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REPORT FROM THE COMMISSION TO THE COUNCIL AND TO PARLIAMENT

APPLICATION OF ARTICLE 37 OF THE EURATOM TREATY

SURVEY OF ACTIVITIES
EXPERIENCE GAINED
1959 - 1981

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ABSTRACT

Article 37 of the EURATOM Treaty stipulates that each Member State shall submit to the Commission such general data concerning any plan for the disposal of radioactive waste as will enable the Commission to give its opinion whether or not the implementation of such a plan is likely to involve radiological consequences in another Member State.

In the 22 years during which this Article has been applied, the Commission has issued 94 Opinions relating to 149 nuclear installations.

This report, in part responding to a request from the European Parliament, reviews the procedure followed in formulating such Opinions, the focal points of the examination of a disposal plan and the experience thereby acquired. The last-mentioned has been taken fully into account in the revision of the Recommendation relating to the application of Article 37, as approved by the Commission on February 3rd 1982.

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I. INTRODUCTION

Title 2, Chapter III ("Health Protection") of the Treaty establishing the European Atomic Energy Community (EURATOM) imposes the following obligations upon Member States as regards the discharge of radioactive waste from nuclear installations.

Article 37

"Each Member State shall provide the Commission with such general data relating to any plan for the disposal of radioactive waste in whatever form as will make it possible to determine whether the implementation of such plan is liable to result in the radioactive contamination of the water, soil or airspace of another Member State.

The Commission shall deliver its opinion within six months, after consulting the group of experts referred to in Article 31".

A further article of the Treaty, Article 38, defines the measures to be taken by the Commission to prevent infringement of the EURATOM Basic Safety Standards with regard to the level of radioactivity in the air, water or soil in any Member State.

After what now amounts to over twenty years' experience of the application of these provisions of the EURATOM Treaty, it seems appropriate to present a comprehensive review of the role of Article 37 in the approach to radiation protection adopted by the Commission and to take stock of the work that has been carried out under the terms of this Article, with an appraisal of the experience gained and the lessons that have been learned. The present report is intended to constitute, in particular, the first of the annual reports concerning the application of Article 37 and the experience gained therefrom that have been called for by the European Parliament 1).

1) Resolution, dated 20th November 1980, on the siting of nuclear power stations in frontier regions
O.J. C 327 Vol 23, pp 34-35, 15/12/80

II. PROCEDURES FOLLOWED IN APPLICATION OF ARTICLE 37

Since Article 37 provides the only legal basis, within the framework of the Treaty, for the Commission receiving from the Governments of the Member States certain data relating to the radiological safety ¹⁾ of nuclear projects, it is understandable that the mandate actually laid down in Article 37 has frequently been seen, incorrectly, as an instrument which may, by extension, be used to handle all problems specific to such projects. The description given below of the procedures followed in application of Article 37 therefore starts with the 1960 Recommendation which allows a better understanding of this point. The procedure used in examining waste disposal plans is then reviewed and the most significant points raised in opinions delivered by the Commission are discussed.

1. Recommendation concerning the application of Article 37 adopted by the Commission in 1960

The first application of Article 37 was preceded, in the period 1959/60, by an exchange of views on the interpretation and objectives of this Article and the procedure to be followed from the notification of a waste disposal plan to the delivery of the Commission's opinion under the terms of the Treaty. The group of experts ²⁾ cited in the Article realized at an early stage that certain, mainly technical terms in the Treaty would need elucidation to ensure that it could be applied as uniformly as possible throughout the

1) It should be noted that the term "nuclear safety" (e.g. in the sense of "reactor safety") is not to be found in the text of the EURATOM Treaty.

2) For the composition of the Group of Experts see Appendix I.

Community. It should be remembered, in this context, that Article 37 was written in only on the day preceding the signature of the Rome Treaties (at the eleventh hour, so to speak), without detailed discussion. It must also be remembered that, at that time ¹⁾, the original six signatory States possessed little experience of the discharge of radioactive wastes (particularly from nuclear installations of an industrial nature), which explains why certain phrases in this passage from the Treaty are couched in rather general terms. They were meant to be so interpreted as to ensure meaningful application - where appropriate, on the basis of such specialized knowledge as might be acquired in the course of time or of other experience relevant to their technical significance. The first question to resolve was what plans, i.e. disposal plans, for what installations should be subject to the procedure provided for in the Treaty and what evidence should form the basis of the Commission's opinion in each case.

There is in fact no generally recognized definition of the level above which wastes should be regarded as "radioactive", and the same applies to "radioactive contamination". Nor is it immediately obvious which aspects of a waste disposal plan should be covered by the "general data" stipulated in the Treaty.

1) The Treaties of Rome were signed on 25th March, 1957

The discussions on these points resulted in a Recommendation concerning the application of Article 37 which was approved by the Commission on November 16th, 1960 /1/. The essential points of this Recommendation, which is addressed to all Member States, are summarized below.

Since the Treaty implies that the health protection aspects are of essential importance in the assessment of a waste disposal plan, it is obvious that the Euratom Basic Safety Standards /2/, which were drawn up in accordance with Article 30 of the Euratom Treaty, constitute the main authority to which reference should be made. This is why any attempts to define more precisely the wording of Article 37 had to take account of these Basic Safety Standards.

For the purposes of this Article, therefore, "disposal of radioactive waste" was deemed to mean "any definitive release into the air, water or soil of radioactive substances that can cause, for persons other than those occupationally exposed, a contamination involving a danger of exceeding the maximum permissible dose for the general population as fixed in the Basic Safety Standards in pursuance of Article 31 of the Treaty".

Thus, it is this health aspect alone, and not the type of installation (laboratory, power station, reprocessing plant, etc) or its capacity or location, which determines whether a project is subject to the provisions of Article 37. Member States are, however, at liberty to submit to the Commission individual projects which do not come under the definition given above but for which they would welcome the opinion of the group of experts.

The aforesaid Recommendation also specifies:

- what comprises the "general data" ¹⁾ for the purposes of Article 37;
- that the general data should be submitted at least 6 months before the date set for the disposal plan to be put into operation;
- which plans are to be regarded as involving releases of "radioactive waste";
- that simple handling and temporary storage of radioactive waste is not regarded as "disposal";
- that the nuclear installations already in service in 1960 were to be listed, and that the data on their waste discharges under normal operating conditions were to be entered on record.

In addition, at the request of the Atomic Questions Group, the Secretariat of the Council of the EAEC defined more precisely, in a note dated 12th January 1962 (see Appendix II), the obligations imposed upon the Member States pursuant to Article 37 with regard to supplying the required data and the completeness and correctness thereof. It emphasized in particular that the Commission should also be notified of any substantial modifications made to plans previously submitted, insofar as they are relevant to the aspects covered by Article 37.

1) The list of general data set forth in the Appendix to this Recommendation was revised for the first time in 1973 to take account of experience acquired up to that date.

This note also emphasized the fact that to grant official authorization for the implementation of any plan without having first obtained the Commission's opinion would be inconsistent with the spirit of Article 37 and would rob the latter of all practical significance.

In this respect, it is worthwhile noting that two Member States, Belgium and Italy, have made explicit reference to Article 37 in their legislation on the authorization of nuclear installations. The Belgian Royal Decree of 28th February 1963 /3/ specifies that the opinion of the Commission pursuant to Article 37 must be obtained before granting authorization for the operation of major nuclear installations, while Article 42 of Decree No. 185 (1964) of the President of the Republic of Italy /4/ stipulates that the "general data" must be submitted to the Commission before any disposal plan is authorized.

2. Examination of submissions

It must be expected that the completeness and accuracy of the general data concerning any plan for the disposal of radioactive waste will have been checked before it is submitted to the Commission by the government of the Member State in question (cf. the Council Note in Appendix II).

The successive stages of the procedure, which meets the requirements of the Treaty, are as follows:

- (1) Submission of the general data to the Secretary General of the Commission by the Member State
- (2) Verification, by that Commission department which provides the Secretariat to the Group of Experts that the general data are complete and, if necessary, collection of any missing information
- (3) Preparation, by the Secretariat to the Group of Experts, of a study of the waste disposal plan, to serve as a working document for examination at the experts' meeting
- (4) Meeting of the group of experts
and compilation of the
Report of the Group of Experts to
the Commission) Consultation
of the group
of Experts
- (5) Compilation of a draft of the opinion required by the Treaty and Approval thereof by the Commission
- (6) Communication of the Commission's opinion to the Government of the Member State concerned, within the six-month period allowed, and where appropriate transmission of all or part of the opinion, to any neighbouring Member State concerned.

Insofar as the documentation is submitted only in the language of the Member State concerned, translation and reproduction is a relatively time-consuming process.

The actual process of consulting the experts is Stage 4 of the sequence outlined above. To ensure that any technical questions can be answered, the meetings are attended not only by representatives of relevant Commission departments but also by representatives of the government of the Member State submitting the data.

In addition to a brief description of the installation and its monitoring and safety equipment, the report then compiled by the experts generally contains an analysis of the possible radiological consequences of:

- discharges of gaseous radioactive effluents during normal operation;
- discharges of liquid radioactive effluents and solid radioactive wastes during normal operation;
- unplanned releases which may occur in the event of an accident.

The report finishes with a statement of whether and to what extent the implementation of the waste disposal plan is liable to result in contamination in another Member State.

On the basis of the experts' report, the Secretariat, in collaboration with the Legal Department of the Commission and with Directorate-General XII¹⁾, draws up a draft of the Commission Opinion required by the Treaty which is then submitted to the Commission, usually by written procedure, for its approval.

1) Directorate-General "Science, Research and Development"

The procedure is completed by the communication of the Opinion thus produced to the Government of the Member State which submitted the waste disposal plan. For ease of understanding of the technical factors on which the Opinion was based, the report compiled by the group of experts is frequently enclosed. Furthermore, if other States (whether Member States or non-member countries) could be affected by the discharges in question, they are notified, in an appropriate way, of the conclusions of the study or of other aspects of the Opinion of special relevance to them.

3. Essential features cited in Opinions on waste disposal plans

The above description of the content of the reports submitted by the experts to the Commission on waste disposal plans, simply by mentioning the essential features of the investigation, gives some indication of the various problems involved.

On the one hand, it is obvious that the scope of Article 37 does not include a complete safety analysis of the type usually required as part of the nuclear installations licensing procedure ¹⁾. On the other hand, the opinions issued in application of the Treaty are essentially dependent on the consequences that may arise in the event of an accidental release. It can therefore be seen that it is, in practice, necessary to refer repeatedly to the results of the safety studies on which the national authorities base the granting of permits for the siting, construction and operation of nuclear installations. The original view, that Article 37 was confined, in its application, to "planned releases" has been replaced over the years by a broad interpretation extending its application to accidental releases, i.e. the principle is that every project, and in particular every waste disposal plan, must be examined to ascertain whether the plan presented can be adhered to and the consequences of any failure to do so.

1) See footnote 1) to page 3

Normal discharges. Normal discharges include not only continuous discharges but also variations which reflect the need for a certain degree of flexibility in the operation of a plant 1). Observance of the stringent provisions of the Basic Safety Standards implies the elimination of any possible hazard to the areas surrounding the site as a result of such discharges, and it is barely credible that any significant amount of activity could carry to a neighbouring country (e.g. through take up in clouds and subsequent rain-out).

There are, however, special cases in which "normal" discharges call for attention under the terms of Article 37. This may be so, for example, when liquid effluent is discharged into a river which impinges on the territory of another Member State. Apart from the problems associated with the dilution capacity of such rivers, the question may arise of an unremarked significant increase in radioactivity levels (e.g. in river-borne sediment or as a result of utilization of the water for irrigating crops). The monitoring of the radioactivity of such a body of water should then be organized under a bilateral or multilateral agreement, depending on the number of States involved, and in such cases the Commission can provide the appropriate stimulus 2).

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- 1) These are referred to in French as 'rejets concertés' (planned releases). The phrase 'rejets exceptionnels concertés' ('planned exceptional releases') is also sometimes used in contrast to 'normal' (= planned) discharges; releases in the former category, during which the release rates are temporarily higher than during quasi-continuous releases, are associated with specific operating conditions and occur particularly in the case of reactors and reprocessing plants.
 - 2) Recently, for example, a stimulus of this kind has been given for co-ordination of radioactive effluent discharges into the River Meuse by the riparian states involved.

Gaseous discharges under normal operating conditions usually need to be closely examined under the terms of Article 37 only in the case of installations sited so close to a frontier that even surveillance of the environmental effects of routine discharges necessitates collaboration with the competent authorities in the neighbouring country or in cases where the proximity of several nuclear installations close to a frontier means that superposition of the respective discharges must be expected.

To date the minimum distance from the frontier of a neighbouring country for a site investigated under Article 37 1) is 1500 m, in the case of Fessenheim nuclear power station (2 units) in France. In a number of other cases (Doel I, II, III and IV in Belgium and the SENA nuclear power station 2) in the Ardennes region of France), the frontier is within a few kilometres of the site.

Unplanned releases. Whereas the majority of routine and specific planned discharges present few problems under the terms of Article 37, unplanned releases, as previously remarked, are important in this context. It is only in the event of uncontrolled, i.e. accidental, releases that larger quantities of activity are liable to be liberated and cause significant contamination even at appreciable distances from the site.

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- 1) Excluding the case of the Remerschen nuclear power station in the Grand Duchy of Luxembourg, which has never passed beyond the planning stage.
 - 2) In this case the Belgian and French Governments resolved the problems of radiological protection procedures at an early stage, under the terms of a special agreement /5/.

The safety reports regularly include the analysis of a range of hypothetical accidents. Of these, the accidents with non-negligible degrees of probability involving the most serious consequences for the environment are studied with particular attention by the group of experts when examining the discharge-plan, since their consequences are usually decisive in formulating the opinion required by the Treaty. Starting from the hypotheses adopted for these accidents, 1) the experts assess the consequences of the release of activity in the vicinity of the site in question (frequently basing their appraisal on their own calculations using conservative parameters) and then extend their study to the possible consequences in a neighbouring Member State, particularly in the latter's frontier region.

This form of procedure on the part of the experts ensures a uniform approach to the analyses and gives a continuity to the assessments of the reference accident consequences. It is this part of the experts' report in particular that demands close cooperation between the various disciplines represented within the group, not only in order to judge whether the accident hypotheses are justified but also in order to decide whether the calculations submitted are sound.

1) Referred to as "reference accidents"

One can thus expect to obtain a realistic idea, in terms of the information available and the assumptions accepted at the time of the assessment in each case, of the risk involved for the environment of the site and for the frontier zone of a neighbouring country over the lifetime of the nuclear installation concerned.

Assessment of the risk of contamination. The dilemma when it comes to assessing the risk of contamination of the area surrounding a nuclear site is the same as that which has generally to be faced when assessing the safety of a nuclear installation: on the one hand, notwithstanding its inherent risks, nuclear engineering has proved to be "safe" (or even, indeed, safer than certain other branches of human activity), while on the other hand we are still far from being in a position to quantify the degree of safety with sufficient accuracy. What we lack here, precisely because accidents involving the release of significant activity have been extremely rare, are the probability factors by which the assumed consequences of an accident would have to be multiplied to reach any conclusion regarding the risk in its fullest sense.

It must also be borne in mind that when it is a matter of assessing the site for a nuclear power station, the surrounding population is unlikely to be interested in the mathematical probability of the risk; what they really want to know is, "What could happen to us?" In other words they want to be told what the consequences of the operation of a power station in their vicinity might be for their health. Thus, they want to know (individually and not collectively) the upper limit of the health hazard associated with the reference accident. The only meaningful way of obtaining this maximum value is to calculate the doses which the individual members of the population in question could conceivably receive.

For the purposes Article 37, the possible exposure of the population involved in each case has to be evaluated in the same way when assessing the risk of contamination. These individual doses, calculated on the basis of conservative hypotheses, thus become the decisive criteria in forming an opinion. Further, through their comparison with dose limits or reference levels, they also play a major role in planning such radiation protection and intervention measures as may need to be taken. Collective doses are of little merit in this context since the necessary averaging over larger population groups conceals the contribution from the maximum values of individual doses.

Trans-frontier cooperation. Article 37 is so formulated that its legal effect is exhausted by the Commission's issuing the opinion provided for therein. If, therefore, the health and safety objectives set out in Article 2 (b) and clearly underlying Title two, Chapter III, of the EURATOM-Treaty, are to be effectively realized, then there must be, subsequent to the issue of the opinion, close cooperation between the Member States concerned in each case.

Attention has already been drawn to the circumstances in which cooperation between neighbouring States may be necessary even in connection with normal discharges.

But smooth cooperation between the authorities on both sides of the frontier becomes a far more crucial factor in the event of a serious accident resulting in the release of activity from a nuclear installation. In such cases, time is of the essence and information has to be promptly transmitted

so as to ensure that the population are not unnecessarily put at risk or alarmed. Hence, in Opinions issued under the terms of Article 37, the Commission has recommended, where appropriate, that advance contacts be established between the competent authorities in neighbouring countries, with a view to minimizing the constraints imposed by national frontiers in respect of:

- the activation of a rapid trans-frontier alarm system;
- the transmission of urgent instructions with regard to radiation protection;
- the exchange of information on the development of accident situations and on the observed consequences of accidents in the surrounding area.

In the case of nuclear installations sited near to national frontiers, a particular emphasis is also placed on the desirability of carrying out trans-frontier exercises even such as those designed to ensure the prompt operation of communication systems. Such practical aspects are necessarily the subject of particular attention in meetings with the competent authorities and are held to be of greater importance than any formal agreements concluded between the governments concerned.

III. WASTE DISPOSAL PLANS SUBMITTED TO THE COMMISSION

As of 31st December 1981, the Commission had received the general data in respect of 94 plans for the disposal of radioactive waste, relating in all to 149 nuclear units and had delivered its opinions accordingly. Some of these notifications were particularly complex, as in the case of the research centres at JÜLICH and KARLSRUHE, the ISPRA Joint Research Centre, and industrial installations such as EUROCHEMIC, for which a single waste disposal plan related to a whole series of laboratories or other nuclear installations.

The breakdown of these submissions by Member States is as follows:

Member State	Number of notifications	Number of installations concerned
Belgium	16	28
Denmark	-	-
F.R. of Germany	35	47
France	22	43
Greece	-	-
Ireland	-	-
Italy	7	12
Luxembourg	1	1
Netherlands	5	5
United Kingdom	8	13
Total	94	149

These submissions cover a wide range of projects, viz.:

- teaching and research reactors,
- radiochemical and metallurgical laboratories,
- power reactors of various types,
- enrichment plants,
- fuel element fabrication plants,
- installations for the storage of irradiated fuel,
- fuel reprocessing plants
- the nuclear-powered ship 'Otto Hahn'
- handling and storage facilities for radioactive wastes
- controlled sea-dumping of radioactive waste.

In some cases, when major modifications have been made to the capacity or to the plant process, several opinions have been delivered with respect to a single installation.

The individual installations for which the Commission has delivered opinions on the plans for the disposal of radioactive waste are listed, country by country, in Appendix III. It should be noted that, without exception, every plan for the disposal of radioactive waste from the type of installation on which public interest is concentrated, namely nuclear power stations, has been examined under the terms of Article 37 of the Treaty.

IV. EXPERIENCE ACQUIRED AND PROGRESS ACHIEVED

1. Experience acquired

As was to be expected, the tendency, already noted in the previous report on the present topic /9/, towards industrial scale nuclear installations instead of research facilities and to larger generating capacities on any given site has continued.

The Article 37 procedure is one of the few means available to the Commission for obtaining an up-to-date picture of the practical problems of radiological protection of the environment. The examination of discharge plans with reference to the aspects discussed above corroborates a substantial fund of experience gathered elsewhere which confirms nuclear technology is "favourable" to the environment. This experience can be summarized as follows.

N o r m a l d i s c h a r g e s . The levels foreseen for routine discharges from nuclear installations studied are invariably so low that throughout the surrounding areas the corresponding exposure of the population is in all cases very much lower than the maximum permissible doses laid down in Article 12 of the EURATOM Basic Safety Standards /2/.

As shown elsewhere /6/ 1), the actual discharges from the major nuclear installations - i.e. power stations and reprocessing plants - amount to a fraction of the corresponding foreseen or authorized maximum values. It should also be noted, in this connection, that the past 23 years have seen a considerable improvement in our understanding of the operational behaviour of even large capacity nuclear reactors and their associated installations.

The favourable operational experience gained is also reflected in the continuing downward trend 2) in discharge limits and in the actual discharges normalized to power generated 3). It has therefore been rare to find high discharge limits, as compared with the more customary values, such as would prompt a recommendation for a particularly close watch to be kept on operating practice in the installation in question or for a reappraisal of the need to maintain such limits. Hence to date it has not proved necessary to fall back on the implementation of Article 38.

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- 1) The Commission periodically reviews the discharges from the more significant nuclear installations, which serves to confirm in practice the information received in plans submitted.
 - 2) This trend is visible evidence of the observation, in practice, of the principle laid down in the Basic Safety Standards whereby "all exposures should be kept as low as reasonably achievable" /7/, corresponding to the ALARA principle of the ICRP.
 - 3) In the period 1970-78, for example, the discharge of noble gases was reduced in the European Community from an average of 25 Ci/MWa to 2 Ci/MWa, and the normalized values for liquid effluent discharges in 1978 were on average less than one third of the 1970 values.

E x p o s u r e o f t h e p o p u l a t i o n . The doses to which the population might possibly be exposed as a result of these discharges are correspondingly low. This is confirmed by the data summarized in Appendix IV for the immediate vicinities of the nuclear power stations in the European Community. The figures show that the doses to individuals are on average around 1 % or less of the dose limits ¹⁾; in other words, they lie within the range of regional and temporal variations about the average level of natural background radiation, which is generally recognized to be about 1 mSv/a (0.1 rem/a).

A c c i d e n t a n a l y s e s . It can be concluded on the basis of the studies of the possible consequences of hypothetical accidents for a wide variety of nuclear installations (see Section III) carried out during the period under review, that significant contamination with effects extending over large distances into a neighbouring country is conceivable only in the event of serious accidents occurring in certain well defined categories of nuclear installations in particular nuclear power plants and, to a lesser degree, reprocessing plants. As is clear from the present report, the Commission pays particularly close attention to these types of installation in the context of Article 37.

No accidents resulting in a significant environmental impact following the release of activity have yet been recorded within the Community. Furthermore, the analyses carried out to date suggest that the foreseeable consequences for a neighbouring country could generally be kept within acceptable limits simply by administrative measures, e.g. restrictions on the consumption of locally produced foodstuffs.

1) The whole-body dose limit for individual members of the population is 5 mSv/a (0.5 rem/a), /8/.

Nuclear sites near national frontiers. The available cooling capacity is well known as one of the decisive criteria for siting of nuclear power stations, and this has resulted in a certain degree of competition for sites on the coast and along the major rivers. The geography of the European continent, particularly as regards the situation of the Rhine, the Moselle, the Meuse, and the Ems, is such that a whole series of nuclear power plants, often comprising several units, have been constructed or are to be constructed in close proximity to national frontiers.

The sites of the major nuclear installations in the Community, both operational and under construction, which are located close to national frontiers of Member States are listed in Appendixes V and VI.

In some 20 % of Opinions on disposal plans issued by the Commission in the context of Article 37, it has been judged opportune to make a recommendation concerning co-operation between neighbouring Member States as regards possible accidents in nuclear installations which could have consequences reaching beyond the national frontier. Although no special problems have so far arisen with sites located close to frontiers it was deemed advisable to provide for the submission of waste disposal plans for nuclear power plants and fuel reprocessing plants at an earlier juncture than hitherto stipulated. See also Section V.

2. Progress achieved

The generally satisfactory experience outlined in this report also reflects the, to some extent parallel, harmonization achieved as regards the technical aspects of radiological protection. Although, as far as regulations are concerned, the Basic Safety Standards /2/ referred to several times in the present report have constituted a basis for a harmonized approach to the problems of radiation protection, considerable efforts have been and still are required to implement this harmonization on a wide front. This is the purpose behind the technical cooperation that has been instituted at various levels. As regards the procedural aspects, harmonization of the application of Article 37 has already been largely achieved. The following paragraphs are devoted to these two aspects.

T e c h n i c a l c o o p e r a t i o n . On the basis of the experience acquired in the application of Article 37, a wide-ranging programme of cooperation has been introduced at various levels under which progress has been made towards harmonization on outstanding technical problems and the supply of more detailed information has been improved, particularly in the following fields which have been the subject of seminars, experts' meetings and published reports:

- Methodology for evaluating the radiological exposure of the population /10/;
- Verification procedures and characteristic values for the efficiencies of iodine and aerosol filters /11/, /12/, /13/;
- Surveys of radioactive discharges from nuclear power stations and reprocessing plants in the Community /6/;

- The radiological exposure of the population in the Rhine-Meuse Region /14/;
- Collection of data regarding the exposure of the population of the Community to natural background radiation /15/;
- Criteria and reference dose levels for radiological protection and intervention measures in the event of radiological exposure of the population resulting from a nuclear accident /16/.

The examination of plans for the disposal of radioactive waste has thus provided a welcome opportunity for identifying problems and defining unresolved technical questions in the field of radiological protection, the treatment of which and answers thereto are of interest in a wider context than that of Article 37.

A r t i c l e 3 7 p r o c e d u r e s . With regard to the Article 37 procedures per se, it should be noted that delays in the communication of and major gaps in the general data have become less frequent in the course of the period under review and also that, where such gaps have occurred, they have been more quickly rectified, so that the procedures stipulated by the Treaty have run more smoothly. In particular, as previously noted, the general data for all operational plants of the type on which public interest is most closely focussed, i.e. nuclear power stations, have been duly examined.

As a result of the technical cooperation mentioned previously a greater uniformity of technical language in the communications submitted by the various Member States and of

the approach to assessing discharges and their consequences has been realized. In spite of this generally encouraging experience, it seems desirable that the Commission should in future be provided with certain additional information and this is one of the aims of the aforementioned revised version of the Recommendation concerning the application of Article 37 discussed further in Section V below.

V. REVISION OF THE RECOMMENDATION CONCERNING THE APPLICATION
OF ARTICLE 37

On the basis of more than 22 years' experience of the application of Article 37 in accordance with the provisions of the 1960 Recommendation, /1/ it seemed advisable to revise the text of the Recommendation to bring it into line with current needs. It seemed in fact worthwhile, in view of the technical developments in the nuclear field with the accompanying quantitative and qualitative changes in the associated radioactive effluents, to formulate a clearer definition of the actual concept of 'the disposal of radioactive waste' taking account of the potential risk of exposure and to compile a new version of the list of 'general data' 1) corresponding to each category of nuclear installation.

It has also become clear that it is imperative for the Commission to receive general data in respect of the most important types of nuclear installations, namely nuclear reactors and reprocessing plants, at an earlier juncture than hitherto 2), namely before construction starts. This would permit the airing, at a preliminary examination, of any specific bilateral problems resulting from the disposal plan in question, with a view in particular to the timely establishment of bilateral contacts.

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- 1) The list of 'general data' has been once previously revised, in 1973. (See /9/ and Annex V).
 - 2) The European Parliament has also drawn attention, on several occasions, to the need of such advance information.

To facilitate the implementation of certain recommendations in Opinions formulated by the Commission, it appeared advisable to require the data, submitted under Article 37, wherever possible one year prior to the planned commissioning of the installation in question.

The Recommendation also calls for the submission at regular intervals of reports on discharges from individual fuel cycle installations (every 2 years) and on total discharges (every 5 years) by small-scale users of radionuclides, into bodies of water or river systems. This information will provide the Commission with background data for the calculation of existing exposure rates and are intended to facilitate the formulation of the Commission's Opinion with regard to individual projects.

In line with technical developments, details are also given of the procedure for plans for the underground or marine disposal of radioactive waste.

This Recommendation, appended to the present report as Annex VI, was adopted by the Commission on 3rd Feb. 1982 /17/. It lays down the procedures for implementing the provisions of Article 37 in the years to come.

REFERENCES

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- /1/ "Recommandation de la Commission concernant l'application de l'article 37 du Traité"
J.O. *) 3e année, N° 81, 1893-1896, 1960
- /2/ The EURATOM Basic Safety Standards are laid down in the following Directives by the Council of Ministers:
- "Directives fixant les normes de base relatives à la protection sanitaire de la population et des travailleurs contre les dangers résultant des radiations ionisantes"
J.O. 2e année, N° 11, 221-239, 1959
 - "Directive portant révision des annexes 1 et 3 des directives fixant les normes de base en matière de protection sanitaire"
J.O. 5e année, N° 57, 1633-1649, 1962
 - "Directive du Conseil du 27 octobre 1966, portant modification des directives fixant les normes de base relatives à la protection sanitaire de la population et des travailleurs contre les dangers résultant des radiations ionisantes"
J.O. 9e année, N° 216, 3693-3703, 1966
 - "Council Directive of June 1976 laying down the revised basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation"
J.O. Vol 19, N° L 187, 1-44, 1976
 - "Directive du Conseil du 15 juillet 1980, portant modification des directives fixant les normes de base relatives à la protection sanitaire de la population et des travailleurs contre les dangers résultants des rayonnements ionisants"
J.O. 23e année, N° L 246, 1-72, 1980

*) J.O. = Journal Officiel des Communautés Européennes

- /3/ "28 FEVRIER 1963 - Arrêté royal portant règlement général de la protection de la population et des travailleurs contre le danger des radiations ionisantes "
Moniteur Belge, 133e année, N° 98, 5206-5266, 1963;
cf. especially Art. 6.5 and 7.4.
- /4/ Decreto del Presidente della Repubblica Italiana
13 febbraio 1964, n. 185
"Sicurezza degli impianti e protezione sanitaria dei lavoratori e delle popolazioni contro i pericoli delle radiazioni ionizzanti derivanti dall'impiego pacifico dell'energia nucleare "
Gazzetta Ufficiale n. 95, Supplemento ordinario, 1-30, 16 aprile 1964;
cf. especially Art. 42, par. 2
- /5/ "Convention entre la Belgique et la France sur la protection radiologique concernant les installations de la Centrale nucléaire des Ardennes, et annexes, signée à Paris, le 23 septembre 1966 "
Moniteur Belge, 137e année, N° 45, 2276-2280, 1967.
- /6/ "Radioactive effluents from nuclear power stations and nuclear fuel reprocessing plants in the European Community - Discharge Data 1974/1978 - Radiological Aspects "
Commission of the European Communities (September 1980)
- /7/ Article 6 b) of the 1980 Directive, v. /2/
- /8/ Article 12 (2) of the 1980 Directive, v. /2/
- /9/ "Application of article 37 of the EURATOM Treaty - Survey of activities - Experience gained 1959-72 "
Commission of the European Communities, Directorate General of Social Affairs, 1972
- /10/ "Methodology for Evaluating the Radiological Consequences of Radioactive Effluents released in Normal Operations "
Joint Report by the NRPB and the CEA
Commission of the European Communities (July 1979)

- /11/ "Proceedings Seminar on Iodine Filter Testing"
Vol. I and II
Commission of the European Communities 1974
- /12/ "Proceedings Seminar on High Efficiency Aerosol Filtration
in the Nuclear Industry"
Commission of the European Communities
Luxembourg, February 1977
- /13/ J.G. WILHELM
"Jodfilter in Kernkraftwerken"
Kommission der Europäischen Gemeinschaften,
Luxemburg 1976
- R.G. DORMAN
"A comparison of the Methods used in the Nuclear Industry
to test High Efficiency Filters"
Commission of the European Communities,
Luxembourg June 1981
- /14/ A. BAYER
"The Radiological Exposure of the Population of the
Rhine-Meuse Region"
Commission of the European Communities, June 1978
a revised edition of the report to be published
- /15/ "Proceedings Seminar on the Radiological Burden of Man
from Natural Radioactivity in the Countries of the Euro-
pean Communities"
Le Vésinet 4-6 December 1979
Commission of the European Communities
Luxembourg 1980
- /16/ "Radiological Protection Criteria for Controlling Doses
to the Public in the Event of Accidental Releases of
Radioactive Material"- A Guide on Emergency Reference
Levels of Dose from the Group of Experts convened under
Article 31 of the Euratom Treaty (in preparation)
- /17/ Commission Recommendation of 3 February 1982 on the
application of Article 37 of the EURATOM Treaty"
J.O. Vol. 25, No. L 83, 15-23, 1982

THE ARTICLE 37 GROUP OF EXPERTS

The group of experts referred to in Article 37 and established under the terms of Article 31 is the same group as that which collaborates in drawing up the Basic Safety Standards, so that its members are in particular experts in public health as stipulated in Article 31. It seemed appropriate, however, in view of the intrinsic technical problems in the assessment of the health risks inherent in the disposal of radioactive waste, that a number of technological experts should also be appointed to the group. Hence the Scientific and Technical Committee (STC), established under Article 134 of the Treaty, at its meeting on 13th October 1959, agreed that for the purpose of the tasks imposed by Article 37 the group should comprise six technological experts and six public health experts.

To ensure the presence of the more important technical disciplines at the meetings of the group, it soon proved necessary to increase the number of technical experts. Hence, at its meeting on 4th December 1962 the Scientific and Technical Committee has decided to appoint a further six technical experts to the group.

Following the enlargement of the Community through the accession of new Member States still, further members were brought into the group, which now has thirty members (see list below). Up to 31st December 1981, the group of experts had been convened on 57 occasions. These meetings, at which the plans submitted for the disposal of radioactive waste and any related problems are examined, usually take two or three days.

The Secretariat for the group of experts is provided by DG V/E/2 ¹⁾.

1) Division "Radioactive waste and prevention and safety measures in nuclear installations"

31.XII.1981

SACHVERSTÄNDIGENGRUPPE

GROUPE D'EXPERTS

EXPERTS' GROUP

(Article 37 of the EURATOM TREATY)

Mitglied seit
Membre depuis
Member since

Fachgebiet
Spécialité
Speciality

BELGIQUE

H. DOPCHIE 1960 Technique nucléaire
Directeur
Association Vinçotte
935, Ch de Waterloo
1180 BRUXELLES

Dr. A. LAFONTAINE 1968 Santé publique
Directeur
de l'Institut d'Hygiène et
d'Epidémiologie
14, rue Juliette Wytzman
1050 BRUXELLES

P. STALLAERT 1974 Santé publique
Ministère de l'Emploi et
du Travail
Administration de la Sécurité
du Travail
53, rue Belliard
1040 BRUXELLES

	<u>Mitglied seit</u> <u>Membre depuis</u> <u>Member since</u>	<u>Fachgebiet</u> <u>Spécialité</u> <u>Speciality</u>
<u>DANEMARK</u>		
L. HANNIBAL The National Board of Health National Institute of Radiation Hygiene Frederikssundsvej 378 <u>2700 COPENHAGEN</u>	1975	Health protection
O. WALMOD-LARSEN Health Physics Division Risø National Laboratory <u>4000 ROSKILDE</u>	1978	Health protection
<u>DEUTSCHLAND (BUNDESREPUBLIK)</u>		
M. TSCHERNER TUV-Rheinland Postfach 10 17 50 <u>5000 KÖLN 1</u>	1977	Strahlen- und Umweltschutz
Dipl.-Phys. L.F. FRANZEN Gesellschaft für Reaktor- sicherheit mbH Glockengasse 2 <u>5000 KÖLN 1</u>	1974	Kerntechnik
Dr. W. POHL Präsident des Bayer. Landesamts für Umweltschutz Rosenkavalierplatz 3 <u>8000 MÜNCHEN 81</u>	1969	Umweltschutz

	<u>Mitglied seit</u> <u>Membre depuis</u> <u>Member since</u>	<u>Fachgebiet</u> <u>Spécialité</u> <u>Speciality</u>
Dr.-Ing. Karl ZUEHLKE Kernforschungszentrum Karlsruhe GmbH Postfach 3640 <u>7500 KARLSRUHE 1</u>	1966	Kerntechnik
<u>FRANCE</u>		
J. CHANTEUR Ministère de la Santé S.C.P.R.I. B.P. no 35 <u>78110 LE VESINET</u>	1975	Santé publique
R. COULON Chef du Service d'Etudes générales de Protection Département de la Protection Sanitaire Centre d'Etudes Nucléaires B.P. no 6 <u>92260 FONTENAY-AUX-ROSES</u>	1978	Protection sanitaire
J. JACQUET Chef du Département "Environnement Aquatique et Atmosphérique" Electricité de France B.P. no 24 <u>78400 CHATOU</u>	1971	Hydrologie Météorologie
Dr. H. JAMMET Chef du Département de la Protection Sanitaire Centre d'Etudes Nucléaires B.P. no 6 <u>92260 FONTENAY-AUX-ROSES</u>	1960	Protection sanitaire

Mitglied seit
Membre depuis
Member since

Fachgebiet
Spécialité
Speciality

GRECE

Ass. Professor P. KOSTAMIS
Alexandra Hospital
Vas. Sofias Av.
ATHENS 611, GREECE

1981

Health protection

Dr. A. HADJIANTONIOU
Head Health Physics Div.
Greek Atomic Energy Commission
Democritos N.R.C.
Aghia Paraskevi, Attikis
ATHENS, GREECE

1981

Health protection

IRLANDE

C. CUNNINGHAM
Nuclear Energy Board Ireland
20, Lower Hatch Street
DUBLIN 2

1976

Health protection

J.D. CUNNINGHAM
Nuclear Energy Board Ireland
20, Lower Hatch Street
DUBLIN 2

1974

Health protection

Mitglied seit
Membre depuis
Member since

Fachgebiet
Spécialité
Spéciality

ITALIE

Dott.ssa Carla BROFFERIO 1976 Radiological Protection
Direzione Centrale Sicurezza
Nucleare e Protezione Sanitaria
Divisione Protezione dell'Ambiente
C.N.E.N.
Viale Regina Margherita, 125
00198 ROMA

Dott. Pietro CAGNETTI 1970 Meteorology
Dipartimento delle Ricerche
di Sicurezza Nucleare e
di Protezione Sanitaria
Gruppo di Meteorologia
C.N.E.N./C.S.N. Casaccia
S.P. Anguillarese Km 1+300
00100 ROMA

Ing. Giuseppe RUSSINO 1978 Nuclear techniques
ENEL-Settore Impianto e
Sicurezza Nucleare
Via G.B. Martini, 3
00198 ROMA

Ing. C. SENNIS from 1962 to 1969 Radiological protection
and since 1978
Direzione Centrale Sicurezza
Nucleare e Protezione Sanitaria
Divisione Protezione
dell'Ambiente
C.N.E.N.
Viale Regina Margherita, 125
0198 ROMA

Mitglied seit
Membre depuis
Member since

Fachgebiet
Spécialité
Speciality

LUXEMBOURG

J.P. HOFFMANN
Ministère de l'Energie
19-21 Bd. Royal

1978

Technique nucléaire

LUXEMBOURG

Dr. P. KAYSER
Direction de la Santé
37, rue Glesener

1962

Santé publique

LUXEMBOURG

PAYS-BAS

Dr. P. HAGEL
Rijksinstituut voor
Visserijonderzoek
Haringkade 1

1980

Aquatic Environmental
Protection

1976-CP LJMUIDEN

Ir. C.J. VAN DAATSELAAR
Adviseur bij het Directoraat-
Generaal van de Arbeid
Ministerie van Sociale Zaken
Balen van Andelplein 2

1965

Nuclear techniques

VOORBURG

Dr. J. WEBER
Ministerie van Volksgezondheid
en Milieuhygiëne
12, Dr. Reijerstraat

1974

Health protection

LEIDSCHENDAM

Mitglied seit
Membre depuis
Member since

Fachgebiet
Spécialité
Speciality

ROYAUME-UNI

W.S. GRONOW
Nuclear Installations
Inspectorate
Health and Safety Executive
Thames House North, Millbank
LONDON SW1

1974

Nuclear Safety

B.R. HOOKWAY
Department of the Environment
Romney House
Marsham St.
LONDON SW1

1976

Environmental radio-
logical protection

N.G. KELLY
National Radiological Protection
Board
HARWELL, Chilton,
Oxfordshire OX11 0RQ

1980

Radiological protection

Dr. N.T. MITCHELL
Ministry of Agriculture,
Fisheries and Food
Fisheries Radiological Laboratory
Directorate of Fisheries Research
Pakefield Road
Lowestoft
SUFFOLK NR 33 OHT

1976

Aquatic Environmental
Protection

EUROPEAN ATOMIC
ENERGY COMMUNITY

39

Brussels, 12 January 1962
32/62 (ATO 4)

Council

N O T E

Re : Application of Article 37 of the Euratom Treaty

Article 37 is worded as follows:

"Each Member State shall submit to the Commission such general data concerning any plan for the disposal of any kind of radioactive waste as will enable the Commission to determine whether the implementation of such plans is likely to involve radioactive contamination of the water, soil or airspace of another Member State.

The Commission, after consulting the group of experts referred to in Article 31, shall give its opinion thereon within a period of six months".

At the request of the Committee on Atomic Affairs, the Secretariat has formulated some considerations regarding the application of this article.

- 1) It will be noted that this article imposes no obligations on companies themselves. It is only Member States that are required to provide the Commission with information. Consequently, it is the Member States alone that are held responsible for the accuracy, validity and completeness of this information for the purposes of the formulation of the Commission's opinion. The Commission has addressed a recommendation to Member States in this connection (Official Journal, 21 December 1960).

Every Member State must take all necessary steps to ensure, by internal arrangements (legislative if needed), that it has the necessary means of fulfilling this obligation. It must therefore, where applicable, require private companies to provide it with information and, possibly, monitoring data.

- 2) Article 37 does not require Member States to send to the Commission complete details of projects involving the discharge of radioactive effluents, but only general data on these projects insofar as is necessary to enable the Commission to determine whether the implementation of these projects is likely to cause radioactive contamination of the water, soil or airspace of another Member State.

Consequently, the Commission should be notified of any modification made subsequently to a project that has already been submitted to it, if the modification is relevant to these general data. On the other hand, a Member State can not be accused of failing to satisfy the requirements of Article 37 in any way for not notifying the Commission of modifications of details that do not come under the definition of this article.

- 3) In Member States the implementation of a project involving the discharge of radioactive effluents is usually subject to governmental authorization. It is precisely for the guidance of the national authority that possesses these powers of authorization that Article 37 makes provision for an opinion on the part of the Commission, issued after consultation of the group of experts referred to in Article 31. (This group is composed of individuals designated by the Scientific and Technical Committee from among the scientific experts of Member States, and particularly from among experts in the field of public health.)

It may be asked whether the national authority that possesses powers of authorization should

- examine projects before submitting them to the Commission, in fact, decide upon its own attitude in the matter before the Commission is requested to issue its opinion,

or, on the contrary,

- wait for the opinion of the Commission before granting its own authorization, in fact, before examining a project at all.

Article 37 does not require Member States to suspend all authorization before the opinion of the Commission is issued. However, to authorize a project without having first taken into consideration the opinion of the Commission would in practice mean robbing Article 37 of all significance. It therefore seems certain that no authorization should be granted until the Commission has first had time to issue its opinion.

In any case, there is nothing to prevent the national authority, upon receipt of an application for authorization, from carrying out a preliminary examination of the project, before submitting it to the Commission. A preliminary examination of this kind could even be necessary in order to check the accuracy and validity of the data provided.

The question could then arise of exactly how far an examination of this kind could be taken before submitting the project to the Commission. In this connection, it does not seem permissible for the national authority to go so far as to formulate its official attitude to the project as a whole. For the adoption of an official attitude in this way would be taking place in the absence of an opinion from the Commission, which is explicitly intended for the guidance of the national authority in making its assessment.

It will, however, be noted that the opinion on the part of the Commission that is provided for in Article 37 relates only to one aspect of the project, namely, the risk that it may involve of causing contamination in other Member States. Thus, before granting its authorization the national authority should also examine all those other aspects of the project that are not taken into consideration in the Commission's opinion. Consequently, the question may arise of whether the national authority should examine the other aspects of the project before, at the same time as, or after it is submitted to the Commission.

It will be noted in this connection that preliminary examination of these other aspects would have the fortunate effect of avoiding unnecessary examination on the part of the Commission of projects that could not in any case be implemented because of factors outside the scope of its opinion. On the other hand, any delay in submitting the project to the Commission caused by a preliminary examination of this kind would prolong the total period of authorization. Finally, the significance of the Commission's opinion will depend in particular upon the site on which the project is to be built (near to frontiers of international rivers, for instance).

It seems, therefore, that the question raised here is a matter of expediency rather than law. It could be settled individually case by case. It could also be subjected to general criteria agreed upon between Member States.

PLÄNE ZUR ABLEITUNG RADIOAKTIVER STOFFE

PROJETS DE REJET D'EFFLUENTS RADIOACTIFS

PLANS FOR THE DISPOSAL OF RADIOACTIVE WASTE

(as notified at 31.XII.1981 under the Terms of Article 37
of the EURATOM TREATY)

	Nominal capacity [MW _e]	Date of the Commission's opinion	Minimum distance to frontier [km]
<u>BELGIQUE</u>			
- Réacteur BR2 (Mol)	(50 MW _{th})	27/VII/61	11
- Centrale nucléaire BR3 (Mol)	10,5	20/XII/61	11
- Installations de traitement des résidus radioactifs du CEN (Mol) exploitées par la Société Belchim	-	09/V/62	11
- Laboratoires du Plutonium du programme de recherche "Belgo- nucléaire - CEN (Mol)"	-	09/V/62	11
- Installations EUROCHEMIC (Mol)		18/IX/64	11
. Laboratoire de Recherche	-		
. Bâtiment de réception et de stockage des éléments combustibles enrichis en U-235 ≤ 1,6 %	-		
. Canalisations de trans- port des effluents liquides vers les in- stallations de retraite- ment du CEN	-		
- Centrale nucléaire BR3/VULCAIN (Mol)	10,5	09/III/65	11
- Collecteur pour le rejet dans l'Escaut d'eaux usées industrielles	-	15/VII/65	11

	Nominal capacity [MWe]	Date of the Commission's opinion	Minimum distance to frontier [km]
- Installations EUROCHEMIC (Mol)		30/IX/66	11
. Bâtiment de retraitement des combustibles	-		
. Laboratoire analytique	-		
. Bâtiments de stockage des produits retraités	-		
. Station de traitement des effluents liquides	-		
. Bâtiments de stockage des déchets liquides d'acti- vité élevée	-		
. Bâtiment de stockage des déchets liquides d'acti- vité moyenne	-		
. Bâtiment de stockage des déchets solides actifs	-		
. Bâtiment de ventilation et cheminée	-		
- Laboratoires du plutonium du programme de recherche Belgo- nucléaire - CEN (Mol) Nouveaux laboratoires	-	18/VII/69	11
- Etablissement pour la fabri- cation d'éléments combustibles au plutonium dit "Atelier Plutonium" de la Belgonu- cléaire à Dessel	-	04/VI/70	11,5
- Bureau Central de Mesures Nucléaires (BCMN) à Geel	-	22/XII/70	15
- Centrale nucléaire de Doel	2 x 392,5	02/IV/73	3
- Centrale nucléaire de Tihange	870	23/VII/74	40
- Centrale nucléaire de Doel (3+4)	897/1003	03/XI/81	3
- Centrale nucléaire de Tihange (2+3)	902/1006	14/XII/81	40

	Nominal capacity [MWe]	Date of the Commission's opinion	Minimum distance to frontier [km]
<u>BUNDESREPUBLIK DEUTSCHLAND</u>			
- Reaktor FR2 (Karlsruhe)	(12 MW _{th})	17/III/61	21
- Forschungsreaktor BER (Berlin)	(50 kW _{th})	17/III/61	5
- Forschungsreaktor FRM (München)	(1 MW _{th})	17/III/61	140
- Forschungsreaktor ARGONAUT (München)	(1 kW _{th})	17/III/61	140
- Reaktor PR 10 (Grosswelzheim)	(100 W _{th})	17/III/61	140
- Institut für Kernphysik der Universität Frankfurt/M.	(50 kW _{th})	20/VII/62	120
- Anlagen der Firma Nuklear- Chemie und -Metallurgie (NUKEM)	-	20/VII/62	140
- Versuchsatomkraftwerk Kahl/Main	15	12/X/62	150
- Reaktor FRJ-1-MERLIN der Kernforschungsanlage Jülich	(5 MW _{th})	11/VII/63	22
- Kernforschungsanlage Jülich		25/II/65	22
. Reaktor FRJ-2-DIDO	(10 MW _{th})		
. Anlage zur Behandlung flüssiger und fester radioaktiver Stoffe	-		
- Versuchsatomkraftwerk AVR (Jülich)	13,6	18/V/66	22
- Kernforschungszentrum Karlsruhe		28/VI/67	21
. Reaktor FR2 (Leistungserhöhung)	(44 MW _{th})		
. Reaktor MZFR	60		

Nominal capacity	Date of the Commission's opinion	Minimum distance to frontier [km]
/ MWe /		
- Kernforschungszentrum Karlsruhe (Fortsetzung)	28/VI/67	21
. Reaktor SNEAK	-	
. Reaktor STARK	(10 W _{th})	
. Heisse Zellen	-	
. Institut für Heisse Chemie	-	
. Prototyp-Labor	-	
. Alpha-Chemie und -Metallur- gie (ALKEM)	-	
. Europäisches Institut für Transurane	-	
. Gemeinsame Dekontamina- tionsanlage	-	
. Lager für feste Abfälle	-	
- Kernkraftwerk Gundremmingen (KRB)	237	11/IV/67
- Kernkraftwerk Lingen (KWL)	240	24/IX/68
- Kernkraftwerk Obrigheim (KWO)	282,7	10/III/69
- Kernforschungsanlage Jülich		22/IV/69
. Laboratorium der heißen Zellen	-	
. Laboratorium zur Prüfung von Brennelementen (BZ III)	-	
- Reaktor KNK des Kernfor- schungszentrums Karlsruhe	19,1	22/IV/69
- Dekontaminationsanlage des Kernforschungszentrums Karls- ruhe (ersetzt die Stellung- nahme vom 28.VI.67 über die ge- meinsame Dekontaminierungs- anlage)	-	22/IV/69
- Atomversuchskraftwerk AVR Jülich (Änderungsmeldung)	13,6	10/XII/69
- Kernenergie-Forschungs- schiff "OTTO HAHN"	(38 MW _{th})	21/I/70

	Nominal capacity [MWe]	Date of the Commission's opinion	Minimum distance to frontier [km]
- Wiederaufarbeitungs- anlage Karlsruhe (WAK)	-	01/VII/71	21
- Heissdampfreaktor (HDR) Grosswelzheim	25	14/XII/71	135
- Kernkraftwerk Würgassen (KKW)	640	17/IV/72	180
- Anlage FERAB und Bitumini- rungsanlage des Kernfor- schungszentrums Karlsruhe	-	24/IV/72	21
- Kernkraftwerk Stade (KKS)	630	30/X/72	135
- Kernkraftwerk Niederaich- bach (KKN)	100,4	09/V/73	60
- Kernkraftwerk Biblis A	1146	31/X/74	85
- Kernkraftwerk Brunsbüttel	770	02/X/75	102
- Kernkraftwerk Unterweser	1230	22/X/76	85
- Kernkraftwerk Biblis B	1240	27/I/77	85
- Kernkraftwerk Philippsburg Block I	864	02/VII/77	33
- Kernkraftwerk Neckarwestheim	805	04/V/77	70
- Kernkraftwerk Isar Block I	870	21/II/78	62
- Brennelement-Fertigungsan- lage Exxon, Lingen	(180 t/a)	14/V/80	20
- Kernkraftwerk Grafenrheinfeld	1225	03/XI/81	40

	Nominal capacity [MWe]	Date of the Commission's opinion	Minimum distance to frontier [km]
<u>FRANCE</u>			
- Immersion en Méditerranée de déchets radioactifs	-	26/VII/60	-
- Centrale nucléaire de Chinon 1ère tranche - EDF 1	68	30/IV/64	390
- Centrale nucléaire de Chinon . 2e tranche - EDF 2	210	13/VII/65	390
. Atelier des matériaux irradiés (AMI)	-		
- Centrale nucléaire des Ardennes - SENA (CHOOZ)	266	12/XII/67	3
- Centrale nucléaire de Chinon 3e tranche - EDF 3	480	-	390
- Centrale de St. Laurent-des-Eaux 1ère tranche - SL 1	487	20/IX/71	310
- Centrale des Monts d'Arrée tranche EL 4	70	09/XII/71	150
- Centrale de St. Laurent-des-Eaux 2e tranche - SL 2	516	19/IX/72	310
- Centrale nucléaire du Bugey 1ère tranche	526	19/IX/72	65
- Centrale nucléaire Phénix	233	23/VII/74	175
- Chaufferie Avancée Prototype (CAP) de Cadarache	(110 MW _{th})	22/X/76	115
- Installation HAO + UP2 de la Hague	-	05/IV/79	20

	Nominal capacity [MWe]	Date of the Commission's opinion	Minimum distance to frontier [km]
- Centrale nucléaire de Fessenheim (I + II)	2 x 890	05/IV/79	1,5
- Atelier de Vitrification de Marcoule (AVM)	-	19/II/80	175
- Centrale nucléaire de Gravelines (I à IV)	4 x 925	26/II/80	30
- Usine d'enrichissement de l'uranium EURODIF du Tricastin	(10,8 x 10 ⁶ UTS)*)	04/VII/80	160
- Centrale nucléaire du Bugey (II à V)	4 x 925	01/VII/80	65
- Centrale nucléaire de Dampierre (I à IV)	4 x 925	13/X/80	275
- Centrale nucléaire du Tricastin (I à IV)	4 x 925	13/X/80	160
- Centrale nucléaire de St. Laurent-des-Eaux (B1, B2)	2 x 925	20/V/81	310
- Centrale nucléaire du Blayais (I à IV)	4 x 925	26/V/81	220
- Centrale nucléaire de Chinon (B1 à B4)	4 x 905	09/II/82	270

*) UTS = Unités de Travail de Séparation

	Nominal capacity / MWe /	Date of the Commission's opinion	Minimum distance to frontier [km]
<u>ITALIA</u>			
- Centrale nucléaire du Garigliano (SENN)	150	15/X/64	375
- Centrale nucléaire de Latina (SIMEA)	200	25/VI/65	300
- Centrale nucléaire Enrico Fermi de Trinco Vercellese	257	16/VIII/66	90
- Installation de retraitement de combustibles irradiés CNEN-EUREX à Saluggia	-	10/VI/69	70
- Installations du Centre Commun de Recherche (CCR) Ispra	-	19/IX/72	22
- Installation pour la produc- tion d'éléments combustibles pour centrales nucléaires à Bosco Marengo	-	09/IV/73	155
- Centrale nucléaire de Caorso	840	04/XII/74	200

	Nominal capacity <u>/ MWe /</u>	Date of the Commission's opinion	Minimum distance to frontier <u>[km]</u>
<u>LUXEMBOURG</u>			
- Centrale nucléaire de Remerschen	1252	02/VI/76	0,1
<u>NEDERLANDE</u>			
- Discharge into the sea of liquid wastes from the RCN at Petten	-	20/VII/62	-
- Submersion of solid radioactive waste in the Atlantic	-	18/XI/66	-
- Dodewaard nuclear power station (GKN)	51.5	15/I/69	-
- Borssele nuclear power station	450	04/XII/74	15
- Almelo Uranium Enrichment Plant (URENCO)	(1200 t swu/a)*	08/II/82	15

*) swu = separative work units

	Nominal capacity [MWe]	Date of the Commission's opinion	Minimum distance to frontier [km]
<u>UNITED KINGDOM</u>			
- Hinkley Point B nuclear power station	2 x 620	07/III/75	180
- Hunterston B nuclear power station	2 x 620	07/V/75	155
- Dungeness B nuclear power station	2 x 590	22/XII/76	40
- Hartlepool nuclear power station	2 x 625	05/X/78	360
- Forest Farm Laboratories of the Radiochemical Centre Ltd.	-	05/X/78	220
- Prototyp Fast Reactor Fuel Reprocessing Plant, Dounreay	(5 t/a)	05/V/80	350
- Heysham Nuclear Power Station (Stage I)	2 x 625	13/X/80	210
- Uranium Enrichment Plant (URENCO), Capenhurst	(940 t swu/a)*	05/X/81	200

*) swu = separative work units

MAXIMUM HYPOTHETICAL EXPOSURE IN 1978 FROM GASEOUS EFFLUENTS (NOBLE GASES AND IODINE-131)
 AT 0.5 KM AND 5 KM FROM NPSs (a) / 6 /

Facility	Height (b) of release [m]	Dose [μrem]					
		at 0.5 km			at 5 km		
		Whole body (gamma)	Skin (beta only)	Thyroid (c)	Whole body (gamma)	Skin (beta only)	Thyroid (c)
BELGIUM							
Doel 1 + 2	48	0.02	0.03	-	0.001	0.003	-
Tihange 1	160	0.04	0.03	0.4	0.005	0.01	0.2
GERMANY							
MZFR	100	0.01	0.007	-	< 0.001	0.001	-
Gundremmingen	109	0.02	0.01	3×10^{-3}	0.001	0.001	< 0.001
Obrigheim	60	0.06	0.03	0.05	0.003	0.003	0.005
Würgassen	67	0.2	0.4	9	0.01	0.04	1
Stade	80	0.02	0.02	0.3	0.002	0.002	0.03
Biblis A + B	100	0.03	0.01	0.5	0.002	0.002	0.1
Neckarwestheim	150	0.01	0.003	0.3	< 0.001	< 0.001	0.04
Brunsbüttel	100	0.4	0.3	0.3	0.02	0.05	0.04
Isar	130	0.06	0.02	-	0.005	0.005	-
Untervefer	100	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
FRANCE							
Chinon	50	0.7	0.4	2	0.04	0.03	0.2
Chooz	18	0.3	0.9	7	0.01	0.02	0.2
Monts d'Arrée	70	46	19	1	2	0.2	0.1
St-Laurent- des-Eaux	78	1	0.5	0.3	0.08	0.06	0.03
Bugey 1	85	0.6	0.2	1.2	0.03	0.02	0.1
Bugey 2 + 3	62						
Phénix	70	0.007	0.008	0.01	< 0.001	< 0.001	0.001
Fessenheim	56	0.2	0.1	2	0.01	0.009	0.2
ITALY							
Latina	52	0.7	0.4	0.003	0.04	0.03	< 0.001
Garigliano	92	7	4	1	0.4	0.6	0.2
Trino	100	0.05	0.02	0.003	0.003	0.002	< 0.001
Caorso	57	0.01	0.01	0.2	< 0.001	0.001	0.01

Facility	Height (b) of release [m]	Dose [mrem]					
		at 0.5 km			at 5 km		
		Whole body (gamma)	Skin (beta only)	Thyroid (c)	Whole body (gamma)	Skin (beta only)	Thyroid (c)
<u>NETHERLANDS</u>							
Dodewaard	100	0.3	0.2	0.2	0.02	0.02	0.02
Borssele	57	0.01	0.01	0.02	< 0.001	0.001	0.002
<u>UNITED KINGDOM</u>							
Calder		12	12		0.5	0.5	
Chapelcross		13	13		0.6	0.5	
Bradwell		7	6		0.3	0.3	
Berkeley		5	5		0.2	0.2	
Hunterston A + B		8	8		0.4	0.3	
Trawsfynydd		54	52		2	2	
Hinkley Point A		33	32		1.5	1	
Dungeness A		12	12		0.5	0.5	
Sizewell A		25	24		1	1	
Winfrith		8	8	20	0.3	0.3	1

(a) Calculations based on pessimistic assumptions. (NPS = Nuclear Power Station)

(b) The effective height of release is taken as the height of the discharge point except for :

- Tihange and Neckarwestheim where the latter height was modified to take account of local topography;
- U.K. AGR/GCRs for which the effective height was reduced to 30 m to take into account building entrainment.

For sites with two or more stations a single discharge point is assumed.

(c) Dose to the thyroid of an infant drinking only milk from cattle grazing at this distance. Moreover, for the French stations in this Table it is conservatively assumed that the entire discharge termed "radioactive aerosols and gaseous halogens" (Table V) can be attributed to I-131.

ANNEXE V

PRINCIPLE SITES WITH NUCLEAR INSTALLATIONS, OPERATIONAL OR UNDER CONSTRUCTION,
LOCATED NEAR THE FRONTIERS OF MEMBER STATES

Site	Type of Plant	Capacity [MWe]	Connection to Grid	Water Body concerned	Distance to Border [km]	Neighbour country
<u>BELGIUM</u>						
Doel 1/2	PWR	2 x 415	VIII 1974/75	Scheldt	3	NL
Eurochemic	NFRP	(60 t/a)	1966 (a)	Mol-Neet	11	NL
CEN/SCK Mol	RC	-	-	Mol-Neet	11	NL
Tihange 1	PWR	920	III 1975	Meuse	40	NL
<u>FRANCE</u>						
Ardennes (Chooz)	PWR	320	IV 1967	Meuse	3	B
Cap de la Hague	NFRP	(800 t/a)	first "Hot Run" 1976	English Channel	20	GB
Cattenom 1/2/3	PWR	3 x 1300	(c)	Moselle	10	L/D
Fessenheim 1/2	PWR	2 x 931	IV/VI 1977	Rhine	1.5	D
Gravelines Bl-B4	PWR	4 x 925	III 1980/81	English Channel	30	B
<u>GERMANY</u>						
Grafenrheinfeld	PWR	1225	XII 1981	Main	40	DDR
Kalkar	LMFR	282	(c)	Rhine	15	NL
Karlsruhe (KfK)	RC/PHWR	(200 MWe _{th})	III 1966	Rhine	21	F
Krömmel	BWR	1316	(c)	Elbe	15	DDR
Lingen (b)	BWR	182	V 1968	Ems	19	NL
Philippsburg	BWR	864	III 1980	Rhine	35	F
<u>ITALY</u>						
JRC Ispra	RC	-	-	Lago Maggiore	22	CH
<u>NETHERLANDS</u>						
Borssele	PWR	477	VII 1973	Scheldt Estuary	15	B
Dordrecht	BWR	54	X 1968	Waal	23	D
<u>SWEDEN</u>						
Barsebäck 1/2	BWR	2 x 570	1975/77	Öresund Channel	25	DK
<u>SWITZERLAND</u>						
Beznau 1/2	PWR	2 x 364	XII 1969/71	Aare	5	D
Gösgen	PWR	920	1979	Aare	21	D
Leibstadt	BWR	955	(c)	Rhine	1	D
Mühleberg	PWR	321	XI 1972	Aare	39	F
<u>UNITED KINGDOM</u>						
Dungeness A	GCR	2 x 275	1965	{ English Channel	40	F
B	AGR	2 x 590	1981		40	F

- (a) first hot run; no reprocessing since 1974
 (b) in 1979 this plant definitively shut down
 (c) under construction

KEY: BWR = Boiling Water Reactor
 NFRP = Nuclear Fuel Reprocessing Plant
 PWR = Pressurized Water Reactor
 RC = Research Centre
 PHWR = Pressurized Heavy Water Reactor
 GCR = Gas Cooled Reactor (Magnox)
 AGR = Advanced Gas Cooled Reactor

COMMISSION

COMMISSION RECOMMENDATION

of 3 February 1982

on the application of Article 37 of the Euratom Treaty

(82/181/Euratom)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Articles 37 and 124 thereof,

Having consulted the group of experts appointed in accordance with Article 31 of the Treaty by the Scientific and Technical Committee,

Considering the experience acquired in the application of the Commission recommendation of 16 November 1960 concerning the application of Article 37 of the Treaty ⁽¹⁾,

Whereas general technical progress in nuclear energy, changes in the nature and quantities of radioactive waste and developments in the approaches to radiation protection indicate a need to give a more precise definition of 'disposal of radioactive waste';

Whereas it cannot be excluded that certain operations from which discharges of radioactive waste are normally negligible, can give rise to significant releases in the event of an accident;

Whereas the European Parliament, in its resolution of 20 November 1980 on the siting of nuclear power stations in frontier zones, has requested that the Commission review the application of Article 37, particularly as regards the timing currently in force;

Whereas plans for the disposal of radioactive wastes from nuclear reactors and nuclear fuel reprocessing

plants necessitate particular attention in the context of Article 37 prior to construction beginning;

Whereas the growing concentrations of waste discharge sources and the superimposition of the effects of such discharges, particularly into an aquatic environment, call for a more exact knowledge of the actual discharges in order to obtain a better appreciation of the overall radiological impact when submissions of general data are examined pursuant to Article 37 and whereas, for this purpose, certain information needs to be communicated periodically by the Member States as to discharges arising under disposal plans previously the subject of an opinion pursuant to Article 37;

Whereas to ensure that the basic safety standards for the health protection of the population are uniformly applied and to appraise disposal plans in a consistent manner, it is necessary to specify the information to be supplied, in particular in the general data,

HEREBY RECOMMENDS:

1. That the 'disposal of radioactive waste' within the meaning of Article 37 of the Treaty should cover any form of disposal, planned or accidental, of radioactive substances from the operations listed in the three categories below.

CATEGORY 1 OPERATIONS

- (1) The operation of nuclear reactors
- (2) The reprocessing of irradiated nuclear fuel

CATEGORY 2 OPERATIONS

- (1) The mining, milling and conversion of uranium and thorium
- (2) U 235 enrichment uranium
- (3) The fabrication of nuclear fuel

⁽¹⁾ OJ No 81, 21. 12. 1960, p. 1893/60.

- (4) The processing and storage ⁽¹⁾ of radioactive waste arising from category 1 and category 2 operations
- (5) The sea dumping of radioactive waste from category 1 and category 2 operations
- (6) The land or sea burial of radioactive waste from category 1 and category 2 operations
- (7) The storage ⁽¹⁾ of irradiated nuclear fuel on sites other than those involving category 1 operations
- (8) The decommissioning of installations involving category 1 operations
- (9) The handling or processing of radioactive substances on an industrial scale.

CATEGORY 3 OPERATIONS

All other operations giving rise to radioactive waste.

2. That 'general data' within the meaning of Article 37 of the Treaty be understood to mean:
 - for category 1 operations the information set out in Annexes 1A and 2,
 - for category 2 operations other than (5) and (6) the information set out in Annex 1A and for category 2, operations (5) and (6), that set out in Annex 1B,
 - for category 3 operations the information set out in paragraph 5 (b).
3. That, for plans involving category 1 and category 2 operations, the relevant parts of the 'general data' listed in Annex 1A or 1B be submitted to the Commission whenever possible one year but not less than six months before the planned date of commencement of disposal of radioactive waste.
4. That, for plans involving category 1 operations, the preliminary 'general data' listed in Annex 2 be submitted to the Commission before permission for construction is granted by the competent authorities.
5. That there be communicated to the Commission:
 - (a) every two years, a statement of the radioactive waste discharges from each installation involving category 1 or category 2 operations;
 - (b) every five years, an estimate of the total radioactive liquid waste discharges from all category 3 operations into any water medium (e.g. hydrographic basin, sea, etc.). This estimate may be based on the discharge data for individual installations or on measurements in the receiving water medium;
 - (c) prior to any dumping of radioactive waste in the sea, a copy of the notification communicated to other international bodies.
6. That, if a Member State considers it appropriate, it may request from the Commission an opinion on any plan for the disposal of radioactive waste on its own territory and not called for by the present recommendation.
7. That the Commission be notified, before authorization is granted, of any modification of a plan for disposal of radioactive waste, which has already been submitted for its opinion, if such modification could cause any appreciable increase in the effect of such disposal on the exposure of the population.
8. That, since submission of a plan for the disposal of radioactive waste is the responsibility of the government of the relevant Member State, that government accept responsibility for all information submitted to the Commission in respect of such a plan.

This recommendation is addressed to the Member States.

It replaces the recommendation of 16 November 1960.

Done at Brussels, 3 February 1982.

For the Commission

Karl-Heinz NARJES

Member of the Commission

⁽¹⁾ Provided that the operation is not incorporated in a plan submitted under another heading.

ANNEX 1A

'GENERAL DATA'

applicable to category 1 operations and category 2 operations other than (5) and (6)

INTRODUCTION

General presentation of the plan

1. THE SITE AND ITS SURROUNDINGS

1.1. Geographical and topographical situation of the site with

- a map of the region showing the location of the site,
- the location of the plant in relation to other nuclear installations, existing or planned, on the same or other site(s), discharges from which may have implications for discharges from the plant in question,
- the location of the plant with regard to other Member States giving the distances from frontiers and closest conurbations.

1.2. Geology — Seismology

Brief description of

- the main geological features of the region,
- the degree of seismic activity; probable maximum seismic intensity and designated plant seismic response.

1.3. Hydrology

For a plant situated beside a watercourse

Description of the watercourse with

- a general description of its path (major features, main tributaries, estuary, etc.),
- the average waterflow at the site,
- the maximum and minimum waterflows stating frequency and periods of occurrence.

Where the river flows through the territory of one or more other Member States downstream of the site, corresponding information in respect of the State(s).

For a plant situated on the coast

General description of the coastal area with

- heights of the tides,
- direction and force of currents, both local and regional.

In both cases

- flood-risk and protection of the site,
- water-table level and direction of flow.

1.4. Meteorology and climatology

- regional climatology taking account of orographic features (plains, valleys, mountain ranges),
- local climatology with frequency distributions of:
 - wind directions and speeds,

- precipitation intensity and duration,
- for each wind sector, atmospheric dispersion conditions and duration of temperature inversions.

1.5. Natural resources

Brief description of

- soil characteristics and ecological features of the region,
- water utilization in the region for drinking, irrigation, etc.,
- principal food resources; methods and scale of production; crops, stock breeding, fishing, hunting; for discharges into the sea, data on fishing in territorial and extra-territorial waters,
- foodstuffs distribution system and particularly the export to other Member States of agricultural products, fish or game from the regions concerned.

1.6. Other activities in the vicinity of the site

- industrial or military sites, surface and aerial traffic, bulk transport by pipeline,
- possible influence on the plant; protective measures,
- regulations covering industrial or other development.

1.7. Population

- distribution of the populations of interest in other Member States,
- pattern of daily life and eating habits of these populations;

main features; the data required concern the population distribution (density), noting conurbations and any particular characteristics in so far as these are related to the risk of exposure from discharges through the significant exposure pathways.

2. THE PLANT

2.1. Main features of the plant

Brief description of the plant, giving the type, purpose and main features

- for reactors: main features of the reactor, the reactor building, the auxiliary installations, the fuel storage facilities, safety provisions, etc.;
- for other plants or laboratories: main features of processes used; throughput of radioactive and fissile materials, installations which make up the plant, safety provisions, etc.

2.2. Ventilation system

Schematic diagrams and description indicating function in normal operating conditions and in the case of an accident, air flows, relative pressures in the buildings and heights of release; data on filters, their efficiency, methods and frequency of testing.

2.3. Containments

Brief description and main characteristics; methods and frequency of testing for leaktightness.

- 3.5. **Radioactive discharges to atmosphere from those installations cited under 1.1**
Where appropriate, procedures for coordination with discharges from other installations, where there may be an additive effect for the exposure levels.
4. **RELEASE OF LIQUID RADIOACTIVE EFFLUENTS IN NORMAL OPERATION**
- 4.1. **Authorization procedure in force**
- outline of the general procedure involved,
 - discharges assumed for evaluation of the radiological consequences:
 - where the procedure has not been completed: discharges forecast by the operator,
 - where the procedure has been completed: discharges authorized.
- 4.2. **Technical aspects**
- origins of these radioactive effluents, their composition and physico-chemical forms,
 - treatment of these effluents, storage capacities, methods and paths of release.
- 4.3. **Monitoring of discharges**
- sampling, measurement and analysis of discharges,
 - principal features of monitoring equipment,
 - alarm levels, intervention actions (manual and automatic).
- 4.4. **Evaluation of transfer to man**
- 4.4.1. models and parameters used to calculate:
- aquatic dispersion of the effluents,
 - their transfer by sedimentation and ion exchange,
 - transfer via food chains,
 - exposure levels via the significant exposure pathways.
- 4.4.2. evaluation of the exposure levels ⁽¹⁾ associated with the discharges cited in 4.1 above: dose equivalents to those living in relevant areas of other Member States, taking account of all significant exposure pathways.
- 4.5. **Radioactive discharges into the same receiving waters by other installations**
Where appropriate, procedures for coordination with discharges from other installations, where there may be an additive effect for the exposure levels.
5. **DISPOSAL OF SOLID RADIOACTIVE WASTE**
- 5.1. **Categories of solid radioactive wastes and estimated amounts**
- 5.2. **Processing and packaging**
- 5.3. **Intermediate storage; storage capacities and conditions, radiological risks to the environment, precautions taken**

⁽¹⁾ The values submitted should reflect that the results can represent little more than orders of magnitude to which it would be inappropriate to ascribe a false precision.

- 2.4. **Time scale**
- commissioning period and date for routine operation of the plant,
 - present stage of licensing procedure.
- 2.5. **Decommissioning and dismantling of the plant**
- Outline of technical and administrative provisions.
3. **RELEASE OF AIRBORNE RADIOACTIVE EFFLUENTS IN NORMAL OPERATION**
- 3.1. **Authorization procedure in force**
- outline of the general procedure involved,
 - discharges assumed for evaluation of the radiological consequences:
 - where the procedure has not been completed: discharges forecast by the operator,
 - where the procedure has been completed: discharges authorized.
- 3.2. **Technical aspects**
- origins of these radioactive effluents, their composition and physico-chemical forms,
 - purification and holdup of these effluents, methods and paths of release.
- 3.3. **Monitoring of discharges**
- sampling, measurement and analysis of discharges,
 - principal features of the monitoring equipment,
 - alarm levels, intervention actions (manual and automatic).
- 3.4. **Evaluation of transfer to man**
- 3.4.1. models and parameters used to calculate:
- atmospheric dispersion of the effluents,
 - ground deposition and resuspension,
 - transfer via food chains,
 - exposure levels via the significant exposure pathways.
- 3.4.2. evaluation of concentrations and exposure levels associated with discharges cited in 3.1 above:
- in the case of continuous release: average annual concentrations of activity in the atmosphere near the ground and surface contamination levels,
 - in the case of intermittent release and planned special release: time-integrated concentrations in the atmosphere near the ground and surface contamination levels.
- These data are to be provided for the most exposed areas in the vicinity of the plant and for relevant areas in other Member States.
- corresponding exposure levels ⁽¹⁾: dose equivalents to those living in the relevant areas of other Member States taking account of all significant exposure pathways.

⁽¹⁾ The values submitted should reflect the fact that the results can represent little more than orders of magnitude to which it would be inappropriate to ascribe a false precision.

6. UNPLANNED RELEASES OF RADIOACTIVE EFFLUENTS
- 6.1. Review of accidents of internal and external origin which could result in unplanned releases of radioactive substances
List of the accidents studied in the safety report.
- 6.2. Reference accident(s) taken into consideration by the competent national authorities for evaluating possible radiological consequences in the case of unplanned releases
Outline of the accident(s) considered and justification of its (their) choice.
- 6.3. Evaluation of the radiological consequences of the reference accident(s)
- 6.3.1. Entailing releases to atmosphere
- assumptions used to calculate the releases to atmosphere,
 - release paths; time pattern of the releases,
 - amounts and physico-chemical forms of those radionuclides released which are significant from the point of view of health,
 - models and parameters used to calculate for the releases their atmospheric dispersion, ground deposition, resuspension and transfer via food chains and to evaluate the exposure levels via the significant exposure pathways,
 - maximum time-integrated concentrations of radioactivity in the atmosphere near the ground and maximum surface contamination levels (in dry and wet weather) for the most exposed areas in the vicinity of the plant and for relevant areas in other Member States,
 - corresponding exposure levels ⁽¹⁾: dose equivalents to those living in relevant areas of other Member States taking account of all significant exposure pathways.
- 6.3.2. Entailing releases into an aquatic environment
- assumptions used to calculate the liquid releases,
 - release paths, time pattern of releases,
 - amounts and physico-chemical forms of those radionuclides released which are significant from the point of view of health,
 - models and parameters used to calculate for the releases their aquatic dispersion, their transfer by sedimentation and ion exchange, their transfer via food chains and to evaluate the exposure levels via the significant exposure pathways,
 - corresponding exposure levels ⁽¹⁾: dose equivalents to those living in the vicinity of the plant and in relevant areas of other Member States taking account of all significant exposure pathways.
- 6.4. Emergency plans; agreements with other Member States
Brief description of emergency planning zones, emergency reference levels of dose, bilateral or multilateral agreements on transfrontier communications and mutual assistance, rehearsals, reviewing and updating of emergency plans.

⁽¹⁾ The values submitted should reflect that the results can represent little more than orders of magnitude to which it would be inappropriate to ascribe a false precision.

7. ENVIRONMENTAL MONITORING

- external radiation levels,
- radioactivity in air, water, soil and the food chains.

With reference to 3.1 and 4.1 above, monitoring programme as approved by the competent national authorities, organization, sample forms and frequency, type of monitoring instruments used in normal and accidental circumstances; where appropriate, any collaboration arrangements in this respect with neighbouring Member States.

ANNEX 1B

'GENERAL DATA'

applicable to category 2, operations (5) and (6)

(for plans concerning new disposal sites)

1. The site and surroundings

Location, depth, geology, seismology, and

for a sea site: seabed characteristics (including the presence of pipelines and submarine cables) currents and other dispersion mechanisms, relevant biological data, risk of disturbance (e.g. by exploitation of marine resources, by dumping of other wastes etc.)

for a land site: hydrology, use of land and of ground water, repository design including safety features and capacity, long term control of the site.

2. The wastes

Volumes, radionuclides present, activities, prohibited wastes, conditioning and packaging, assumed leak rates and, where appropriate, heat release rates.

3. Environmental effects

Assessment of the radiological consequences to the environment.

4. Operational procedures

Including measures to be taken in the event of incidents.

5. Monitoring

Radiation monitoring programme(s).

ANNEX 2

PRELIMINARY 'GENERAL DATA'

applicable to category 1 operations

1. **The site and its surroundings**
 - map of the region showing the location of the plant with regard to other nearby nuclear installations and to other Member States,
 - main seismic characteristics of the region,
 - main characteristics of the waterbodies receiving radioactive effluents,
 - main regional and local climatological characteristics,
 - industrial or military activities in the vicinity of the plant,
 - population distribution in adjacent regions of other Member States concerned.

 2. **The plant**
 - brief description of the plant and its main safety features,
 - time scale of plant construction.

 3. **Forecast releases of radioactive effluents**
 - estimate of annual radioactive discharges and their radiological consequences.

 4. **Accidental releases of radioactive effluents**
 - list of accidents considered in the preliminary safety report,
 - preliminary evaluation of the radiological consequences of the reference accident(s).
-