



**Interim Evaluation
Seventh Euratom Framework Programme
(2007-2011)
Direct actions of the Joint Research Centre**

Final Report
February 2010

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PREFACE BY THE CHAIRMAN

In the autumn of 2009 I had the honour and pleasure to chair a panel of international experts that carried out an interim evaluation of the nuclear activities of the Joint Research Centre (JRC) under the Seventh Euratom Framework Programme. I wish to express my personal gratitude to the members of the panel, whose expertise perfectly covered the relevant nuclear research disciplines.

It is a sign of strength of a programme when it remains open to feedback and is adjusted accordingly. Evaluation gives this feedback. Therefore the report of this interim evaluation is no exception to the rule that evaluation reports tend to focus on what can be improved rather than on recording the well-functioning elements of the programme.

The panel was clear in expressing a very positive assessment of much of the nuclear activities done by the JRC within the programme. In spite of this overall positive appreciation, the panel believes that there is considerable scope for clearer programming, improvement of governance and better articulation of a strategic vision for the programme with a horizon of 2030.

This dedicated evaluation of the JRC's nuclear activities encourages the Centre to take a strong position in the Euratom programme and to make sure that it takes an appropriate share in the EU's efforts for the further development of the safety and security of nuclear energy.

Finally, I would like to take this opportunity on behalf of the panel to recognise the assistance provided to it by the staff of the JRC. Particular thanks go to Pieter van Nes and Guy Bordin for their efforts to facilitate the panel's work.

Hervé Bernard

EXECUTIVE SUMMARY

This report presents the interim evaluation of the direct actions of the Joint Research Centre (JRC) under the Seventh Euratom Framework Programme (2007-2011). The evaluation took place half way through the programme and covers the period of January 2007 until September 2009.

The evaluation addresses three sets of broad subjects, the rationale and the relevance of the programme, the implementation of the programme, and the achievements and the performance level of the actions.

The panel assessed the substance of the various actions, looking at the contributions to more general goals of European research. Whereas the focus of the analysis was at the level of the actions, the objective remained to derive macro-level conclusions on target setting, programming and governance. The overall assessment of the work is positive, based on the consideration that much of the JRC's scientific work is of a very high standard (internationally at the highest level).

In spite of this, the panel also has the strong opinion that there is much scope for clearer programming, improvement of governance and better articulation of a strategic orientation for the programme and the necessary experimental facilities. This is expressed in three main recommendations, which should also help the JRC to prepare convincing proposals to continue the Euratom programme beyond 2011.

1. The panel recommends that the JRC should enhance the transparency, effectiveness and efficiency of the governance of its nuclear activities through:
 - Improving and recording formal customer consultations with respect to the definition, planning and implementation of the Euratom programme;
 - Adopting a management structure that assigns more clearly the overall responsibility for all nuclear activities in the JRC; and
 - Minimising the bureaucratic burden of quality management.
2. To help underpin the JRC proposals for the Eighth Framework Programme, the panel recommends the JRC to develop an ambitious "Vision 2030" and associated strategy for its nuclear activities, which:
 - Starts from a stock-take of the impact of the JRC's past work;
 - Builds on the Strategic Research Agenda (SRA 2009) of the Sustainable Nuclear Energy Technology Platform (SNETP); and
 - Defines a 10-20 year outlook for its nuclear research facility infrastructure with an associated implementation plan.
 - It is recommended that the development of the vision and strategy include substantive consultations with external experts.
3. The panel recommends the JRC should place more emphasis on transparent reporting of its results, achievements and impacts. This would be facilitated by the use of specific, measurable, achievable, relevant, time-related (SMART) objectives at every level of the programme.

1 INTRODUCTION

1.1 Historical background

The nuclear activities of the JRC stem from the Treaty on the European Community for Atomic Energy (Euratom) signed in 1957. Article 4 of this Treaty made the Commission responsible “for promoting and facilitating nuclear research in the Member States and complementing it by carrying out a Community research and training programme”, whilst Article 8 foresaw the establishment of a Joint Nuclear Research Centre (JRC).

In the mid-1960s towards the end of two five-year research programmes, the interest in a common nuclear research programme almost disappeared and instead of a third dedicated nuclear research programme the JRC received a programme with a wider mission extending its scientific and technical work into “non-nuclear” domains.

In the mid-1980s the JRC programme became part of the first Euratom and European Community Framework Programmes for Research. Since then these two framework programmes have specified the content and budget of the JRC.

At the start of the 5th Framework Programme (1998-2002), the JRC formulated its current mission, which is to provide customer-oriented scientific and technical support to EU policies as a service of the Commission. This has led to the JRC today, which has a broad range of activities covering a variety of scientific and technological fields in support of different EU policies.

1.2 The JRC in the Seventh Euratom Framework Programme

The Seventh Euratom Framework Programme (FP7) for nuclear research and training activities (2007-2011) defines the JRC’s nuclear activities in general terms. The Euratom FP7 Specific Programme (SP) for the JRC describes these activities in more detail, but still in rather general terms. The decisions for these Euratom programmes were taken at the end of 2006, in conjunction with the decisions for the Seventh European Community (EC) Framework Programme (2007-2013) and its specific programmes.

Based on these formal programme decisions the JRC prepared its multi-annual work programme (MAWP) for the period 2007-2013, which was endorsed by the JRC’s Board of Governors and approved by the European Commission. The Euratom “agenda” within this MAWP runs from 2007 to 2011.

The MAWP and the derived annual work programmes are organised into “actions”, which are the smallest “administrative entities” for implementing the JRC programme. Each action has its own set of objectives and associated resources.

The nuclear actions in the JRC annual work programmes from 2007 to 2009 are given in Annex 1. In 2009 the nuclear work programme comprised twenty five actions, which together account for roughly 30% of the financial and staff resources of the whole JRC. Indeed, the nuclear actions produce a proportional

share of the output, for instance in terms of peer-reviewed publications and competitive income.

The JRC implements its Euratom programme in five of its seven institutes as follows¹:

- The Institute for Transuranium Elements (ITU) in Karlsruhe: 100% nuclear work;
- The Institute for Energy (IE) in Petten: ~40% of the work related to the nuclear domain;
- The Institute for Reference Materials and Measurements (IRMM) in Geel: ~30% of the work related to the nuclear domain;
- The Institute for Protection and Security of the Citizen (IPSC) in Ispra: ~20% of the work related to the nuclear domain; and
- The Institute for Environment and Sustainability (IES) in Ispra: < 5% of the work related to the nuclear domain.

The nuclear programme of the JRC employs approximately 25% of the total 2700 JRC staff. The total annual budget of the JRC is of the order of €350 million, of which roughly €100 million comes through the Euratom programme.

1.3 The interim evaluation

Major evaluations in the past always involved the nuclear and non-nuclear activities of the JRC together and simultaneously for both framework programmes (EC and Euratom). However, the panel of the last external major evaluation—the FP6 Ex-post Evaluation²—recommended changing this approach and submitting the organisation to smaller, thematic evaluations. At the same time the different life spans of the Euratom and the EC framework programmes introduced as of 2007 made it necessary to separate the evaluations of the activities under the two programmes.

This interim evaluation concerns the JRC's direct actions under the Seventh Euratom Framework Programme (2007-2011). The evaluation deals with the work carried out as part of Policy theme 5 of the MAWP, i.e. the nuclear activities of the JRC, and with this evaluation, the JRC is de facto implementing a first thematic evaluation. The non-nuclear activities undertaken by the JRC are not addressed in this evaluation; they will be subject to an upcoming interim evaluation of the EC FP7.

In carrying out the evaluation the panel studied the following evidence base:

¹ The synthesis report of JRC infrastructure lists a cyclotron used to produce radioisotopes hosted in the Institute for Health and Consumer Protection (IHCP). This institute has no action in the JRC Euratom programme.

² Ex-post Evaluation of Joint Research Centre (JRC) Direct Actions in the 6th Framework Programmes 2002-2006, Final Report, September 2008, http://ec.europa.eu/dgs/jrc/downloads/2008_expost_fp6_evaluation_final_report_en.pdf

General information

- The baseline against which the assessment was made (framework programme, specific programmes, multi-annual work programme);
- General reports on progress (e.g. annual reports, annual activity reports, and the results of customer surveys);
- Reports of previous framework programme evaluations and Commission replies; and
- JRC “Facts and Figures”, a summary document containing, inter alia, information on human resources and budget implementation for the JRC and the nuclear programme.

Specific information

- A report from each “Euratom” action in the JRC during the evaluation period;
- Statistical information on the implementation of the research activities (i.e. publications, patents, etc.);
- Detailed publication data from JRC’s corporate publication repository (PUSBY);
- A synthesis of an internal report on JRC infrastructures; and
- A status report on the follow-up to recommendations of the ex-post FP6 evaluation which was carried out in 2008.

1.4 Evaluation methodology

In accordance with the terms of reference (cf. Annex 2) for the evaluation, three sets of broad evaluation subjects were addressed:

- First the rationale and the relevance of the programme by posing the following questions: Is the programme consistent in structure and in content and do the actions that the JRC carries out fit the programme? What are the objectives it addresses? Are the activities in the programme consistent with these objectives? These questions were then tackled by analysing the programme descriptions and the relevant aspects of all actions in the programme.
- Second the implementation of the programme. This covers aspects of the organisation and planning of the actions. The panel investigated this by analysing all JRC actions carried out under the Euratom programme and by looking at the macro-level how the JRC organises the governance of its programme and actions. Where possible, considerations are provided in this report on efficiency and cost-effectiveness.
- Third the achievements and performance level. Here the substance of the various actions was assessed, looking at the contributions to more general goals of European research. Some statements are provided on the performance level within the programme and on the follow-up given to previous evaluations. The focus of the analysis was at the level of the actions, but with the objective of deriving macro-level conclusions.

To agree on the working method, the findings, conclusions and recommendations the panel had a number of working sessions before or during the visits to the JRC institutes and during the drafting stage the panel also used videoconferencing facilities.

The panel organised the evaluation in a number of tasks as follows:

- a general analysis of the background documentation (as listed in Annex 3);
- an analysis of the twenty-five nuclear actions in the JRC Euratom programme explained below;
- an exchange of views with JRC management and staff at several JRC institutes;
- on-site visits to the facilities and laboratories;
- the establishment of a list of findings and issues to be flagged in the final report; and
- the drafting of a final report (this document) with the main observations and a set of recommendations.

The assessment of the twenty-five actions is at the basis of this interim programme evaluation. Each of the actions produced an “action report” for the panel. The panel assessed the actions addressing a number of questions pertaining to their rationale and relevance, customers, implementation, deliverables and achievements (cf. Annex 4). Each action report was analysed by at least two experts. In addition, upon request, the reports have been complemented by a self-assessment from the responsible action leader answering the question: How do the achievements of this action compare to what is achieved elsewhere in the relevant fields? Based on the various pieces of information the panel assessed the performance of each action in the Euratom programme, but refrained from ranking them.

The panel met with a range of staff when meetings were held at JRC sites. It also had discussions with the director general of the JRC, the institute directors of the IE, IRMM and ITU, most heads of units and a number of action leaders of the five institutes with nuclear activities. These contacts were very useful for better understanding the details of work carried out in the actions and thus for arriving at a better-informed judgement on the programme as a whole.

Chapters 2, 3 and 4 of this report deal in consecutive order with the above-mentioned evaluation subjects: the rationale and relevance of the programme, the implementation of the programme, and the achievements and the performance level of the actions. The observations and suggestions made in these chapters are summarised in the last chapter. In the end the panel grouped the issues and made a synthesis of the suggestions and proposed remedies, which resulted in three final recommendations to the JRC to further strengthen its Euratom programme.

2 THE RATIONALE AND THE RELEVANCE OF THE PROGRAMME

2.1 Rationale

The JRC Euratom programme is divided into three areas:

- (a) Nuclear waste management, environmental impact;
- (b) Nuclear safety; and
- (c) Nuclear security³.

According to the JRC Specific Programme⁴ the nuclear activities of the JRC “aim at satisfying the R&D obligations of the Euratom Treaty and supporting both the European Commission and Member States in the fields of the safeguards and non-proliferation, waste management, safety of nuclear installations and the fuel cycle, radioactivity in the environment, and radiological protection”.

The overarching objective is “to provide customer-driven scientific and technical support for the Community policy related to nuclear energy, ensuring support for the implementation and monitoring of existing policies while flexibly responding to new policy demands”. Elsewhere the programme formulates this also as “to develop and assemble knowledge, by providing crucial scientific/technical data and support for safety/security and reliability, sustainability and control of nuclear energy, including the assessment of innovative/future systems”.

The panel found that in general the work of the JRC is pertinent to these general aims and objectives, but it had difficulties understanding the rationale for including “medical applications” of nuclear research under these thematic areas and aims. To the panel this appeared as a subject outside the scope of the JRC Euratom programme. On the one hand the Euratom JRC specific programme and the MAWP include, rather inconsistently, “Medical applications from nuclear research” as sub-agenda of the thematic area (a) nuclear waste management, environmental impact. On the other hand, the higher level Euratom Framework Programme does not refer to medical applications as a topic for the direct actions of the JRC, whereas it does so for the indirect actions. Hence there is an evident inconsistency between the framework programme and the specific programme.

At the start of the programme there was an action “Alpha-immunotherapy” (AIT action 51502) and an action “Boron neutron capture therapy” (BNCT). The latter stopped in 2008. The action AIT is on-going and the associated study of the production of alpha emitters and their therapeutic efficacy is of high scientific quality. Hence there may be no reason to stop this work as such, but

³ Note that this nuclear security area also includes nuclear safeguards. For the future, it would be helpful if the action title was extended to reflect this fact, i.e. to read “Nuclear Security and Safeguards”.

⁴ COUNCIL DECISION of 19 December 2006 concerning the Specific Programme to be carried out by means of direct actions by the Joint Research Centre implementing the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011) (2006/977/Euratom)

the administrative programmatic inconsistency should be remedied sooner rather than later, in any case for the Eighth Framework Programme.

Following recommendations of the previous evaluation², the JRC is elaborating a corporate strategy that will determine whether research on medical applications has a place in the JRC work programme. The panel notes that work on alpha-immunotherapy could have significant potential for third-party funding and a partnership with industry.

The panel broadly supports the rationale of the JRC Euratom programme as adopted by the Council and the European Parliament. It found no logic for including medical applications in this programme. This issue has to be addressed before the next framework programme starts.

2.2 Objectives

To assess the rationale and the relevance the panel analysed the Seventh Framework Programme and the JRC Specific Programme in some detail and noticed the rather general character of the objectives. Early on in the evaluation it became clear that a straightforward evaluation of the JRC Euratom programme against stated objectives was not an option.

Understandably, the objectives of a programme that will run for at least five years need to have some flexibility, but objectives in the Euratom programme decisions should be more specific on the expected results. A strategic approach with a more explicit vision for the nuclear activities within the JRC would help to underpin the programme and to identify more specific objectives; something which is referred to again in the panel's overall conclusions.

The programme setting for the JRC's nuclear activities shows quite a number of unconnected objectives dispersed over the framework programme, the specific programme, the annual work programme and the individual actions. This hampers a straightforward evaluation and the senior management of the JRC should examine where and how it can convert the (too) flexible objectives in the Euratom programme into SMART⁵ objectives in a future programme.

At action level there are too many cases in which stated objectives are rather weak and self-serving (e.g. the stated objective of CAPTURE, action 52303, "To sustain the position of the JRC as a reference centre") or too general (e.g. FANGS, action 52303, "Evaluation of feasibility, safety and performance of next generation nuclear reactors and fuel cycles").

To facilitate an assessment of achievements against the stated objectives the panel recommends for the next Euratom nuclear programme that the JRC should formulate objectives that are more specific at every level of the programme.

⁵ SMART: Specific, Measurable, Achievable, Relevant, Time-related.

2.3 Relevance

To assess the relevance of the JRC specific programme in the Euratom programme the panel analysed the scientific and technical content of the twenty five actions, looking at various aspects, i.e.:

- Pertinence to the needs and problems in nuclear energy research;
- Pertinence to the needs and problems of European policy makers and Member State authorities in charge of nuclear matters;
- Contribution to the EU strategic objectives and policies; and
- Suitability of the JRC to undertake this work.

The panel noticed that the majority of the actions can easily be related to nuclear energy research. The exceptions found concerned the recently initiated clearinghouse activities, part of the environment-related projects and the “medical applications” project on alpha-immunotherapy. However, it should be borne in mind that pertinence for nuclear energy research is only one element to make an action relevant and suitable for the JRC.

As regards the relevance of the specific programme, the panel found that all actions of the JRC are in line with the Council decisions on the specific programme for the JRC in the Seventh Euratom Framework Programme.

From the systematic review the panel found that most of the actions have relevance for the needs and problems of European policy makers and Member State authorities in charge of nuclear matters. The same applies for contributions to the EU strategic objectives and policies. Only for a handful of actions were these contributions less obvious, but in itself this was no reason for concern.

The information received through the combination of action reports, oral presentations, institute visits and interviews convinced the panel of the relevance of the programme and many of the activities therein. However, the official background documents concerning the nuclear activities hardly explain successes in a way that would allow decision makers to appreciate the importance of the programme.

This triggered the suggestion that the JRC should display its goals and achievements much more clearly, also in view of a proper underpinning of programme proposals for the Eighth Euratom Framework Programme. For long running programmes such as this one, under the current administration and legislation, the Council and the European Parliament will want to have an impact assessment showing convincing results (impact) from the past. Therefore the JRC needs a comprehensive account of its scientific and technical achievements covering a period longer than one framework programme.

The JRC should prepare a comprehensive overview of the impact of its nuclear activities in the last decade (i.e. during the last two framework programmes) with a view to a robust underpinning of future proposals for the Euratom Framework Programme and to improving the visibility and appreciation of its achievements.

3 THE IMPLEMENTATION OF THE JRC EURATOM PROGRAMME

Under the heading “implementation” the panel examined the organisation, planning and programming of the actions covering the JRC’s activities in the area of nuclear research. Subsequently a number of issues concerning the programme (customer involvement, programme planning and management, and quality management) were grouped under the heading “governance of the programme”. The two other issues addressed under implementation concern the “infrastructure” of research facilities and the “reporting” on the programme and the actions.

3.1 Governance of the programme

3.1.1 Customer involvement

The last two evaluation reports on the JRC were unanimous in noting that adoption of the mission with “customer-driven scientific and technological support” strongly contributed to the better positioning of the JRC since FP5. With this perspective the panel wondered “who is the customer” for the nuclear activities. An analysis was made of the customers reported by the nuclear actions.

For about 65-75% of the actions the panel could easily recognise a relation between the work carried out and customers presented. In the remaining cases the customer was less clear. Therefore the panel deepened the analysis by establishing a “customer profile” for the JRC’s Euratom programme. A survey was carried out for all the actions, to determine what percentage of the action’s work was devoted to work for Commission services, to work for external customers (e.g. international organisations), to work with and for stakeholders (e.g. Member States) and/or to research oriented towards serving the nuclear community at large.

The survey confirmed the impression that the Commission is not a strategic customer of the nuclear activities⁶: only one action estimates that it spends 50% or more of its work on specific deliverables for the Commission; for the twenty-four others the percentage is less than that. In fact, ten out of the twenty-five actions responded that the action produces no or hardly any deliverables for the Commission.

As an example of an important external customer of the JRC’s Euratom programme, the panel took the work at the JRC institute Geel that provides nuclear data to the International Atomic Energy Agency (IAEA) and to the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development (OECD). These customers specify their needs and required measurements to the JRC and there are procedures to select carefully which measurements ultimately are carried out in Geel. Nevertheless, from

⁶ Although there are no comparable statistics for the non-nuclear activities of the JRC, the available information in, for instance, JRC customer surveys shows that Commission services are the predominant customer of the JRC’s non-nuclear actions.

a corporate point of view the JRC has no formal procedure to organise these kinds of “customer requests”.

This led to the conclusion that there is scope for a much clearer and formal expression of the customer requirements in the governance of the Euratom programme. In view of the minority position of the Commission services in the programme’s customer base, the High Level Users Group (HLUG) is insufficient as a consultation mechanism for the Euratom programme. From inquiries on this issue the panel found that in most (but not all) of the cases there is a formal or informal, sometimes ad hoc, involvement of customers in the definition of activities, but there is no systematically structured documented customer consultation for every part of the programme.

The panel received some information on the drafting status of a corporate strategy and noticed that the JRC drew up the strategy mainly on its own. It incorporates feedback from horizon scans with relevant Commission services, from internal consultations and from the JRC Board of Governors, but there is no significant place for external feedback in the (nuclear part of the) strategy process. Considering that the nuclear programme has an important part of its customer base outside the Commission, the definition of the relevant parts of the vision and strategy and the derived work programme need a much stronger involvement of outside “customers”.

A systematic and structured customer consultation will make the nuclear programme more coherent. It would require predefined and well-described mechanisms to involve external customers (e.g. from international organisations, nuclear industry) at expert level in the conception, the planning and the execution phases of the programme down to the individual actions.

The JRC should define and implement a more formal and visible mechanism to involve external customers of its Euratom programme at expert level in the conception, planning and execution phases of the programme, similar to, or as an extension of the Commission High Level User Group.

3.1.2 Programme planning and management

In the various interviews and discussions on the nuclear programme it became apparent that the planning and management of the programme is dispersed as explained below.

The JRC carries out its nuclear activities in five institutes, ITU (Karlsruhe), IE (Petten), IRMM (Geel) and IPSC and IES, both in Ispra. An institute programme is partially, or in the case of ITU, fully nuclear, so the panel wondered how these nuclear parts are coherently defined, planned and managed. Is this done at institute level and brought together in a JRC programme or is it managed as a JRC programme of which parts are implemented in the institutes?

The ITU in Karlsruhe hosts roughly half of the nuclear activities of the JRC. They have an institute advisory group that provides the institute director with advice and expertise in scientific matters relevant to the work of the institute. The advisory group also gives its opinion on the institute programme to ensure that it is geared towards the real requirements of its customers and users and

that a high scientific standard is maintained. There is no such group for other institutes or for the Euratom programme in total.

Towards the end of FP6 the JRC set up a structure with seven “priority areas” in its work programme animated by seven Priority Area Coordinators (PACs). Since then these priority areas are indicated as PACs and the nuclear priority became PAC 5 with activities in ITU, IE, IRMM and IPSC and IES. This PAC is coordinated by the director of ITU. Considering that the nuclear activities amount to a 500 M€ nuclear research programme, over five years, coordination of work in five institutes can hardly be sufficient as a mechanism for implementation and management. Indeed, after the various consultations the panel finds that the definition and management of the programme in spite of the PAC is currently too dispersed amongst the institutes and concludes that the PAC approach has not led to homogeneous mechanisms for transparent and effective decision making throughout the JRC’s nuclear programme.

Management of a programme with the size and importance of the JRC Euratom programme requires more than just a coordinated approach. To define, plan and manage nuclear activities between the institutes effectively within one programme, the JRC should adopt a clearly defined management structure in which, for example, one senior manager has the overall responsibility for all nuclear activities in the JRC.

3.1.3 Quality management

The panel informed itself about the JRC’s approach to quality management via the briefings and through discussions with staff during the institute visits.

Currently several JRC institutes and directorates are certified according to the International Standardization Organisation (ISO) standards ISO 9001:2008 (quality management), ISO 14001:2004 (environmental management) and OHSAS 18001 (occupational health and safety). In addition to this, some JRC institutes have acquired laboratory accreditations according to ISO 17025. At the end of 2008 the JRC intensified its approach to quality management by setting the objective to achieve ISO 9001:2008, ISO 14001:2004 and OHSAS 18001 certifications for the whole JRC, i.e. for the management systems of all of its scientific and administrative directorates. This should be accomplished by the beginning of 2010.

The experience within the expert panel is that quality management is an excellent tool to clarify processes and procedures in an organisation and setting ISO as a standard may bring great benefits. However, the need to go as far as full certification of all parts of an organisation is less evident.

Although many organisations accept the cost associated with certification in exchange for the perceived benefit of an independent confirmation of conformity, the International Organization for Standardization itself promotes the idea that certification is not a requirement. Indeed, standards can be implemented without certification and bring the same benefits to the user organisations and to their customers.

Given the sophisticated system of internal standards and control mechanisms in place in the Commission for most of its operations, does the JRC need this additional independent confirmation for every part of its organisation? In the view of the panel an organisation like the JRC could limit certification to cases in which customer contract relations require it, which in practice would mean that only some selected laboratories in the JRC would need to be certified.

Since there are numerous successful examples of similar organisations that just implement the standards or achieve a first certification with no further renewal, the question was raised how the JRC would be able to justify the amount of money, time and paperwork required for continued certification of the full organisation to the ISO 9001 standard. In summary, the panel remains to be convinced of the appropriateness of the approach and is concerned about the cost-benefit ratio of continued certification for the whole JRC. A differentiated and nuanced approach to the implementation of quality management could be as effective and more efficient.

The panel takes note that the JRC embarked on a quality management approach in which it wants to achieve full certification for all of its scientific and administrative services. Based on considerations of cost-effectiveness the panel would take a more differentiated quality management approach, e.g. limit continued certification to cases where there is a contractual requirement.

3.2 Infrastructure

The nuclear research facility infrastructure of the JRC is a vital element for the implementation of the Euratom programme. Concerning whether the nuclear facilities of the JRC are appropriate for achieving its objectives in the Euratom programme, the panel found that these facilities in some cases are unique (GELINA) or rare (e.g. hot cells for fuel research, PERLA). In a few other instances the panel had questions about the objectives and scientific programme of facilities (e.g. insufficiently detailed for PUNITA). This led the panel to consider how the JRC currently plans its nuclear research facility infrastructure.

The panel was provided a preliminary version of an inventory of all facilities and equipment that make up the full scientific infrastructure for all disciplines in the JRC. This inventory had been prepared in response to a recommendation⁷ in the ex-post FP6 evaluation, but lacks the requested forward-looking assessment. To be of use for planning and programming an inventory should show the research facility infrastructure with its functions today, show when the various elements come to the end of their life, and include an assessment of when and what kind of new elements will be needed in future.

⁷ "... the JRC should start a continuous process for making a detailed short, medium and long-term assessment of the status of its research facilities and infrastructure with the aim to further enhance its efficiency and effectiveness. This should be part of an overall strategy."(recommendation in ref 2)

Currently the JRC operates without a formal medium or long-term plan for procurement, future replacement and refurbishment of major facilities and associated capital equipment. In the panel's inquiries the JRC confirmed that there is an official plan with "Priorities for JRC Infrastructure Development 2007-2010" and that budgeting has to stay within the EU's financial perspectives (currently 2007-2013). Considering the strong dependence of nuclear research activities on the infrastructure of an organisation, it is the view of the panel that this is an unusually short timeframe. The panel is of the opinion that the timeframe for infrastructure planning needs to be expanded considerably and that the nuclear activities of the JRC need a carefully considered "prospective inventory" with a formally endorsed implementation plan.

The panel believes that one issue to be reviewed in the development of a prospective inventory is of the scope for concentrating important nuclear facilities in fewer (say two or possibly three) sites. While the JRC's nuclear facility infrastructure is currently spread over four sites in four Member States, medium and long-term plans should elaborate proposed arrangements and adjustments necessary for consolidating the current experimental infrastructure. A prospective inventory for the nuclear activities of the JRC would also be useful in more clearly defining the position of the JRC in the implementation of the Strategic Research Agenda of the European Sustainable Nuclear Energy Technology Platform (SNETP). Naturally, this should include the JRC's vision of its future role in the domain of nuclear safety and security.

As a specific question in the evaluation the panel examined "whether the level of funding is adequate to achieve the objectives set". This issue was reviewed as part of the evaluation given the substantive costs and importance of maintaining JRC's nuclear research facility infrastructure. Overall, the panel considers that the JRC's activities under the Euratom programme are currently at an appropriate level and the JRC's current funding is both appropriate and necessary. In summary, with a view to upcoming proposals for the extension of the Euratom programme, budget and resources should remain at least at the current levels.

The nuclear part of the JRC programme has a specific research facility infrastructure component. For prudent planning of future replacement and refurbishment of major facilities the JRC needs to develop a "prospective inventory" of its nuclear infrastructure facilities up to 2030. This inventory should be developed against the background of the Strategic Research Agenda of the SNETP.

In view of upcoming proposals for the Euratom programme the panel believes that funding of the JRC's activities is currently at an appropriate level and its budget and resources for the future should remain at least at the current level.

3.3 Reporting

To comment on the arrangements for planning, monitoring, reporting and evaluation for the JRC's part in the Euratom FP7, as requested in the terms of reference, would require a complete study of the JRC's internal processes. Instead the panel focussed its attention on the tangible elements of these

processes presented for this evaluation, i.e. on the reports and the quality of the underlying “reporting” at the JRC.

To be more precise, the panel uses the general term “reporting” to refer to the feedback that programme implementers provide to stakeholders, budget authorities, and internal or external evaluators notably to:

- Report on progress towards stated objectives;
- Demonstrate the effectiveness of the programme;
- Meet accountability requirements; and
- Review and identify future priorities.

Indeed such feedback (reporting) is an essential element of proper programme implementation and for the current evaluation this concerns all reports received from individual nuclear actions as well as the various oral reports and feedback received in the presentations and discussions during the meetings with staff.

This collection of written and oral reports gave a good insight into the JRC’s Euratom programme and as such the panel found the level of detail an example of transparent programme reporting. This “action reporting” is highly appreciated and made it possible to extract a rather complete picture of the nuclear activities in the JRC. However, after reviewing these reports the impression remained that there is ample scope for improvement in the reporting, for instance on the following points:

- An action report should be explicit about the rationale behind the work; too often the report at best refers to it implicitly. Those who are responsible for the reporting in the JRC have to keep in mind that what may be obvious for insiders cannot be guessed by an external expert, a policy maker or a stakeholder. For example:
 - Reports on the NUSAC action 52104, the clearinghouse initiative, raised serious doubts about the benefits of the work. The panel had to ask many questions to find the evidence that the action effectively helped the nuclear industry to enhance the operational experience feedback from nuclear power plants and that the Technical Safety Organisations (TSOs) are properly involved in the initiative.
 - A similar situation occurred for MATTINO action 52304, which introduced the planned procurement of a liquid lead stress corrosion cracking test facility with so little explanation that the panel could only see this facility as rather duplicative. Further inquiries clarified that the planned facility has some unique aspects and took away the panel’s concerns.
- An action report should give concrete goals in the sense of scientific results strived for and the scheduled date of achievement. These items are explicitly required, inter alia, to allow proper evaluation. Where possible it would be useful to have a description of who is going to use the results, for what reason, and by when. It is understood that one cannot always be specific, but the panel found too many unspecific or meaningless objectives and there is ample scope for improvement. By contrast, the ND Minwaste action 51402 is a positive example.

- An action report should describe deliverables in clear and unambiguous terms. From an analysis of the deliverables in the action reports the panel found that around 60% of the actions provided concrete information on (the nature of) deliverables: an insufficient number and a further reason to criticise the reporting.
- An action report should present a verifiable and credible (list of) customer(s). Statistics indicate, as mentioned in section 3.1.1, that about 65-75% of the actions showed a credible list of customers. In the other cases the customer was less clear, with several actions giving long lists of customers and stakeholders without any reference on the nature of the relation with them. A list of customers becomes credible if there is information on how the different customers are involved, e.g. on the mechanisms by which they can influence the direction and priorities of the action.

Generally, the information provided for the evaluation was of a high standard. However, it would have been helpful if the JRC had presented detailed action information in the context of the three higher level areas (viz. nuclear waste management and environmental impact, nuclear safety, and nuclear security including safeguards). It takes time to develop the culture and documentation by which the organisation can clearly and quickly explain and defend the content and rationale of its work to external experts. A JRC “nuclear” vision/strategy to which the action leaders could refer would make this easier.

The quality of reporting at programme and action level should be enhanced. To enable a more precise measurement of achievement against stated objectives the programme should also be more specific in the formulation of the objectives in the various elements (areas and actions) of the programme. Deliverables have to be properly defined and reported, where possible with a description of who is going to use the results for what purpose and by when.

4 ACHIEVEMENTS AND PERFORMANCE LEVEL

4.1 Achievements

The work carried out in a large part of the actions is of a very good standard. Because of the infrastructure-driven character of nuclear research there is not much opportunity to pursue research that is driven solely by personal interest and the JRC's programme does appear to have the end uses in mind, though these could be specified more precisely.

Much of the work in this programme is continuously building and extending the basis for nuclear energy research and nuclear power plant operations. Therefore, in response to the relevant evaluation question in the terms of reference, it would be difficult to select specific achievements in the first 30 months of FP7 that provide the "indications in the early outcomes of the research activities that the overall and specific objectives of the Euratom FP7 can be met". All the same, the panel found enough scientific and technical deliverables of this programme to be supportive of the work done.

A specific question to look at was: to what extent is the programme contributing to more general goals of European research, i.e. (a) mobility and training of researchers, (b) innovation and or (c) the integration of researchers from new Member States? Based on the information in the action reports the panel compiled some statistics regarding these goals and found that some parts of the programme contribute significantly to these goals, whereas other parts hardly contribute at all.

As regards mobility and training, all nuclear actions together have hosted a significant numbers of visiting staff since 2007:

- Twenty-eight fellows worked on a PhD (three year contracts);
- Forty fellows worked on a post-doc (two to three year contracts);
- Twenty-five trainees students at pre- or graduate level (variable duration, commonly three to six months); and
- Forty-five other visiting scientists contributed to the JRC work, e.g. senior visiting scientists, detached national experts, and unpaid visiting scientists (stays of variable duration).

As regards the contribution to innovation within the Community the panel found positive contributions in 40% of the nuclear actions.

As regards the integration of researchers several actions supported the work of PhD students and/or hosted students post-docs and visiting scientists from new Member States. In total thirteen actions contribute in this way to the integration, nine actions contribute little or somewhat, and for three actions no data were available.

The panel acknowledges the JRC's sound contributions to the aims of the Euratom programme regarding (a) mobility and training of researchers, (b) innovation and (c) the integration of researchers from new Member States.

4.2 Performance level

The terms of reference of the evaluation asked for an expert view on the performance level of the nuclear actions. A fully fledged benchmarking exercise, if meaningfully possible at all, would require well-developed criteria to carry out an objective and transparent comparison with similar work done elsewhere. Therefore, in the context of this interim evaluation, the panel took a pragmatic approach to answering this question.

To develop an idea about the level of performance, all the action leaders were asked to make a self-assessment of their performance level. The panel could agree with the majority of the action leaders' statements about the position of their work within the nuclear research community. The panel considers this correct self-assessment as a positive indicator of the quality of the action leaders.

The panel's analysis of the action reports confirms that there is considerable appreciation of the work carried out in a good number of JRC actions. The text box in this section gives top comments expressed by the panel experts relating to the performance level of individual actions. There were some neutral and critical comments, the latter of which are dealt with in the next section.

To isolate complete actions at the other end of the performance spectrum is more difficult, but to some activities in the programme the panel would assign a different priority than the JRC. This may be because the JRC works with information that the panel does not have (e.g. informal unregistered customer demand), but it may also be because the push to do the work from within the JRC is higher than warranted by the needs of the nuclear community. Section 4.3 specifies the work which merits further discussion within the programme management.

Finally, as mentioned in the discussion on the programme in Chapters 2 and 3, there is certainly scope for improving the way in which the JRC brings the actions together in a programme that should be presented more coherently and supported by a clear group of customers (partners), first of all in the EU and where applicable, world wide.

The JRC has a long-standing tradition in the nuclear field and in many parts of the programme the work is of a very high standard and internationally at the highest level.

4.3 Comments on the actions in the JRC programme

In 2007, the first year of FP7, the programme started with twenty-eight nuclear actions; this grew to twenty-nine in 2008 and decreased to twenty-five in 2009. Besides the variation in number from year to year, there are also some actions that seem to be stopped but reappear under a different name with the same work profile without explanation. For instance VERTEC action 53105 on verification of nuclear facilities changed its name in 2009 to NUVER without change in substance; similarly action AMENUS 53104 on information analysis for nuclear security changed its name into IANUS. The MATTINO action 52304 on materials performance assessment appeared as a new action starting

A selection of quotes from the panel's comments relating to performance levels

"Top level, excellent scientific quality" NWD 51102, SCNF 52201, SANF 52301

"High international standard" ANFC 51201

"A highly competent group; internationally capabilities and status are probably only surpassed by the United States" FACIL 53103

"Internationally at the top" FAR 51301

"Internationally a leading role, acting as European infrastructure for nuclear data measurements open to European users" ND-Stds 51401, ND-Minwaste 51402

"The JRC has a good reputation and makes a substantive contribution in this area – probably surpassed only by the United States. Work in support of the IAEA is highly appreciated." NTAS 53108, NUSIM 53201

"Long-standing tradition and reference action for other EU and associate countries. Essential contribution to training researchers of new member states" KTE 51701

"JRC is in a world class position compared to institutes, such as US-DOE" METRO 53102

"Internationally a leading role in the use of laser-based techniques though similar technologies may exist outside the nuclear field" NUVER 53105

"The JRC is an IAEA reference partner for training inspectors and PERLA is a unique laboratory" NUMAMET 53106

"This action permits to give autonomy of judgement to the European Commission on nuclear security issues. Nevertheless, on some issues the exclusive access to open source information can be a limitation and the contribution of Member States must not be neglected" IANUS 53104

in January 2009 without reference to its predecessor actions and without explanation of the change. In 2009 ANTE action 51604 started, but is largely a continuation of MARE action 51602.

These modifications are of minor importance for the substance in the programme, but unexplained as they were for the panel, they make it difficult to grasp the exact work that is going on. The search for more transparency on this triggered the question how the JRC decides to start or to stop work and how an action becomes an action.

The presentations and discussions during the evaluation revealed a number of criteria that the JRC uses to justify or start work:

- Customer drive;
- Scientific excellence;
- Alignment with core competence, expertise and major equipment/facilities;
- Critical mass and concentration;
- Support to policy;
- Subsidiarity principle (Community added value); and
- Generation of competitive income with an eye for a balance between services and research.

These criteria cannot serve to justify decisions on starting or stopping an action. For that purpose the list would need to contain much more specific decision factors. However, in a broader perspective the management should be able to establish priorities based on a clear vision and strategy, peer review, and the requirements of users, customers and partners of the nuclear programme. The work needs to serve the strategy; if it does not then it should not be taken on.

For a number of cases the panel could see positive effects from merging actions into a more strategic entity. The two “nuclear data” actions (ND Stds action 51401 and ND Minwaste action 51402) are good candidates for that. The two actions with “knowledge management” in their title (KTE action 51701 and CAPTURE action 52303) provide another example and there could be more if the concept of an action were more focussed.

The research agenda “Nuclear waste management, environmental impact” and actions therein offer most scope for review:

- The case of alpha-immunotherapy (AIT action 51502) has been addressed already in detail in section 2.1. This action demonstrates the need for elaborated criteria for starting and stopping work referred to above. “Scientific excellence” is not an isolated criterion that is enough for inclusion in the JRC programme. An action should fit into an agreed strategy to realise the JRC’s vision in the nuclear field.
- The content of the environment-related work in REM action 51601 and in ANTE action 51604 is worth review:

- The impression is that the demand for the information provided by ANTE is more facility-driven than demand-driven. The expertise on the characterization of particles is of a high level, but this area has been thoroughly investigated and it may fit better into safeguards and forensic analyses than the environmental context. The scope could be redefined to obtain new knowledge (e.g. developing faster methods applicable in the field or methods for easier finding of particles). Hence the JRC management might wish to re-examine the need for this work.
- For REM the situation is different. The benefit and quality of the work is evident. The work in this action is justified as a Commission obligation to under the Euratom Treaty (Ch. III art 39). More recent legislation (e.g. CD 87/600 for emergency response and Recommendation 2000/473/Euratom for routine data monitoring) provide more details for implementing the general context of the Treaty text.

Finally the panel used the individual action reviews to help answer the question on cost-effectiveness. Above all, cost-effectiveness in this work is difficult to measure and the criteria are hard to fix. Even if it were at all possible to make the assessment, the panel did not dispose of the necessary elements to make a quantitative judgement, and to answer such questions the JRC should take on the burden of proof, i.e. provide convincing information that the work is carried out in a cost-effective way.

Nevertheless the panel posed this question of cost-effectiveness for each individual action, and for two thirds of the actions the panel saw no reason for concern. For the remaining one third, it was difficult to make a correlation between the amount of funds allocated for the period 2007-2009 and the allocated manpower. However, this was not sufficient reason to express concerns about the cost-effectiveness of these actions.

There is scope to consolidate and rationalise actions within the programme. What the ex-post FP6 evaluation recommended for the whole JRC certainly applies to the Euratom programme: a vision and a strategy for the nuclear activities would “help to set priorities and make the difficult choices between activities that are worthy of support and those which are not” (quote from the ex-post FP6 evaluation).

4.4 Follow-up to recommendations of the ex-post FP6 evaluation

The panel looked into the follow-up given to recommendations from the ex-post FP6 evaluation. The key recommendation there was that the JRC would need to develop a fully fledged corporate strategy. This recommendation, to formulate a vision with clear goals and establish a corporate strategy, was central to a number of other recommendations concerning planning, programming, evaluation and operation.

The panel considered its own observations in the light of the findings and recommendations of the ex-post FP6 evaluation and was struck by some overlapping issues:

- The FP6 evaluation addressed the strategic positioning of the JRC and specified explicitly that the Euratom commitment is a stable element within the JRC that should be distinguished in a corporate vision. This interim evaluation of the Euratom FP7 comes to an equivalent conclusion, i.e. that the JRC should develop a vision and a strategy for the nuclear activities that is part of any future JRC corporate strategy;
- The FP6 evaluation noted the lack of an adequate internal coordination structure for programme implementation (e.g. PAC). This interim FP7 evaluation identifies this under “governance” as an improvement issue for the nuclear activities of the JRC;
- The FP6 evaluation asked the JRC to pay attention to long-term planning and investments for facilities and infrastructure. This interim FP7 evaluation identifies this as an urgent strategic issue for the JRC Euratom programme.

As regards the status of the follow-up to the ten recommendations from the ex-post FP6 evaluation the JRC has communicated little that allows the panel to answer in an informed way. Interviews confirm that the ideas are there and that the thinking is advancing.

The time since the last evaluation may have been too short for accomplishing concrete results, but step by step the JRC should come to grips with these outstanding issues at all levels in all areas of its competence, including the nuclear area. In that respect this interim evaluation points in the same direction: for the JRC to achieve the results envisaged by the recommendations in the ex-post FP6 evaluation, a consolidated nuclear programme is crucial.

Considering the central role of the formulation of a vision and the establishment of a strategy in the ex-post evaluation follow-up, the panel wishes to reiterate that the strategic framework for the JRC’s nuclear activities should be elaborated with substantial feedback from the nuclear customer base, which, as noticed in Chapter 3, is largely outside the Commission.

The JRC is undertaking a substantial follow-up to the recommendations of the ex-post FP6 evaluation. It is too early to judge the progress based on the emerging results, but the panel encourages the JRC to implement all recommendations from the ex-post FP6 evaluation. A consolidated nuclear programme is crucial for the JRC to achieve the results envisaged by the recommendations in the ex-post FP6 evaluation.

5 SUMMARY AND RECOMMENDATIONS

In conclusion the last chapter of this evaluation report lists a summary of the observations and suggestions made. The panel made a synthesis of the suggestions and presents them at the end as three main recommendations that follow from this evaluation.

Regarding the **rationale and relevance** of the JRC nuclear activities, the report identified the need to:

- Resolve whether work in the area of medical applications (e.g. alpha-immunotherapy) should be part of the JRC's direct actions under the Euratom Framework Programme;
- Formulate more specific objectives in the programme as well as in the individual actions; and
- Prepare a comprehensive overview of the impact of the JRC's nuclear activities in the last decade (e.g. impact of work undertaken in the last two framework programmes).

Regarding **implementation** of the nuclear work programme, the report identified the need to:

- Develop a more formal and transparent mechanism to involve external customers in the definition, planning and implementation of the Euratom programme;
- Introduce a management structure that defines clear overall responsibility for all nuclear activities in the JRC;
- Minimise the bureaucratic burden of quality management (e.g. limit continued certification to cases when customer contract relations require it);
- Prepare a long-term plan (10 to 20 year horizon) concerning the JRC's nuclear research facility infrastructure; and
- Improve reporting of deliverables and achievements at programme and action level.

Regarding the **achievements and performance level** of the JRC in this field, the report identified the need to:

- Increase awareness that the JRC's work has a vital role in helping to ensure safe and sustainable nuclear energy and to recognise that much of the JRC's scientific work is of a very high standard (internationally at the highest level);
- Develop and apply criteria for starting and stopping work, review the priorities assigned to certain actions (see section 4.3) and consolidate some of them; and
- Complete the implementation of the recommendations from the ex-post FP6 evaluation.

Taking note of the above observations and issues raised in the ex-post FP6 evaluation the panel formulated three broad recommendations to help the JRC to:

- Enhance its governance and make its programme implementation as efficient as possible;
- Underpin its present work and proposals for the Euratom programme with a vision and strategy; and
- Improve its programming, planning and reporting.

Recommendation 1

The panel recommends that the JRC should enhance the transparency, effectiveness and efficiency of the governance of its nuclear activities through:

- Improving and recording formal customer consultations with respect to the definition, planning and implementation of the Euratom programme;
- Adopting a management structure that assigns more clearly the overall responsibility for all nuclear activities in the JRC; and
- Minimising the bureaucratic burden of quality management.

Recommendation 2

To help underpin the JRC proposals for the Eighth Framework Programme, the panel recommends the JRC to develop an ambitious “Vision 2030” and associated strategy for its nuclear activities, which:

- Starts from a stock-take of the impact of the JRC’s past work;
- Builds on the Strategic Research Agenda (SRA 2009) of the Sustainable Nuclear Energy Technology Platform (SNETP); and
- Defines a 10 to 20 year outlook for its nuclear research facility infrastructure with an associated implementation plan.

It is recommended that the development of the vision and strategy include substantive consultations with external experts.

Recommendation 3

The panel recommends the JRC should place more emphasis on transparent reporting of its results, achievements and impacts. This would be facilitated by the use of specific, measurable, achievable, relevant, time-related (SMART) objectives at every level of the programme.

Nuclear actions in the JRC annual work programmes, development from 2007 to 2009

Sub-agenda	Action (Institute)			Year		
AGENDA 5.1 Nuclear waste management, environmental impact						
5.1.1 Spent fuel characterisation, storage and disposal	51101 SAFEWASTE	Waste Package and Systems for Transport, Storage and Disposal of High-level Nuclear Waste and Spent Fuel (IE)	2007	2008	—	
	51102 NWD	Nuclear Waste Disposal (ITU)	2007	2008	2009	
5.1.2 Partitioning, transmutation and conditioning	51201 ANFC	Alternative Nuclear Fuel Cycle (ITU)	2007	2008	2009	
5.1.3 Basic actinide research	51301 FAR	Fundamental and applied Actinides Research (ITU)	2007	2008	2009	
5.1.4 Nuclear data	51401 ND Stds	Basic research in nuclear physics and nuclear data standards (IRMM)	2007	2008	2009	
	51402 ND Minwaste	Nuclear data for radioactive waste management and safety of new reactor developments (IRMM)	2007	2008	2009	
5.1.5 Medical applications from nuclear research	51501 NCT	Development and Exploitation of Neutron Capture Therapy (IE)	2007	2008	—	
	51502 AIT	Alpha-Immunotherapy (ITU)	2007	2008	2009	
5.1.6 Measurement of radioactivity in the environment	51601 REM	Radioactivity Environmental Monitoring (IES)	2007	2008	2009	
	51602 MaRE	Measurement of Radioactivity in the Environment and biological matrices (ITU)	2007	2008	—	
	51603 RADMET	Radionuclide metrology for primary standardisation and policy support (IRMM)	2007	2008	2009	
	51604 ANTE	Analysis of Nuclear Traces in the Environment (ITU)	—	—	2009	
5.1.7 Knowledge management, training and education	51701 KTE	Knowledge management, education and training - nuclear fuel cycle (ITU)	2007	2008	2009	

Sub-agenda	Action (Institute)			Year		
AGENDA 5.2 Nuclear safety						
5.2.1 Safety of nuclear installations	52101 AMA	Analysis and Management of Nuclear Accidents (IE)	2007	2008	—	
	52102 SAFELIFE	Safety of Ageing Components in Nuclear Power Plants (IE)	2007	2008	—	
	52103 SONIS (POS)	Current Nuclear Reactors- Operation Safety (IE)	2007	2008	2009	
	52104 NUSAC	Nuclear Safety Clearinghouse (IE)	2007	2008	2009	
5.2.2 Nuclear fuel safety in power reactors operating in the EU	52201 SCNF	Safety of Conventional Nuclear Fuels (ITU)	2007	2008	2009	
5.2.3 Safe operation of advanced nuclear energy system	52301 SANF	Safety of Advanced Nuclear Fuels (ITU)	2007	2008	2009	
	52302 SAFETY-INNO (FANGS)	Feasibility Assessment of Next Generation nuclear energy Systems (IE)	2007	2008	2009	
	52303 CAPTURE	Knowledge Management, Training and Education in Reactor Design and Operation (IE)	—	2008	2009	
	52304 MATTINO	Materials performance assessment for Innovative reactor systems (IE)	—	—	2009	

Sub-agenda	Action (Institute)			Year		
AGENDA 5.3 Nuclear security						
5.3.1 Nuclear safeguards, additional protocol and combating illicit trafficking	53101 NUTRASEAL	Nuclear Traceability and Sealing Systems (IPSC)	2007	2008	2009	
	53102 METRO	Providing metrological tools to support nuclear safeguards activities (IRMM)	2007	2008	2009	
	53103 FACIL	Forensic Analysis and Combating Illicit trafficking (ITU)	2007	2008	2009	
	53104 AMENUS (IANUS)	Information Analysis for Nuclear Security (IPSC)	2007	2008	2009	
	53105 VERTEC (NUVER)	Nuclear Facilities Verification (IPSC)	2007	2008	2009	
	53106 NUMAMET	Nuclear Materials Measurement Techniques (IPSC)	2007	2008	2009	
	53108 NTAS	Nuclear and Trace Analysis for Safeguards (ITU)	2007	2008	2009	
	53109 TENS	Training and Education in Nuclear Safeguards and Security (IPSC)	—	2008	—	
5.3.2 Open source information collection on non proliferation	53201 PhyMod	Physical Modelling and Analysis of Instruments and Systems/ Nuclear Fuel Cycle Simulations (IPSC)	2007	2008	2009	
	53202 NP-OSInt	Non Proliferation Open Source Intelligence (IPSC)	2007	—	—	

ANNEX II

Terms of reference for a panel of experts on the interim evaluation of the nuclear activities of the Joint Research Centre in the context of the Seventh Framework Programme of the European Atomic Energy Community (Euratom)

1. Introduction

This document provides the terms of reference for a panel of experts that will carry out the interim evaluation of the direct actions¹ by the Joint Research Centre (JRC) as one of the two specific programmes of the Seventh Framework Programme² (FP7) of the European Atomic Energy Community (Euratom)³.

The overall objective of the panel will be to carry out an evaluation of the quality of the research activities, the programme's implementation and management, and the progress towards the relevant objectives set in the FP7 Council Decisions concerning the nuclear activities of the JRC¹, 2. Where possible and as a kind of benchmarking, the panel is expected to give an expert view on the performance level of the relevant activities as they are carried out in the JRC.

For this purpose the panel of experts will analyse existing evidence on the nuclear activities of the JRC, and prepare a final report in which it will provide conclusions and recommendations as regards the JRC's implementation of its specific programme under the Euratom FP7.

In the context of the general quality approach of the JRC, this evaluation should also help the organisation with the continuous improvement of its science-

¹ 2006/977/Euratom: Council Decision of 19 December 2006 concerning the Specific Programme to be carried out by means of direct actions by the Joint Research Centre implementing the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011)

² Council Decision of 18 December 2006 Concerning the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011), (2006/970/Euratom), Official Journal of the European Union L 400/60;

³ The other specific programme of the Framework Programme covers the "indirect" actions on fusion energy research and nuclear fission and radiation protection and its evaluation is organised in parallel by DG RTD.

based policy support and assist the JRC senior management with detailed orientations for the remaining part of FP7.

2. Mandate, deliverables and timetable

2.1 Legal basis

The Euratom Seventh Framework Programme Decision² contains the provision for an interim review in the Article 6.2, which states: “Not later than 2010, the Commission shall carry out, with the assistance of external experts, an evidence-based interim evaluation of the Seventh Framework Programme and its specific programmes building upon the ex-post evaluation of the Sixth Framework Programme. This evaluation shall cover the quality of the research activities taking place, as well as the quality of implementation and management, and the progress towards the objectives set.”

The relevant ex-post evaluation referred to in the legal basis is the ex-post FP6 evaluation of the JRC carried out by a panel of experts chaired by Sir David King⁴.

Specific inter-institutional and Commission requirements further frame this evaluation; in particular those related to the Financial Regulation (Article 27.4), the Implementing Rules (Article 27.3)⁵ and evaluation standards⁶.

2.2 Objectives and scope

The purpose of this interim evaluation is to assess the nuclear activities of the JRC carried out in the context of the Euratom Seventh Framework Programme for nuclear research and training activities (2007 to 2011).

This evaluation will allow the European Commission to assess the continued relevance of the programme’s objectives, and to review initial outputs and the early effects of the programme. It will pay specific attention to the quality and the performance level of the relevant activities as they are carried out in the JRC.

With the expiry of the Euratom FP7 in 2011, the interim evaluation should facilitate upcoming decisions for continuing the programme beyond 2011 and build a fact base for future impact assessments of nuclear activities of the JRC.

⁴ Ex-post Evaluation, Joint Research Centre Direct Actions in the 6th Framework Programmes (2002-2006), Final Report September 2008 and the response from the Commission: “Ex-post evaluation of the Direct Actions under the Sixth Framework Programmes for Research Technology Development and Demonstration carried out by the Joint Research Centre”, SEC(2008)3105

⁵ Council Regulation (EC, Euratom) No 1995/2006 of 13 December 2006 amending Regulation (EC, Euratom) No 1605/2002 on the Financial Regulation applicable to the general budget of the European Communities (O) L 390 of 30.12.2006, p. 1) and Commission Regulation no. 478/2007 of 23 April 2007, amending Commission Regulation no. 2342/2002 (O) L 111 of 28.4.2007, p.1)

⁶ “Responding to Strategic Needs: Reinforcing the use of evaluation”, SEC(2007) 213.

Previous external evaluations of the JRC always addressed the full range of activities. This Euratom FP7 interim evaluation focuses on one specific theme of the JRC activities and is a first “thematic evaluation” of the JRC. It should form the beginning of a series of further thematic evaluations under the EC FP7, giving a concrete follow-up to the recommendation concerning the implementation of thematic evaluations put forward in the ex-post evaluation of the JRC⁴.

2.3 Evaluation questions

This interim evaluation covers the nuclear activities of the JRC carried out under the Euratom Seventh Framework Programme (2007-11). It should provide substantive answers to the evaluation questions listed hereafter:

Rationale/Relevance

- i) To what extent are the objective, the approach and the activities of the JRC Euratom programme pertinent to
 - a) the needs and problems in nuclear energy research?
 - b) the needs of European policy makers and Member State authorities in charge of nuclear matters?
- ii) To what extent are the JRC’s nuclear activities contributing to the EU strategic objectives and policies, notably: sustainable development, energy policy, the European Research Area (ERA) and the European Strategic Energy Technology Plan (SET-Plan)? And How?
- iii) To what extent does the JRC Euratom programme provide (Community) added value compared to the baseline options (i.e. no EU-policy/no change from FP6 to FP7)?

Implementation

- iv) Is the balance between the different areas of the JRC Euratom programme appropriate and is the level of funding adequate to achieve the objective set?
- v) Are the nuclear facilities of the JRC appropriate for achieving its objectives in the Euratom programme?
- vi) To what extent does the JRC run its Euratom programme of nuclear activities in a cost-effective manner?
- vii) Are the arrangements for planning, monitoring, reporting and evaluation appropriate and effective?

Achievements

- viii) What are the indications in the early outcomes of the research activities that the overall and specific objectives of the Euratom FP7 can be met?
- ix) Referring to the consideration of the Council Decisions (“whereas” clauses) to what extent do the Euratom FP7 direct actions
 - a) promote the mobility and training of researchers (in particular in the field of nuclear safety and security)?

- b) contribute to innovation, within the Community?
- c) promote the integration of New Member States' organisations and researchers in its activities in particular on the implementation of the S&T components of the *acquis communautaire*?
- x) To what extent does the JRC give a follow-up to the recommendations of the JRC FP6 Ex-post evaluation ("King-report") relevant to its nuclear activities?

Performance level

- xi) From an expert point of view, how does the work in the different parts of the JRC programme compare to similar work done at top organisations in the relevant fields?

2.4 Milestones and deliverables

The panel will carry out the interim evaluation from September to December 2009.

The evaluation will start with a kick-off meeting in early September to agree on the detailed workings of the panel and finish in a plenary session of the panel in October 2009. The panel chair will present draft conclusions and recommendations from the evaluation to the JRC Board of Governors at its meeting on 19/20 November 2009.

The panel will deliver its report on the "interim evaluation of the nuclear activities of the JRC in the Euratom FP7 programme" before the end of 2009. The main text of the report includes an analysis of findings, a set of fact-based conclusions and recommendations and should not exceed 30 pages, including an executive summary.

The Commission will make the final report publicly available which will, together with the report of the other specific programmes³ of the Euratom FP7, constitute the interim evaluation of Euratom FP7.

3. Operation of the Panel of Experts

3.1 Composition, identification and selection of experts

The JRC Director General, in close consultation with the Board of Governors, will select at least five acknowledged experts in the areas covered by the JRC Euratom programme and compose a panel that will carry out an independent and objective analysis of the JRC Euratom programme.

The experts will be appointed on the basis of the criterion that they have a high level of expertise in the fields of research and technological development in particular, as attested by higher education qualifications of at least doctoral level and/or proven by having won prizes and awards at national, European and/or international level and/or as evidenced by experience and skills which are widely recognised.

For the composition of the panel attention will also be paid to a balanced representation which ensures expertise in the main areas of the JRC Euratom programme, affiliation to the academic, public service and industry community, a certain geographical spread and equal gender opportunity. In addition, it will be an asset if some experts have a proven ability to assess the societal dimension and strategic relevance of the framework programme and the specific programmes.

3.2 Working method

The experts will carry out the evaluation of the work carried out in the different parts of the specific programme which is divided in 3 agendas with 12 sub-agendas, in the smallest elements currently composed of 25 actions (projects).

They will base their findings on a desk analysis of achievements during the first part of FP7, presentations of selected activities, interviews with selected JRC managers, staff, clients and stakeholders and visits of selected JRC sites. The full “evidence base” is specified in section 0 and will be made available to the experts in electronic form (through access to a dedicated web-site) before 1 September 2009. Upon request the JRC will provide hard copies of the general information documents.

At the kick-off meeting in Brussels the chair of the panel will decide with the experts on the detailed workings, including possible sites to visit. The chair will also establish how the function of rapporteur will be fulfilled in consultation with the panel and the JRC. The chair will be requested to ensure that the panel members and the supporting expertise are best exploited in the areas of the JRC’s nuclear activities.

About six weeks after the kick-off the panel will hold a plenary meeting in Karlsruhe hosted by the JRC’s Institute for Transuranium Elements (ITU). At this event the panel will have the opportunity to interview JRC staff and visit the ITU installations. According to the decision taken at the kick-off meeting, experts can make dedicated visits to JRC institutes to build their opinion on relevant JRC installations.

The Evaluation Unit of the JRC will help organising and support the work of the panel. It will take care of the collection and distribution of the material for the desk analysis. It will be in regular liaison with the members of the panel and notably the chairperson to ensure the smooth running of the panel.

The chair/rapporteur will draft the final report of the evaluation, based on panel members’ contributions and of relevant material, issues and events identified by the panel and/or the JRC. The chair will highlight and exploit main points of findings presented by the experts at the plenary session. The Evaluation Unit will provide input to the production of the report, notably through the collection and provision of evidence.

3.3 Expert support and evidence-base

The panel will carry out its activities through an independent, robust, evidence-based process. At the discretion of the chairperson, appropriate independent experts can be invited to participate in discussing specific issues, including participation to meetings as required.

As evidence base the JRC will provide the panel with all necessary information, in particular:

General information concerning

- The baseline against which the assessment will be made (Framework Programme, Specific Programmes, Multi-Annual Work Programme)
- General reports on progress (e.g. Annual Reports, Annual Activity Reports, results of Customer Surveys)
- Reports of previous Euratom FP Evaluations and Commission replies;
- Figures on human resources and budget implementation

Specific information

- Achievements of each “Euratom” action in the JRC work programme during the reporting period
- Statistical information on the implementation of the research activities (i.e. publications, patents, etc.)
- Detailed publication data from the PUBSY corporate data base

The panel has the possibility to interview selected representatives of the Euratom FP7 clients and stakeholders (e.g. European policy makers, beneficiaries of third party work)

3.4 Credits

The physical and intellectual works generated by the expert’s assignment will remain the property of the Commission. The experts of this panel undertake not to use these works outside this assignment without the previous written agreement of the Joint Research Centre.

The published report will acknowledge the contributions of the members of the panel.

REFERENCE DOCUMENTS FOR THE PANEL

Programme documents

- The Council Decision of 18 December 2006 Concerning the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011) (2006/970/Euratom)
- The Council Decision of 19 December 2006 concerning the Specific Programme to be carried out by means of direct actions by the Joint Research Centre implementing the Seventh Framework Programme of the European Atomic Energy Community (Euratom) for nuclear research and training activities (2007 to 2011) (2006/977/Euratom)
- The JRC Multi-Annual Work Programme (2007-2013)
- The JRC Annual Work Programmes 2007, 2008 and 2009

Relevant reports

- The JRC Annual Reports 2007 and 2008
- Ex-post Evaluation of Joint Research Centre (JRC) Direct Actions in the 6th Framework Programmes 2002-2006, Final Report, September 2008
- “Facts and Figures on the Nuclear activities of the Joint Research Centre under the Seventh Euratom Framework Programme” for the interim evaluation of FP7
- JRC Customer Satisfaction Survey, Final Report 2008
- “Robust Science for Policy Making: A guideline towards integrity and veracity in scientific support and advice”, Board of Governors, document CA(06)55.
- Follow-up Recommendations “King Report”, JRC response to Board Action 87.1, Status November 2009, CA(09)36-1
- Draft Synthesis Report on the JRC Infrastructures, JRC internal report

QUESTIONS FOR THE EXPERTS TO BE ANSWERED FOR EACH ACTION AS ASSIGNED AT THE KICK-OFF MEETING

Rationale/Relevance

- 1) Is the action pertinent to the needs and problems in nuclear energy research?
(to a large extent yes/ to some extent/ very little / not at all)

- 2) Is the action pertinent to the needs and problems of European policy makers and Member States authorities in charge of nuclear matters?
(to a large extent yes/ to some extent/ very little / not at all)

- 3) Does this action contribute to the EU strategic objectives and policies, notably: sustainable development, energy policy, the European Research Area (ERA) and the European Strategic Energy Technology Plan (SET-Plan)?
(to a large extent yes/ to some extent/ very little / not at all)
If yes pls give some evidence of how it contributes.

- 4) Is the JRC the right place to do this work? If possible explain your reply

Implementation

- 5) Is the list of customers/stakeholders credible? If negative pls comment.

- 6) Did the action file provide concrete information on (the nature of) deliverables?

- 7) Does the JRC have the appropriate nuclear facilities for achieving the objectives of this action? (pls comment)

- 8) Does this action raise any considerations of cost-effectiveness with you?

Achievements

9) Does the action

a) Contribute to mobility and training of researchers? (yes / somewhat / no)

b) Contribute to innovation within the Community? (yes / somewhat / no)

If yes pls explain

c) Promote the integration of New Member States' organisations and researchers in its activities? (yes / somewhat / no)

If yes pls explain

Performance level

10) How do the achievements of this action compare to what is achieved elsewhere in the relevant fields? (the action leaders of the JRC will be asked to answer this question first and you will qualify this "self-assessment")

