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Collective Statement Concerning Nuclear Safety Research

Good Practice and Closure Criteria

NEA No. 4908

NUCLEAR ENERGY AGENCY
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

A successful research project requires clearly defined research programme backgrounds, objectives, deliverables and schedules, and progress must be monitored regularly. Setting a well-defined programme basis and monitoring programme performance, including closure considerations, are examples of good practice in conducting research.

This collective statement represents an international consensus reached within the OECD/NEA Committee on the Safety of Nuclear Installations (CSNI) on good practices and closure criteria for nuclear safety research programmes. Potential detrimental effects of programme closure are also discussed. While the scope of this statement focuses on safety research in support of regulatory organisations, many of the considerations apply equally well to research in support of industry.

This statement is intended to assist NEA member countries and the CSNI in the task of defining, monitoring and judging whether certain safety research programmes should be closed. The intended readership is primarily research managers, regulatory organisations and research centres. Government authorities, nuclear power plant operators and the general public may also be interested.

TABLE OF CONTENTS

1. INTRODUCTION

During the CNRA/CSNI* Workshop on "The Role of Research in a Regulatory Context", which was held in Paris on 19-20 June 2001, a recommendation was made to try to identify the type of criteria to be used for "close-out" of specific research activities and issues [1]. Accordingly, the CSNI has developed the collective statement presented in the following pages. It consists of a section which describes good practices for establishing and conducting research programmes; "closure" is part of such good practice. A subsequent section discusses the conditions that can lead to programme closure, suggesting however to exercise caution in weighing the consequences that closure can entail. A final section examines closure considerations as related to the effects that closure can have for the regulator and for the industry, including potential losses of technical capability, expertise and facilities.

The scope of this statement is safety research in support of regulatory organisations, although many of the considerations apply equally well to research in support of industry.

This statement is intended to assist member countries and the CSNI in the task of defining, monitoring and judging whether certain safety research programmes should be closed. It is also intended to provide research managers, regulatory organisations and research centres with information on what criteria could be applied, and to advise on possible areas of concern. The statement does not cover good practices and closure in very broad terms, e.g. as it can be applied to an entire discipline, such as thermal hydraulic, high burn-up fuel behaviour, etc. Instead, it was decided to address good practices and closure as related to research programmes, considering that this approach would lead to a more practical and possibly more useful outcome.

The issue of maintaining technical capabilities and competencies is treated with some attention. Understanding on strategic research issues has been developed through earlier work of the CSNI's Senior Group of Experts on

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* CNRA: Committee on Nuclear Regulatory Activities.
CSNI: Committee on the Safety of Nuclear Installations.

Safety Research (SESAR), which culminated in the production of two reports on Capabilities and Facilities (1997) and Major Facilities and Programmes at Risk (2001) [2,3]. In the latter report a generic template was developed for determining essential facility and programme needs and the need for CSNI action in specific technical areas. In this template, criteria are set down for determining whether action is required in specific technical areas to maintain a key capability and/or facility. This paper proposes complementary guidelines which help to determine whether research work should cease. Therefore, this report should be read in conjunction with the SESAR FAP results, which help set down future needs and challenges, safety significance and criteria for research action.

2. GOOD PRACTICES

The programme background, objectives, deliverables and schedule should be clearly defined, and progress monitored regularly as part of good practice. Setting a well-defined programme basis and monitoring practice also enables to verify whether a programme is producing the results that were expected in a timely manner and provide early warning, when it occurs, of insufficient performance. These are elements that might be decisive for the continuation or closure of a research programme. In a research programme, closure is part of good practice.

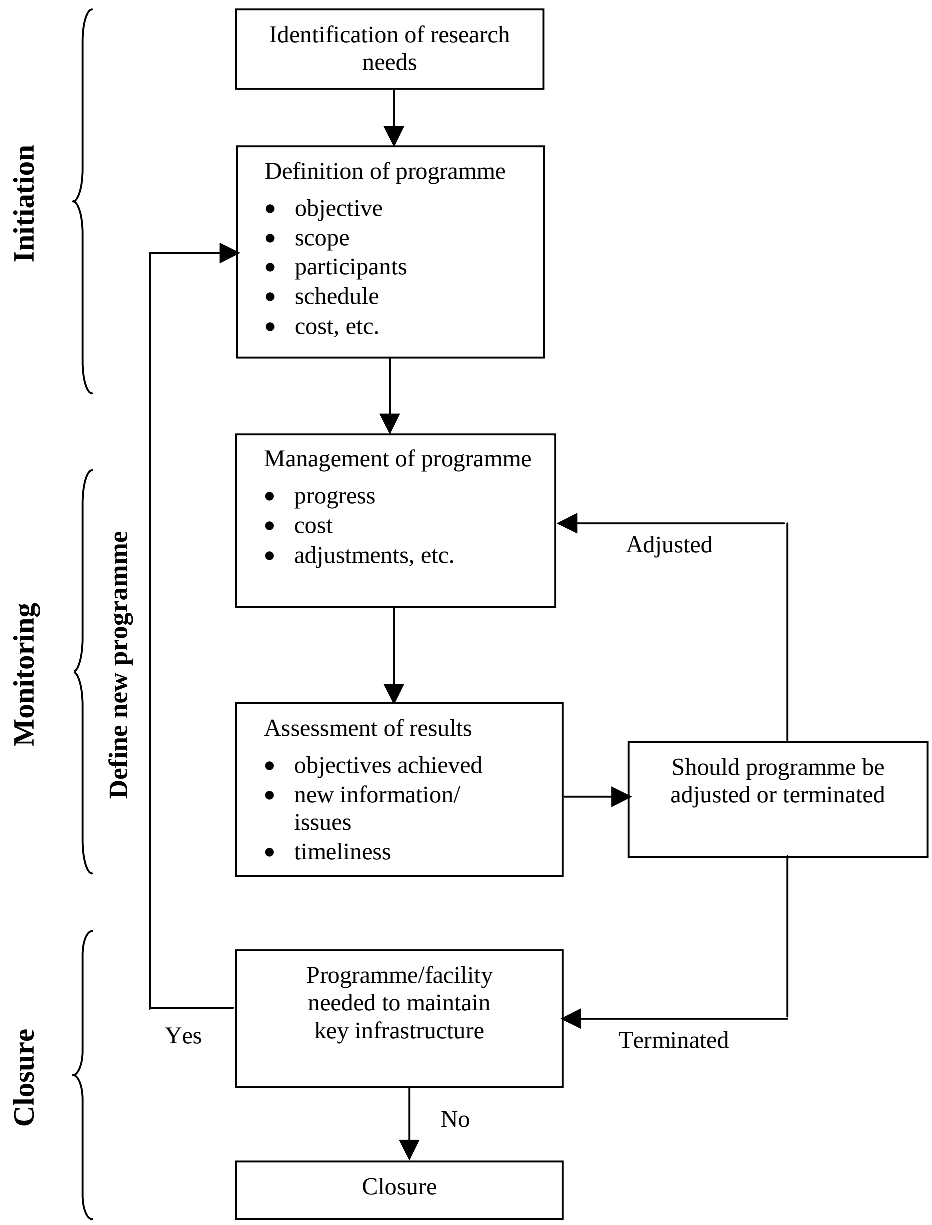
Discussed below are good practices related to research programme initiation, monitoring and closure. The relationship of these practices are also illustrated in Figure 1.

Programme initiation

A programme may be started in response to a specific safety issue. For instance, experimental programmes have been started aiming to define fuel failure limits and consequences of reactivity transients at high burn-ups. In other cases a programme may consist of a variety of items and its contours may be less precise. For instance, a programme devised to assess the safety implications of a plant power up-rate covers many disciplines and has many facets, and some details may emerge only after the programme has started. However, regardless of its complexity, it is essential that a programme is built on a well-structured basis. The key elements required to start a research programme are:

- The background should be clearly described in terms of main motivations, regulatory needs, technical developments that have determined such needs, existing knowledge and possible parallel efforts at the national or international levels. It is desirable that priorities on safety research are defined upfront, i.e. before specific programmes are defined [4]. Programmes must be consistent with such priorities.

Figure 1. **Good practices**



- A programme should have concrete and well-defined objectives. They should be defined in such a manner that one can as clearly as possible discern the steps needed to achieve them, as well as the stage at which one can state with reasonable certainty that the programme objectives have been substantially achieved. For these purposes, one should avoid devising objectives that are too generic or require considerable interpretation.
- The programme work scope should be specified with a reasonable degree of detail, and the schedule should outline when key parts of the programme are expected to begin, be carried out and completed. One should make sure that the programme schedule and completion are consistent with the time when the information is needed.
- The programme basis should include indications on how the information will be employed, such as for code validation, for setting safety margins, or as direct proof of a safety case at agreed boundary conditions. The intended application of the results to the reactor situation, and the scaling and approximation that may be necessary, should also be delineated.
- The intended users of the information should be well identified. One should also make sure that the programme and anticipated results meet the users needs and expectations and that the programme outcome is conveyed in appropriate form, e.g. through adequate data analyses and interpretation.
- Finally, there should be an explanation on how the programme responds to prospective needs for maintaining safety competence in specific fields, and on how it fits in an overall strategy for pursuing such goals.

Programme monitoring

During the execution of a programme, new situations can emerge that can affect the programme’s continuation. Thus, it is important that progress is adequately monitored by technical specialists, especially for programmes that can extend over a relatively long period of time (some years). In defining the programme management structure, the responsibility for such a monitoring function should be clearly identified. This means clarifying both who performs the monitoring and how this monitoring is to be carried out in practice.

It is normally undesirable that the scope of a research programme undergo frequent changes during its execution. However, changes may become a necessity under some circumstances. For instance when research uncovers new phenomena or concerns, or when evidence points out that the issues addressed have been resolved by other means or that objectives can be better met with a different work scope. The programme scope should allow for some flexibility, when this is feasible and does not compromise the credibility of the programme. A good preparatory phase is normally sufficient to avoid that important changes have to be made during the programme execution period. Considering successive programme phases may also help to avoid changes after a programme has started.

The development of a programme should be regularly monitored in order to check if the programme progresses regularly and meets its objectives and schedule. One should also monitor if situations arise that may put the continuation of a programme in danger, due for instance to one or more of the following circumstances:

- The progress of a programme may be unsatisfactory to a degree that can impair the programme objectives. To address this, it is important that monitoring is effective enough to identify problems as early as possible and that instruments for introducing corrective actions are available. For co-operative programmes involving one or more parties, there should be mechanisms available to maintain consensus when problems arise or to deal with situations where consensus breaks down.
- New situations can develop that make the intended programme unnecessary or that require a profound revision of objectives. This may arise because of changes in industry plans. For example, in the mid-1990s the Japanese industry decided to terminate its support to the development of the advanced thermal reactor and to eventually shut down the FUGEN reactor programme. As a result, the entire PNC programme on mixed-oxide fuel utilisation for water reactors was virtually brought to an end within months, which had important consequences for many experimental programmes in Japan and in Europe.
- New issues may be identified that require to be addressed in addition to or instead of those originally treated in the programme. For an experimental programme, these new issues may imply that the experimental matrix undergoes profound revision, or that some aspects are investigated in greater depth. The CABRI reactivity-initiated accident (RIA) tests, for instance, prompted a renewed interest in RIA issues and showed the need of a programme focusing

on the effect of cladding corrosion and hydrogen content on failure propensity in representative reactor coolant environments.

- New information may have been generated in the programme or elsewhere that already provides sufficient insights for resolving the issue addressed by the programme. Or new information may show that the programme must be re-oriented in order to be effective.

Programme closure

As indicated earlier, closure is a part of good practice. A clear definition of objectives, work scope and schedule helps one to recognise when a given programme is fulfilling its objectives and approaching conclusion. The same applies to detailed projects that might compose larger programmes. A close monitoring of progress, and of all relevant information that becomes available, helps determine whether a programme is on the right track or if corrective actions are needed. Drastic changes in situation (e.g. in industry plans or in regulator priorities) or unsatisfactory performance may bring the continuation of a programme under question.

Establishing generic closure criteria can be very difficult, especially if one wishes to apply them to all possible cases. Anticipatory research, for instance, aims to explore ranges of conditions where knowledge is normally limited, and where a measure for "sufficient knowledge" (beyond which further research is not needed) may be difficult to define in a straightforward and objective manner. The same applies for low probability phenomena, which usually have to be addressed by regulatory research. Often, in order to fulfill their tasks, regulators have to explore low probability events for which conditions can be difficult to define and for which operating experience is lacking or non-existing. Although a well-devised programme basis and monitoring may, as said earlier, help set and keep a programme on proper track, it can sometimes be difficult to judge *a priori* how compelling the motivation for the research is, or to anticipate whether the research will eventually produce substantial outcomes.

Regulators and industry share a common goal of performing research to support safe plant operation. However, differences can exist between industry and regulator viewpoints on the need and purpose of research. While industry recognises the importance of research in assuring safe plant operation, it also performs research to reduce costs and to improve efficiency and reliability of operation. In contrast, regulators, consistent with their mandate, are often interested in performing research in greater depth or for a wider range of conditions, in order to confirm the robustness of the safety case and to provide greater confidence in the identification and resolution of potential safety issues [4]. Thus, it would not be surprising if regulators and industry sometimes have a different opinion on which programme should or should not be closed.

Safety research is needed not only to verify that current operation is safe, but also to quantify safety margins, and to ascertain whether these margins can change as a result of more demanding operation. For example, higher fuel burn-up and plant life extension are two areas that require continued updating of knowledge, because safety assessments cannot rely on extrapolations and because fewer data are available at conditions that are relevant for those assessments. Thus, it is not surprising that, for instance, reactor pressure vessel studies that have been conducted for decades are still continuing, if one considers the importance of this issue and the variety of technical aspects that need to be examined in view of the operating experience and the possibility of extending the life of the vessel past the original design intent. Similarly, there is a general consensus today that, as industry plans continue to evolve on high burn-up for example, nuclear fuel safety research needs to be maintained, even if fuel research has been performed since the beginning of the nuclear power age. (It is interesting to observe, however, that at the start of the 1980s it was decided – first in the USA and then elsewhere – that fuel was no longer a concern for regulators. As a result, some regulators effectively terminated fuel safety research for 10-15 years. This decision was reversed in the mid-1990s, acknowledging that fuel safety is an essential part of regulatory research.)

While there are conditions under which closing a research programme becomes a necessity, the points raised above intend to suggest caution in addressing the closure issue. One should carefully weigh all possible consequences a decision to close a programme might entail, and try to avoid over-simplifications. For instance, the fact that a programme has lasted for a long time is not by itself a sufficient reason to close it.

A safety research programme can be closed when it has met its objectives and when there is a general understanding that knowledge is adequate and further research is not needed. A programme can also be closed if one of the following circumstances occur:

- There is convincing information available (convincing for the regulator) that the issue addressed in the programme does not constitute a challenge to plant safety. This convincing information might have been generated in the programme itself or in some other research programme, or be the result of a plant design or operational change. Two aspects should be considered in this context. The first is the definition of "convincing information". The second regards the time interval over which such information is expected to remain convincing. Both aspects need to be examined with sufficient attention before deciding on closure. It is questionable whether probabilistic safety assessments performed to determine the extent to which an issue constitutes a challenge to plant safety should also be used to determine whether a programme should be closed or not. Probabilistic assessments can help in making a decision on closure, but should not substitute a comprehensive evaluation of a variety of factors, including technical and strategic considerations.

- Existing information is sufficient to enable the regulator to draw conclusions on how to deal with a given safety issue. For instance, information is sufficient to define safety criteria for the issue in question, account taken of data uncertainty.
- It is unlikely that further research will provide regulators with useful results or results that will substantially augment the knowledge that is already available, for example because the return of knowledge from a programme has diminished with time. This obviously requires that there is a good understanding both of what is available and of the added value of further research. A time perspective is also important in this case. A related aspect concerns the cost of performing research. Decisions on closure may be taken depending on whether the expected safety advances justify the cost of research, a balance that may involve a variety of considerations and that can be difficult to make in quantitative terms only.
- There have been important changes in situation that affect overall priorities. It goes without saying that sudden changes can only occur exceptionally, whereas gradual changes are part of normal evolution of safety research. While gradual changes in situation can be managed through normal adaptation of research, sudden changes require some degree of flexibility – and a reasonable amount of time – in order to be adequately accommodated.
- The programme performance is unsatisfactory, to a degree that can jeopardise the achievement of the programme objectives. Management changes and other actions should be considered at the earliest possible stage and before taking more drastic steps.

3. PRIORITY CRITERIA AND PROGRAMME RANKING

In some conditions, for instance when research budgets are tight, having a reference set of research priorities can help to rank different programmes and possibly determine which programme should be pursued and which one should be closed or not started.

The method for setting safety research priorities and the criteria for ranking programmes and projects vary from one country to another. In general, it is important that the regulatory authority sets its priorities on research initiatives ahead of discussing any ranking of specific programmes with other partners. The practice of establishing priorities upfront helps set an orderly and transparent course for research programmes, where regulator priorities are well identified and focused.

For example, this practice is used by the *Institut de radioprotection et de sûreté nucléaire* (IRSN) in France and by the Nuclear Installations Inspectorate (NII) in the United Kingdom. In France, the IRSN and *Électricité de France* (EDF) determine their strategy separately, including the objectives of possible collaboration and taking into account the requirements of the safety and protection authority. In Germany, an evaluation commission under the chairmanship of the Federal Ministry of Economics and Labour (BMWi) (and with BMU/BMBF* representation) defined priorities in the fields of nuclear reactor safety and nuclear repository research. Leading members of German research institutions are members of this commission. In the United Kingdom, issues that the regulator requires to be addressed by research are listed on a nuclear safety research index, which is periodically reviewed. At the US Nuclear Regulatory Commission (NRC), priorities are based on the guidance of specific performance goals, which are general criteria that USNRC research shall satisfy. A similar practice is also used in Japan. A special committee in the Nuclear Safety Commission of Japan discusses and sets priorities from the view of regulatory requirements and safety improvements according to pre-determined

* BMU: Federal Ministry of Environment, Nature Protection and Reactor Safety.
BMBF: Federal Ministry of Education and Research.

criteria, such as a) technical value, b) potential to address the specific safety issue, c) personnel development and maintenance of capability, etc.

The criteria for programme ranking could reflect considerations such as:

- the priority of the safety research issue it entails (when research priorities are defined upfront);
- the capacity to address a safety issue in a comprehensive manner;
- the potential for substantial improvements in accident mitigation and management procedures;
- the level of risk involved (when risk assessment is feasible and/or appropriate);
- the extent to which it affects plant operation, if it is an operating plant issue;
- the number of plants affected;
- the programme cost and duration;
- the likelihood that it will bring conclusive results;
- the relevance it has for maintaining strategic competence and infrastructure.

In principle, one could also try to associate a weight factor to the above or possibly other criteria. However, quantitative methods should not substitute sound judgement. Further, one should consider the possibility that programme ranking, which may imply closure of some programmes, is performed by two independent parties, and that a discussion takes place in case of disagreement between the two. In Japan, in addition to the overall and qualitative evaluations, a provisional quantitative approach is used for programme ranking.

4. OTHER CONSIDERATIONS

Maintaining or closing a safety issue or programme can have significant strategic implications. Ceasing to do research may lead to a team of experts to be disbanded or a facility closing. An aspect that needs to be considered in this respect is the risk to operation and/or regulation of not having access to this expertise in the event of a future problem. One should also evaluate whether this risk can be reduced through, for instance, maintaining research but re-orienting it, or by establishing bilateral or multilateral collaborative efforts at the national or international levels that facilitate access to alternative expertise and results.

Efficient and well-conducted research programmes may in some cases result in an early closure of research, for the very reason that it had been effective beyond expectations. This may lead to the paradox that good research, instead of being praised, may have negative consequences for those who have performed it. (Fortunately, good research teams are normally able to adapt to changes and can absorb occasional adjustments.)

Premature closing of research may leave key questions unanswered. The potential for new questions arising in a not too distant future – if not at present – should be carefully evaluated in order to avoid the risk that they remain unanswered or are not answered in a timely manner. As mentioned earlier, the regulator and industry perspective on research needs may at times be different, for instance because regulators might need to perform research in greater depth or for a wider range of conditions in order to confirm the robustness of the safety case. It is thus advisable that regulators have the option of pursuing further research on an independent basis.

Premature closure of safety programmes may in some cases adversely affect the efficacy and effectiveness of regulation, for example when regulators are not in a position to provide timely response to industry initiatives. This can happen when knowledge is lacking and in addition when expertise is not readily available to provide the necessary answers. Another consequence of premature closure that can affect industry may be that, because information is limited, the regulatory decisions are overly conservative. Whether this is a problem or not differs from case to case.

While one should be aware of the potential consequences of closure, pursuing useless or ineffective research for the purpose of maintaining competence can be detrimental. This is particularly true if this condition lasts for a considerable period of time. It is unlikely that good researchers would remain in the unsatisfactory condition of performing ineffective research for very long. On the contrary, it is plausible that such a situation would have negative effects on work morale and motivation, and in any case result in loss of expertise.

A research programme should be closed when there is no sufficient technical basis for continuing it. However, the way closure is carried out should reflect the considerations outlined above on the consequences closure implies. Continued, open communication between those who commit and those who perform research is essential in order to timely address potential problems, especially when they might lead to closure of a research programme. Good communication also helps in discussing and identifying possible remedies at an early stage. As said before, good research teams normally can cope with changes, especially if these are proposed in a constructive manner and when sufficient time is given to adapt to new conditions.

Favouring regulator-industry collaboration in performing research may facilitate open and constructive discussions on closure of certain research issues or programmes, and also reduce the impact of closing research. This relates to the points raised above on potential consequences of premature closure, as well as to the issue of maintaining competence. On the latter point, a recent NEA report [4] states that: "Regulator-industry collaboration permits the most suitable facilities and expertise to remain available for both parties, to the advantage of the quality of the experimental work that needs to be carried out. In some cases there is only one facility available that can do the job, and it may then become essential that two key users such as the regulator and industry share its utilisation in an optimal way, for instance by means of joint undertakings… This not only has the advantage that unique technical resources are made available to more users, but also that good facilities and expertise have the opportunity of reaching a broader spectrum of customers… For key facilities to remain available in the future, it will be very important to have the potential and flexibility to serve both regulator and industry without being drawn into conflicts of interest. The establishment of joint regulator-industry research programmes is probably the best way to achieve this goal."

5. REFERENCES

[1] NEA (2001), *Collective Statement on the Role of Research in a Nuclear Regulatory Context*, OECD/NEA, Paris.

[2] NEA (1997), *Nuclear Safety Research in OECD Countries: Capabilities and Facilities*, OECD, Paris, ISBN 92-64-15509-0.

[3] NEA (2001), *Nuclear Safety Research in OECD Countries: Major Facilities and Programmes at Risk,* OECD/NEA, Paris, ISBN 92-64-18468-6.

[4] NEA (2003), *Regulator and Industry Co-operation on Nuclear Safety Research: Challenges and Opportunities*, OECD/NEA, Paris, ISBN 92-64-02126-4.

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