, into the area of regulation as a whole, of the role hitherto played by the 'Nuclear Safety Department' (now absorbed into the Institute) in relation to the Central Service for safety of nuclear facilities.

In addition, and chiefly through the Institute, the CEA performs research activity in the different areas of nuclear regulation. State financial aid for this highly important effort will henceforth

be specially earmarked in the budget of the Ministry of Industry and Research: the figure exceeds 325 MF in 1977.

The corresponding programs are examined by a 'Program Committee', presided by the High Commissioner for Atomic Energy and attended by the officials mentioned above. This Committee establishes guidelines for programs and makes recommendations concerning the orientation of research and allocation of resources. The secretary general of the interministerial committee also performs, with respect to the Institute, the functions of a 'government commissioner'.

4 SAFETY: DOCTRINE AND PRACTICE

A Doctrine

The doctrine of the French administration in matters of nuclear safety has already been discussed in various articles¹. It is based on the principle of the responsibility of the operators and the builders on whose services they draw. Correlatively, the 'technical regulations', whether specific to a given facility (and specified at the granting of the corresponding individual licences), or whether 'general', in other words, applicable to all facilities of a single category or to all components of a single type, only imposes constraints which are strictly indispensable to the achievement of satisfactory safety. In the general regulations, these requirements are largely expressed in terms of obligations concerning results, performance levels to be attained, if necessary interdictions, rather than in terms of the means to be employed. Thus the French safety authorities have always declined up till now to impose detailed specifications and building codes in such regulations or - what would amount to the same thing - to make the use of existing codes mandatory.

¹ D. Quéniart, 'Sûreté nucléaire et règlements techniques' in 'Annales des Mines', January 1974 (special issue, out of print, devoted to 'Nuclear Safety').
'La sûreté nucléaire en France', Ministry of Industry and Research (series 'Les dossiers de l'énergie', No.4), La documentation française, Paris, 1976.

Contrary to appearances, this is not the easy way out, neither for the administration which is forced to distinguish the essential (which must be imposed) from the subsidiary (which may be discarded), nor for industrial managers, who are required to make a special effort of analysis and demonstration, and finally progress.

Consequently, French safety regulations lend themselves poorly to commercial use (I was about to say diversion!). Instead of regretting this (by comparison with other, vaguer 'systems'), it was considered preferable to develop, side by side with these regulations, the most complete possible set of precise professional or standardization documents, detailed and capable of changing rapidly to match technical advances. The administration encourages this development and follows its progress, in order to make sure of the compatibility of the solutions adopted with general safety principles. Indeed, it finds in this procedure materials for regulations in the strict sense of the term, which are both effective and realistic at the same time.

In the same spirit, I would like to add that the French authorities have always been favorable to international cooperation concerning basic safety regulations, explaining their active participation in the proceedings of the IAEA in this field, and in the exchanges of views which have taken place within the framework of the OECD, as well as the value which they attach to systematic exchanges of information with countries which have a nuclear program (such as the United States, the Federal Republic of Germany, Japan etc).

This sort of cooperation can doubtless contribute to the elimination of excessive or unjustified differences between national regulations, and this is highly desirable. It may even result in an international consensus on basic regulations or common principles.

However, it is necessary to avoid a dual stumbling block. The first would be to imagine that the application of these general regulations would suffice to guarantee safety, whereas it remains indispensable to examine the safety of each nuclear facility case by case: this is the purpose of safety reports drafted by operators, supplemented by analyses or safety assessments, which are required by all the national authorities before the granting of individual licences. The second mistake would be to believe that this harmonization of basic regulations must necessarily be broadened to include the authoritarian uniformization of technological standards and practices, designed to guarantee safety. Without actually

benefiting safety, such an endeavor would be liable to distort international competition and to hinder the progress of nuclear techniques.

It nonetheless remains true that a major effort is under way in France to develop the general technical regulations proper. This effort has been spurred by the awareness of the potential hazards of nuclear energy (making it necessary, for purposes of prevention, to establish regulations before the construction and operation experience has expanded unduly) and by the desire to facilitate the task of builders and operators as much as possible, by establishing the basic structure of the 'rules of the game'. In this respect, as I stated in April 1975, the development of general technical regulations is designed to match the increasing number of installations of similar or comparable types and the increasing 'standardization' of equipment.

Previous articles¹ have already shown that this development was directed at two main levels:

- . 'general safety requirements' for which drafts or preliminary drafts are already available concerning sites, design, quality organization and operation,
- . 'technical safety provisions' (which constitute the regulations proper).

In addition to texts already published concerning prestressed concrete reactor vessels and the main primary circuit of light water nuclear steam supply systems, plans or drafts already exist on the following:

- . seismic risks,
- . fire hazards,
- . containments,
- . reactor protection systems.

¹ J. Servant (op.cit.), D. Quéniart (op.cit.).

Also in preparation are other areas such as:

- . risks from aerial sources,
- . risks due to the industrial environment,
- . nuclear fuels.

B Practice

The description of administrative procedures might give the impression of a complex 'machinery' which formally obeys the prerogatives of the authorities, but which is harder to adapt to concrete realities.

In particular, official decisions at the culmination of licensing procedures are liable to occur too late to validly orient industrial decisions and basic technical choices.

Using two examples, I would like to show how the above snag can be avoided in practice, or at least alleviated.

The first example relates to siting: it is obvious that when the licensing procedure for the creation of a nuclear power plant on a given site has been completed, the future operator has already finalized the choice of the site, and may have even undertaken site development by earthworks and civil engineering operations. Rejection of the site still remains possible, if justified by serious safety considerations, but the consequences of such a decision in terms of costs and schedules are liable to be disastrous. In less extreme cases which cannot justify a refusal, safety will be achieved at the cost of modifications or supplements which are difficult to implement, and whose effectiveness is not easily substantiated.

Hence it is at a far earlier stage that any objections relating to safety must be made concerning the site. The improvements that I have described above in the procedure for declaration of public interest precisely enable the safety authorities to examine the matter and to make their observations known at the start of the procedure, which generally itself precedes the licensing procedure.

Nevertheless, this stage is liable to occur too late, because the filing (by Electricité de France) of a request for a declaration of public interest (with the approval of the Minister of Industry and Research) already constitutes a not easily reversible 'political' act. This led the Government to have the filing preceded by a preliminary phase of analysis and consideration, not institutionalized, the so-called 'discussion phase', during which local elected representatives and administration officials can have their say. In particular, if the project relates to a nuclear power plant, it is covered by a brief safety examination. The problem at this stage is to have available enough data concerning the site (geology, meteorology, hydrology, industrial and human environment) and on the reactor to proceed with such an analysis.

It remains true that this early pragmatic approach offers undeniable advantages over the excessively late 'institutional' approaches, the procedures of declaration of public interest and, a fortiori, for the licence to create the facility.

The second example concerns the very definition of the nuclear power plant and, more precisely, the basic technical options which condition its safety.

In effect, the preparation of the preliminary safety report which must be submitted by the operator in support of his licence application implies that the design of the power plant, and particularly of the reactor, is defined with sufficient precision, and that a number of basic alternatives involving safety have already been selected almost irreversibly. The safety analysis by the competent authorities may obviously give rise to changes and additions concerning the arrangements planned by the operator, but a fundamental change is liable not only to result in additional significant costs and delays, but may cast a shadow over the entire design concept.

This is why, by mutual agreement, the Central Service for safety of nuclear facilities and its technical support bodies, the EDF utility and the General Department for Energy, have considered it desirable, for the future, to proceed with a joint examination of the major technical options concerning pressurized water reactors.

This scrutiny was conducted with an open attitude, so as to clearly highlight the justifications for the various possible alternatives.

However, it was specified that the final decision on these alternatives would be made by the EDF, in due consideration of the general guidelines communicated to it by the Minister of Industry and Research, acting within the general context of the 'trusteeship' which it performs over the public establishment. In effect, with rare exceptions, these decisions cannot be based exclusively on safety criteria, and they fully involve the responsibility of the operator.

On the other hand, it was stressed that the choices in question could not permit the safety authorities with respect to the specific decisions which they may be led to take, after a detailed examination of each power plant, after the completion of the regulation procedures.

A large body of work has been accomplished in the conditions and resulted in the drawing up of twenty-odd data sheets which are listed in Appendix 5, each sheet having been drafted in accordance with the following plan:

- (1) Statement of the problem.
- (2) Basis for selection:
 - . safety concerns,
 - . other concerns or constraints (costs and deadlines, ease of installation, operation etc).
- (3) Foreign regulations and facilities.
- (4) Alternatives adopted previously, planned or considered by the EDF, with justifications.
- (5) Conclusions.

These sheets, which pinpoint the situation and the problems encountered at any given moment, are naturally subject to revision to account for advances in knowhow and experience gained during operation. They may also be supplemented by the drafting of new data sheets. The sheets already prepared reveal the need for supplementary studies to be undertaken by the operator, in liaison with the safety organizations whenever this proves necessary, or even, in certain cases, by the latter.

It may nevertheless be stated that the design of 1300 MWe level pressurized water reactors, which will succeed the 900 MWe level reactors in France, will largely take account of the results of this joint examination of technical safety options. The individual safety analysis of each project will moreover be facilitated by this process.

A similar process will shortly be undertaken concerning the technical safety options of breeder reactors.

5 CONCLUSION

In the areas of regulatory procedures, organization and administrative practice, the situation in France has changed considerably during the past four years. This evolution has occurred without upheavals, but with a constant concern for adapting the resources and methods of the authorities in regulation matters to the rate of growth and the scope of the French nuclear program.

APPENDIX I

Organizational chart of nuclear safety in France

1. Interministerial Committee for Nuclear Regulation
2. Minister of Education
3. Secretary of State for Culture
4. Minister of State Minister of the Interior
5. Minister of Foreign Affairs
6. Minister of Economy and Finance
7. Minister of Defense
8. Minister of Development
9. Minister of Agriculture
10. Minister of the Quality of Life
11. Minister of Labor
12. Minister of Health
13. Minister of Industry and Research
14. Secretary of State for Transportation
15. Secretary of State Government Spokesman
16. Prime Minister Chairman of the Committee
17. General Secretariat of the Committee
18. General framework of nuclear regulation
19. Organization of nuclear safety
20. nuclear group
21. inspectors
22. interdepartmental services of industry and mines
23. permanent groups:
 - . reactors
 - . accelerators
 - . other
24. nuclear facilities:
 - . power reactors
 - . other
 - . CEA facilities

25. Ministry of Industry and Research

26. Key:

acronym:

CIINB	Commission Interministerielle des Installations Nucléaires de Base (Interministerial Committee for Basic Nuclear Facilities)
DGE	Délégation Générale à l'Energie (General Energy Board)
DIGEC	Direction du Gaz, de l'Electricité et du Charbon (Gas, Electricity and Coal Directorate)
DM	Direction des Mines (Mines Directorate)
SCSIN	Service Central de Sûreté des Installations Nucléaires (Central Service for Safety of Nuclear Facilities)
CEA	Commissariat à l'Energie Atomique (Atomic Energy Commission)
IPSN	Institut de Protection et de Sûreté Nucléaire (Nuclear Protection and Safety Institute)
DSN	Département de Sûreté Nucléaire (de l'IPSN) (Nuclear Safety Department (of the NPSI))

Relations:

- . hierarchical
- . supervision or control
- . other

APPENDIX 2

Licensing procedure for (basic) nuclear facilities

Licensing application (filed by the operator)
+ preliminary safety report

Ministry of Industry and Research (MIR)
Central Service for Safety of Nuclear Facilities (SCSIN)

Public Inquiry	Consultation of interdepartmental services of Industry and Mines (SIIM)	Consultation of other ministries: <ul style="list-style-type: none"> . Health . Quality of Life . Development . Interior . Agriculture . Culture . Transportation
see procedure for declaration of public interest		

Examination of preliminary safety report by the Nuclear Protection
and Safety Institute (IPSN)

Presentation of safety assessment report

Decision of permanent group (GP) (experts, administration)

Decision of ministries

Consultation of the Interministerial Commission for Basic Nuclear
Facilities (CIINB)

Draft Decree

Consultation of Minister of Health

(favorable decision)

Licensing Decree

(Prime Minister + MIR)

Construction

+ provisional safety report
(examined by IPSN and GP)

for reactors: authorization
for fuel loading, tests and criticality (MIR/SCSIN)

general
supervision
(CIINB inspectors)
and supervision
of observance of
general technical
regulations
by
representatives
of the SIIM for
the primary
circuit of NSS
systems

commissioning

+ provisional safety report
(examined by IPSN and GP)

approval for operation (MIR/SCSIN)

operation

shutdown and decommissioning

APPENDIX 3

February 1977

Simplified chart showing procedure for declaration of
public interest (for nuclear power plants)

Application (filed by the operator)
+ file

Ministry of Industry and Research (MIR)
Gas, Electricity and Coal Directorate (DIGEC)

other ministries and Central Service for Safety of Nuclear Facilities (SCSIN)	Consultation Interdepartmental Service of Industry and Mines (SIIM) Consultation	Préfet(s)	Information to elected representatives and personalities
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other local services (interservice conference)	observations SIIM applicant (answers)
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SIIM

observations

MIR (DIGEC)

- . possible changes in file
- . decision concerning public inquiry

	modification		
	SIIM	Préfet(s)	
	consultation	modified file	inquiry
			Inquiry Commission
other local services			Report and Conclusions
	observations	Préfet(s)	
	SIIM		
		file + decision	
	applicant (answers)		
	SIIM (overall report)	Préfet(s)	Circulation of conclusions of inquiry
conclusions of inquiry			
	MIR (DIGEC)		
final decision		see procedure for licensing	
	draft Decree		
	Council of State		
	Decree for declaration of public interest (Prime Minister + MIR)		

APPENDIX 4

Situation of nuclear power plants and main fuel cycle plants in operation, under construction or planned in France

A NUCLEAR POWER PLANTS1 Graphite-gas reactors

. Bugey 1 (Ain)

1 reactor 540 MWe:

- . declaration of public interest 6 May 1966
- . building licence 22 November 1968
- . situation: in service since 1972

. Chinon 1, 2, 3 (Indre-et-Loire)

3 reactors 80, 200 and 400 MWe:

- . declaration of public interest (for information)
- . situation:
 - . Chinon 1: commissioned in 1963
 - shutdown since 1973
 - . Chinon 2: in service since 1965
 - . Chinon 3: in service since 1966

. Saint Laurent 1, 2 (Loir-et-Cher)

2 reactors 500 MWe:

- . declaration of public interest (for information)
- . building licence 22 November 1968
- . situation:
 - . Saint Laurent 1: in service since 1969
 - . Saint Laurent 2: in service since 1971

2 Heavy water-gas reactor

Brennilis (Finistère)

1 reactor 70 MWe:

- . declared of public interest on 27 May 1964
- . situation: in service since 1967

3 Pressurized water reactors

3.1 300 MWe reactor

Chooz (Ardennes)

1 reactor 305 MWe:

- . declaration of public interest on 15 January 1964
- . situation: in service since 1967

3.2 900 MWe reactors

. Le Blayais (Gironde)

4 reactors:

- . declaration of public interest (for 4 reactors) 29 December 1975
- . building licence (for 2 reactors) 14 June 1976
- . situation:
 - . under construction
 - . industrial commissioning expected 1981/1982

. Le Bugey 2, 3, 4, 5 (Ain)

4 reactors:

- . declaration of public interest:
 - . Bugey 2, 3 6 May 1966
 - . Bugey 4, 5 6 January 1976

- . building licence:
 - . Bugey 2, 3 20 November 1972
 - . Bugey 4, 5 27 July 1976
- . situation:
 - . Bugey 2, 3: construction nearing completion, industrial commissioning expected 1977/1978
 - . Bugey 4, 5: under construction, industrial commissioning expected 1978/1979
- . Cattenom (Moselle)
 - 2 reactors:
 - . declaration of public interest, application filed on 28 July 1976
 - . building licence, request not filed
- . Chinon 4, 5 (Indre-et-Loire)
 - 2 reactors:
 - . declaration of public interest, application filed on 24 October 1973
 - . building licence, request not filed
 - . situation: industrial commissioning expected 1981/1982
- . Cruas (Ardèche)
 - 4 reactors:
 - . declaration of public interest, application filed on 16 January 1976
 - . building licence, request not filed.
- . Dampierre-en-Burly (Loiret)
 - 4 reactors:
 - . declaration of public interest 17 May 1974
 - . building licence 14 June 1976
 - . situation:
 - . under construction
 - , industrial commissioning expected 1979/1980/1981

- . Fessenheim (Haut-Rhin)
 - 2 reactors:
 - . declaration of public interest 15 September 1971
 - . building licence 3 February 1972
 - . situation:
 - . Fessenheim 1: undergoing tests, industrial commissioning expected May 1977
 - . Fessenheim 2: construction nearing completion, industrial commissioning expected August 1977

- . Gravelines (Nord)
 - 4 reactors:
 - . declaration of public interest 7 November 1975
 - . building licence:
 - . applied for 2 May 1974
 - . expected 1977
 - . situation:
 - . starting construction
 - . industrial commissioning expected 1979/1980/1981

- . Saint Laurent 3, 4 (Loir-et-Cher)
 - 2 reactors:
 - . declaration of public interest 26 February 1974
 - . building licence:
 - . applied for 14 November 1975
 - . expected 1977
 - . situation:
 - . starting construction
 - . industrial commissioning expected 1981

- . Tricastin (Drôme)
 - 4 reactors:
 - . declaration of public interest 6 August 1975
 - . building licence 2 July 1976
 - . situation: under construction, industrial commissioning expected 1979/1980

3.3 1300 MWe reactors

- . Cattenom (Moselle)

2 reactors:

- . declaration of public interest, application filed on 28 July 1976
- . building licence, application not filed.

- . Flamanville (Manche)

4 reactors:

- . declaration of public interest, application filed on 18 February 1976
- . building licence (2 reactors):
 - . application filed on 18 October 1976
 - . expected 1978
- . situation: start of site development, industrial commissioning expected 1983

- . Paluel (Seine-Maritime)

4 reactors:

- . declaration of public interest 23 July 1975
- . building licence:
 - . application filed on 30 April 1976
 - . expected 1977
- . situation: start of site development, industrial commissioning expected 1982/1983

- . Saint-Maurice l'Exil (Isère)

4 reactors:

- . declaration of public interest, application filed on 15 April 1976
- . building licence, application not filed.

- . Le Pellerin (Loire-Atlantique)
 - 4 reactors:
 - . declaration of public interest, application filed on 18 August 1976
 - . building licence, application not filed.

- 4 Fast neutron breeder reactors
 - . Phénix (Gard)
 - 1 reactor 230 MWe:
 - . building licence 31 December 1969
 - . situation: in service since 1973

 - . Creys-Malville (Isère)
 - 1 reactor 1200 MWe:
 - . declaration of public interest:
 - . application filed on 17 July 1973
 - . expected 1977
 - . building licence:
 - . application filed on 28 March 1974
 - . expected early 1977
 - . situation: starting construction, industrial commissioning expected 1981

B FUEL CYCLE PLANTS

- . Eurodif (Drôme)
 - 1 plant for isotopic separation of uranium by gaseous diffusion (10.8 million SWU):

- . declaration of public interest 2 April 1975
- . building licence:
 - . application filed on 2 May 1974
 - . expected 1977

La Hague (Manche)

1 irradiated fuel reprocessing plant:

- . declared of public interest on 27 May 1964
- . in service since 1966

Modification for reprocessing of oxidized
fuels (4 tons per day):

- . building licence 17 January 1974
- . situation: construction under way,
industrial commissioning expected 1978

APPENDIX 5

Safety of pressurized water reactors

BASIC TECHNICAL ALTERNATIVES

List of topics examined

- 1 General design principles in accordance with the various plausible situations of the power plant
- 2 Site plan
 - (a) Separation of reactors.
 - (b) Orientation of turbine-generator plant.
- 3 Determination of levels of different buildings

Fuel cooling and 'at ground level' or 'raised'.
- 4 Electrical installations

Grouping or dispersion of electrical power supply and control and monitoring equipment.
- 5 Containment and penetrations of main steam piping
- 6 Fuel handling building and cooling pond crane
- 7 Nuclear auxiliaries building

Equipment layout in this building.
- 8 Vessel pit design
- 9 Primary fluid activity level and radiological protection
- 10 Fallback

- 11 Main primary circuit
 - (a) General design basis.
 - (b) Circuit dimensions and analysis of mechanical behavior.
 - (c) Selection of materials.
- 12 Main primary circuit
 - Monitoring in operation.
- 13 Flywheels of primary pumps
- 14 Steam generators
 - General design.
- 15 Steam generators
 - . Behavior in case of fracture of main steam piping or loss of primary coolant.
 - . Tube monitoring method.
- 16 Steam generators
 - Tube corrosion.
- 17 Nuclear fuel
- 18 Loss of coolant accident (LOCA)
 - Safety injection system.
- 19 Loss of coolant accident (LOCA)
 - Effectiveness of core emergency cooling systems.
- 20 Reactor building
 - Installation of equipment; accessibility.
- 21 Core internal components

