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**COMMUNICATION FROM THE COMMISSION  
TO THE COUNCIL AND THE EUROPEAN PARLIAMENT**

**Decommissioning of nuclear installations and waste management**

**Nuclear liabilities arising out of the activities of the Joint Research Centre (JRC) carried  
out under the Euratom Treaty**

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## **0. SUMMARY**

The Joint Research Centre (JRC) was created at the beginning of the 1960s under the Euratom Treaty. Originally dedicated entirely to nuclear research, it has since diversified its activities. Nuclear activities today still represent 30% of all the JRC's work and are dedicated to safety and security, which are a key aspect of the peaceful uses of nuclear energy in Europe and hence of the JRC. No date has yet been set for halting these activities, the continuation of which might necessitate the construction of new installations or new laboratories. Under the Euratom Treaty the JRC has to manage its nuclear heritage and in particular decommission installations that have been shut down. A budget heading has been created for this purpose by joint agreement between the European Parliament and the Council.

In 1999, the Commission decided to launch without further delay a programme for decommissioning its obsolete nuclear installations, called the D&WM programme<sup>1</sup>. In this the Commission followed the new doctrine adopted by most of the EU Member States, preferring to start the decommissioning immediately rather than implement a "deferred" decommissioning which would take advantage of the diminishing radioactivity of the installations.

The purpose of this communication is to present a complete provisional programme integrating the decommissioning of all existing installations (shut down or in use) with the processing of the waste existing already or resulting from the decommissioning. Appropriate hypothetical assumptions have been made and, at the end of the programme, all the existing nuclear installations of the JRC will have been decommissioned and the waste removed. The programme will of course be subject to regular review which will have to take account of any new installations that may have been constructed in the meantime.

### **The nuclear installations of the JRC**

Most of the nuclear installations on the Ispra site (IT) have been obsolete for many years. They have been shut down definitively and therefore have to be decommissioned.

The JRC's other nuclear installations, which are located on the Petten (NL), Geel (BE) and Karlsruhe (DE) sites, are still in operation. Their decommissioning will probably not start before 2015 at the very earliest, and possibly not until 2025 or even later. Nevertheless, without waiting for these dates and in accordance with the IAEA's recommendations concerning the decommissioning of nuclear installations and waste management, the Commission intends to draw up decommissioning plans for the installations in use and their maintenance until the start of the decommissioning operations.

The JRC has been carrying out decommissioning and waste management activities on the four sites, in particular at Ispra, since 1999. The Commission presented its programme and intentions to the Council and the European Parliament in its communication COM(1999) 114.

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<sup>1</sup> D&WM: Decommissioning and Waste Management.

## **Communication COM(1999) 114**

Communication COM(1999) 114, submitted to the Council and the European Parliament, was intended to present the first version of the programme for decommissioning these installations and to inform the two institutions of the Commission's decision to undertake such a programme.

The programme as presented focused mainly on the "historical liabilities", i.e. the installations shut down and the management of the waste accumulated during their operation. The cost of cleanup of these "historical liabilities" was estimated at €<sub>1998</sub>230 million and that of decommissioning the installations in use ("future liabilities") at €<sub>1998</sub>223 million (rounded to €<sub>1998</sub>220 million in the communication), or a total of €<sub>1998</sub>453 million.

### **Programme update**

At the end of 2002, the JRC carried out a new analysis of its "historical" and "future" liabilities. The total amount was put at €<sub>2003</sub>941 million.

In accordance with a request from the Court of Auditors, the programme was examined by a Consortium of outside companies with experience in the field. The Consortium estimated the cost at €<sub>2003</sub>1069 million, i.e. 13.6% above the JRC's figure. The cost of the additional "green field" option of returning the land to its original state was estimated at €<sub>2003</sub>76 million.

The Commission finds these latest estimates of the JRC and of the Consortium to be fairly close considering the nature of the work and the uncertainties with which such a programme is fraught. It also notes that the JRC and the Consortium base their estimates on data not available at the time of the first evaluation (a complete inventory and new radiological data).

In view of the fact that the land on which the Euratom installations are located belongs to third parties, to be on the safe side the Commission chooses the "green field" option. The total cost of €<sub>2003</sub>1145 million is split among the four sites as follows:

- 56.3% for Ispra (€645 million);
- 34.0% for Karlsruhe (€389 million);
- 6.0% for Petten (€69 million);
- 3.7% for Geel (€42 million).

### **Analysis of programme cost increases**

The increase in the programme cost stems from several causes:

- Increase in the restrictions and hence in the cost of final disposal of the waste:  
  
This increase is significant in the host countries of the Euratom installations, in particular in Belgium and Italy where revisions of the cost estimates have indicated very sharp increases.
- The evolution of waste management and conditioning legislation in the host countries:

The characterisation of waste is more rigorous (more advanced spectrometry), requiring state-of-the-art instruments; the specifications regarding the packaging are more stringent, and the clearance level has been lowered.

- Incorporation into the cost estimates of expenses for all personnel involved in the management of the obsolete installations.
- Reassessment of the work to be carried out and of the technical difficulties:
- Processing and removal of "exotic" waste: nuclear material (new and spent fuel), alkali metals (Na and NaK).
- Exhaustive review of the decommissioning work to be carried out, in particular on the installations still in use ("future liabilities").

### **Reducing or eliminating risks and uncertainties**

This programme, like all others of its type, is subject to risks and uncertainties:

There are two types of "physical" risk: the "conventional" risks of large worksites and the "nuclear" risks due to handling radioactive or contaminated materials.

Conventional accident risk (falls, crushing, burns, electrocution, etc.) is the same as on any other worksites of this size. Generally speaking there are not many accidents on decommissioning sites, though, no doubt because all operations are well prepared and all nuclear work is backed up by quality assurance procedures. The JRC applies these measures in order to prevent accidents to persons and property, and only involves firms that are accustomed to managing this type of site.

The nuclear risk is substantially reduced in installations that have been shut down, and even more so once the nuclear fuel has been removed, as it always is prior to decommissioning. Due to the presence of waste and contaminated or activated equipment there is, however, still a risk of contamination spreading or of exposure to ionising radiation (the risk of contamination spreading increases as installations age if they are not sufficiently well maintained, which is one of the reasons why obsolete installations should be decommissioned as quickly as possible). The risk of contamination spreading is handled by the staff of the JRC and of the outside firms, who are trained to work in nuclear environments. It is overcome by isolating the installations under decommissioning (by confinement, ventilation and filtration) and by applying strict rules for the processing and conditioning of waste. The risk of exposure to ionising radiation is controlled by means of the ALARA (As Low As Reasonably Achievable) approach, which involves, for example, comparing various possible scenarios and their radiological impact, providing appropriate biological protection and even requiring protective clothing and respiratory apparatus to be worn.

Applying these measures to protect workers and their immediate environment of course helps to protect the general public and the environment at large.

The technical risks, notwithstanding the financial risks, remain:

- The increase in the cost of processing and final disposal of waste: this risk exists in the four countries hosting nuclear installations of the JRC, either because there is no final disposal route releasing the producer from any financial constraints (Germany

and Italy) and/or because the cost can increase between now and the implementation of the longest-dated decommissioning operations (2015-2030). This is one of the reasons behind the proposal for a Council Directive<sup>2</sup> aimed at speeding the creation of final repositories in countries which do not have them. However, whatever the host country, it would be reasonable to think that the cost of processing and final disposal could be estimated better today by taking into account feedback from the experience of certain Member States and the detailed studies carried out, and could therefore be better controlled in the future.

- The evolution of the national and international laws and regulations concerning in particular the processing, conditioning and storage of waste, the rules of radiation protection (limit of operational doses), the rules for the transport of nuclear material, etc.
- The increasing administrative constraints: increase in regulatory documents, more complex administrative procedures (public enquiries), etc.
- The increase in personnel cost and inflation.
- The classical "industrial" risks concerning contractual relations with service providers and suppliers.

A number of preventive measures have been taken to overcome these risks. Apart from the advice of the independent Group of Experts and the implementation by experienced companies of studies and works on the sites, close contacts have been established with national authorities. This has been the case especially in Italy, with a view to securing acceptance of the conditioned waste by a national body and removing the risk of having to recondition the waste when a final repository is opened. An organisational structure and management methods geared to major long-term industrial projects have been put in place, as well as exchange of information with the national entities responsible for similar programmes in the Member States.

### **Transparency**

The measures described above will allow the programme to be pursued and updated on at least an annual basis, as well as ensuring effective communication with its stakeholders: the Council and the European Parliament, the national and local authorities in the host nations, and the public.

***The Commission asks the Council and Parliament to take note of the content of this communication.***

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<sup>2</sup> Proposal for a Council Directive (Euratom) on the management of spent nuclear fuel and radioactive waste, COM(2003) 32 final.

## 1. PURPOSE OF THE COMMUNICATION

The purpose of this communication is to update the information supplied to the European Parliament and the Council on the development of the programme for decommissioning of obsolete nuclear installations and nuclear waste management (D&WM programme<sup>3</sup>) started by the Commission in 1999.

This new communication also responds to the demands of the Council and the European Parliament to submit an action plan over the long term for the D&WM programme. To this end it presents a reevaluation of the programme implemented in 2002 by the JRC and in 2003 by a consortium of companies with solid experience in the sector ("the Consortium").

## 2. CONTEXT

The Joint Research Centre (JRC) of the European Commission was established by Article 8 of the Euratom Treaty. As far back as the start of the 1960s, the Community undertook the first nuclear activities on the Ispra site. Originally dedicated entirely to nuclear activities, the JRC has since diversified to respond to the needs of the Commission's other Directorates-General. The nuclear activities, which still make up 30% of the JRC's work, focus on the priority R&D themes supporting the peaceful use of nuclear energy in Europe. On the basis of Article 8 the JRC has to manage its historical nuclear liabilities and decommission its shut-down nuclear installations. To this end, a budget heading has been created in agreement with the European Parliament and the Council.

The JRC manages the nuclear installations of the European Community on behalf of Euratom. These installations are located at Geel (BE), Ispra (IT), Karlsruhe (DE) and Petten (NL).

The Commission's objective is to provide sound management to clear Euratom's nuclear liabilities, part of which stem from the development of families of reactors at the start of the 1960s and the rest from research programmes on reactor safety.

In practical terms, the Commission has undertaken to decommission its obsolete nuclear installations to IAEA level 3, permitting reuse of the buildings for non-nuclear activities. It has gone for the conservative "green field" option, which consists of demolishing the buildings and returning the grounds to their original state. At the same time, the Commission has undertaken to remove all waste still present on its sites to national repositories in order to be definitively free from any constraint connected with ownership of this waste.

Communication COM(1999) 114 submitted to the Council and the European Parliament was intended to present the first version of the programme for decommissioning the installations. It also sought to notify the two institutions of the Commission's decision to initiate such a programme.

The first evaluation of the programme in 1999 was based on two reports, one produced by a German firm and the other by a French one. These reports led to an evaluation of the cost of decommissioning the obsolete installations at €230 million, stressing at the same time the

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<sup>3</sup> D&WM: Decommissioning and Waste Management.

many uncertainties affecting the programme as reported in the 1999 communication. With a view to giving an overall estimate of the cost of decommissioning the JRC's installations, an additional ballpark figure of €223 million was given for further decommissioning of installations still in operation (rounded off to €220 million in the communication). The total budget requirement was therefore estimated at approximately €<sub>1998</sub>453 million.

The European Parliament, in its report<sup>4</sup>, asked the Commission to refine its decommissioning programme, including installations still in operation, in order to produce an exhaustive programme of current and future requirements.

For its part, the Court of Auditors asked the Commission to obtain an external evaluation to back up the provisions to be made in the Community's budget. To this end, the Commission entrusted a Consortium of four companies with the evaluation of the JRC's programme. SCK•CEN of Mol (BE) was the leader of the Consortium in partnership with Forschungszentrum Karlsruhe (DE), Nuclear Research and Consultancy Group NRG (NL) and Tractebel-Ingegneria (IT).

The Commission Working Document WD 1 provides more extensive background information on the steps being taken by the Commission, the reports issued by the Institutions and the response of the Commission to the European Parliament.

### **3. IMPLEMENTATION OF THE PROGRAMME BETWEEN 1999 AND 2003**

#### **3.1. Ispra (IT)**

The cost of "historical and future liabilities" of the Ispra site represents more than half of the Commission's D&WM programme. Ispra's action programme is also the most pressing since almost all its nuclear installations have been definitively shut down.

The strategy of the Ispra programme concerning "historical liabilities" is to seek the transfer of waste to third-party industrialised countries, whenever possible, and the construction or rehabilitation of waste characterisation, processing, conditioning and storage installations, essential for removal of other existing waste as well as decommissioning waste as it is produced.

Since 1999, the Ispra site has worked to reduce the volume of waste and fuel present on the site. All of the unused fuel has been returned to the United States and the contaminated heavy water was transferred to Canada.

The rehabilitation and construction of waste processing installations were largely under way at the end of 2003. They include, in particular, the waste characterisation installation, the decontamination installation, the liquid effluent treatment station, the concrete embedding plant, a temporary storage facility and an installation for monitoring outgoing decommissioning waste. Finally, the design studies for an interim storage facility on the Ispra site are well advanced.

In addition, so-called pre-decommissioning activities have been launched. These involve in particular the conditioning (completed in 2003) of the shut-down waste incinerator and the

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<sup>4</sup> Report A5-0159/2000 §13c.



demolition of the cooling tower of the Ispra-1 reactor, the demolition (to be completed in 2004) of the pipeline taking the liquid effluents to the old treatment station, and the demolition of several buildings, the removal of equipment and the decontamination or clearance of more than 1200 tonnes of metal.

The corresponding expenditures for the period 1999-2003 amount to €42 million.

### **3.2. IRMM - Geel (BE)**

Geel has completed the first phase of its programme consisting of removing all the site's "historical liabilities". The radiochemical building has been decommissioned and is now being used for non-nuclear activities. The non-irradiated nuclear materials have been transferred to SCK•CEN in Mol (BE). This has permitted downgrading of the site to category 3, which imposes fewer monitoring constraints than category 1. The small Van de Graaff accelerator has been decommissioned and other cleanup works have been performed. A map has been made of all the buildings still in operation, providing a reference for the regular updating of the decommissioning plan.

The corresponding expenditures for the period 1999-2003 amount to €6.5 million.

### **3.3. ITU - Karlsruhe (DE)**

Under this programme, Karlsruhe handles the removal of waste accumulated at the time of past research work, and dismantles equipment that has become obsolete, such as glove boxes, some twenty of which are dismantled each year.

It should be noted that these decommissioning activities are to be distinguished from the day-to-day management of the installations and of the waste generated by R&D activities underway, which is financed by the research programme. These are activities linked to earlier programmes the stoppage of which was decided during development of the JRC's activities in accordance with its mission. Although the two types of activities are difficult to separate, this differentiation has been acknowledged by the Consortium which is essentially made up of research bodies.

The final decommissioning of the Karlsruhe installations will commence, as for Geel, after the stoppage of the research programmes, which has not yet been planned. For the purposes of this exercise, the hypothetical date of 2025 has been assumed.

The corresponding expenditures for the period 1999-2003 amount to €16 million.

### **3.4. IE - Petten (NL)**

The only activity from Petten under its "historical liabilities", from 1999 to 2003, concerns the processing of a consignment of spent fuel originating from the period when the reactor was the object of a Community research programme.

Since 1996, the use of the Petten High Flux Reactor (HFR) has been accompanied by the establishment of provisions for its decommissioning. They amounted to €5 million at the end of 2003. During 2004-2006 the annual provision should be increased to €0.8 million, bringing the total provision by the end of 2006 to €7.4 million. The final amount of the provision will depend on the date of final shutdown of the HFR. However, it will represent less than a third

of the necessary decommissioning budget (€69 million), assuming shutdown taking place between 2015 and 2020.

Decommissioning of the Petten HFR is not envisaged before 2015 (replacement of the reactor vessel in 1986 would allow the reactor to operate well beyond that date). An earlier shutdown cannot be ruled out, however. This might result from a stoppage of the research programmes and/or withdrawal of the countries (currently, the Netherlands and France) participating in the financing of the "supplementary programme". The final amount of the provision is therefore uncertain. For this reason, it was not taken into account in estimating the specific appropriations necessary for the decommissioning of the Petten installations.

#### 4. REVISED GENERAL PROGRAMME

To fulfil its obligations relating to the decommissioning of shut-down nuclear installations and waste processing, the Commission has distinguished three groups of activities:

*Conservation in a safe state:* This is action to maintain shut-down installations in a safe and secure condition, to respond to the ageing of installations or the evolution of national and international safety rules. It is also action for the refurbishment of waste processing facilities dedicated exclusively to the D&WM programme.

Although these actions precede the decommissioning of the installations, it is sometimes difficult to distinguish between cleanup and pre-decommissioning operations. For the sake of clarity in the following comments, these operations have been considered as an integral part of the D&WM programme in the actions as well as in the budget; this was also the choice made by the Consortium at the time of its evaluation of the programme (see section 5).

*Historical liabilities:* These are activities relating to installations already shut down. They include processing of existing waste and the cleanup of installations until their decommissioning, and the processing of the resulting waste. They also include the construction of new waste processing facilities and of an interim store on the Ispra site.

*Future liabilities:* These are decommissioning and waste processing activities relating to installations still in use as part of the Commission's framework programme. They will be implemented after the final shutdown of these installations, i.e. for some of them in 15 to 30 years' time.

The Commission does not intend to change its approach to implementation of the D&WM programme. However, to be on the safe side it believes it now has to consider the "green field" option. The revision of the programme concerns mainly the costs. This revision is based firstly on a detailed analysis of the "historical liabilities" and, even more so, the "future liabilities", and secondly on the evolution of the external context, especially the final disposal cost.

The detailed content of the programme is presented in WD 2.

##### 4.1. THE COMMISSION'S DECOMMISSIONING AND WASTE MANAGEMENT STRATEGY

**The decommissioning of the installations will be subcontracted to external companies with experience in the sector.** The decommissioning operations which have been carried out

in several countries mostly during the last 20 years have made it possible to develop and test methods and techniques meeting all the needs of the Commission's decommissioning programme. The technical risks inherent in these operations have therefore been overcome quite satisfactorily, and the JRC has adopted specific organisational and management measures (see section 6) in order to master the financial risks inherent in a programme of this scope and duration.

**There are different kinds of waste, which have to be treated with appropriate methods and procedures.**

**Waste from operation** consists for the most part of nuclear material (fuel), coolants and moderators (heavy water, alkali metals) and miscellaneous waste, some of it already conditioned. The JRC favours this waste being taken over by third parties whenever possible, which is why Ispra's unirradiated fuel has been taken by the USA and the heavy water by Canada. Waste which cannot be taken over by third parties will be assigned to national repositories. Waste that has already been conditioned will in some cases be reconditioned to take into account the evolution of applicable regulations (bituminised drums at Ispra, for example).

**Waste from decommissioning** of installations is mostly of low and even very low activity. Whenever possible, this waste will be decontaminated in order for it to be cleared from any further nuclear control. It can then be classified as "conventional waste" and undergo the usual treatment or recycling processes applied to industrial waste (remelting of metals, for example). Waste which cannot be cleared will be characterised, processed and conditioned with a view to its final disposal in a national repository.

**The cost of processing, conditioning and storage of waste represents an important part of the programme.** In the case of Ispra, for example, the provision for (final) storage amounts to some 30% of the total programme cost. The construction of conditioning installations and conditioning operations themselves represent an equally sizeable additional cost. Together they make up almost 65% of the total cost of the programme.

**The cost of final disposal is not known with certainty.** In Germany, the Commission remains the owner of the waste which it transfers to an external company, and its financial contribution to final disposal does not free it from any uncertainty as to the final cost. In Italy there is no final repository (the creation of one was announced in November 2003, with operations to start in 2008, but publication of the implementing decree for it has been postponed), so the cost of storage cannot be guaranteed. In the Netherlands, the cost paid to the company dealing with waste storage includes the cost of final disposal, whatever that may be in the end. And the same in Belgium, where the costs paid to ONDRAF<sup>5</sup> discharge the Commission from any liability once and for all. Finally, with regard to decommissioning operations which will commence in 15 to 30 years' time, there is still some doubt as to how final disposal costs will evolve looking so far ahead, even if, as already mentioned, feedback from experience in the Member States now allows better assessment of processing and storage costs, even in the absence of a final repository.

**Commission action:** The JRC has made its own studies and outsourced others for evaluating the cost of decommissioning and assessing the volume of waste. The results of these studies

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<sup>5</sup> ONDRAF: Belgian Agency for Radioactive Waste and Enriched Fissile Materials.

show some uncertainty in the volume estimates, due to the difficulty of estimating waste volumes without the detailed studies generally accompanying the implementation studies. The programme review drawn up by the Consortium (see 5.1) recalls the different evaluations and the waste categories concerned.<sup>6</sup> At Ispra, where the site has actually started work on conditioning the existing waste and preparing for decommissioning, detailed studies are under way to draw up the decommissioning plans. In the calls for tenders the JRC incorporated incentive clauses to limit the volume of waste, applying a financial penalty if the contractor exceeds the volumes estimated. The financial risk in Italy is higher than elsewhere due to the lack of acceptance criteria for conditioned waste. Here the Commission's aim is to avoid having to recondition the waste once the characteristics of the final repository are known. JRC Ispra has approached the company entrusted by the MAP with the management of the "historical nuclear liabilities" in Italy. The JRC and this company have a common interest in laying down interim storage specifications. They are both participating in defining UNICEN standards on waste and waste packaging, and the synergy they have established in the qualification testing of containers and packaging has enabled both parties to make savings.

Under this D&WM programme, the Commission intends to construct an interim storage facility at the Ispra site. This will allow the Commission to pursue its programme pending the opening of the national repository.

The period 1999-2003 has also been used to start discussions with the Italian authorities, mainly MAP and APAT, the body responsible for monitoring nuclear installations in Italy. These discussions are continuing. They focus on the specifications for the conditioning of waste intended to be stored in the future Italian interim storage facility (see above) and on the transfer of ultimate ownership of the waste and of the interim storage facility to a public entity. This approach follows the current practice in almost all the EU Member States at least as regards the short-lived waste which forms the greater part of the waste from decommissioning.

The consultations with MAP on this issue appear to be well-received by its representatives. The next step will be to try to secure a signed agreement enshrining the above provisions.

#### **4.2. Overview of the programme**

The Commission's objective is to decommission all the existing installations to IAEA level 3 as soon as possible. Level 3 means that all nuclear material, all waste and all activated or contaminated equipment have been taken out and all traces of residual radioactivity in the buildings have been removed so that they can be used for other purposes.

Taking a conservative line the Commission has also decided to consider the "green field" option of level 3, whereby the site is returned to its original state, i.e. demolishing the buildings and rehabilitating the land.

As mentioned earlier, the JRC's D&WM programme will be in full swing at Ispra from 1999 to 2020 and at its peak from 2005 to 2010.

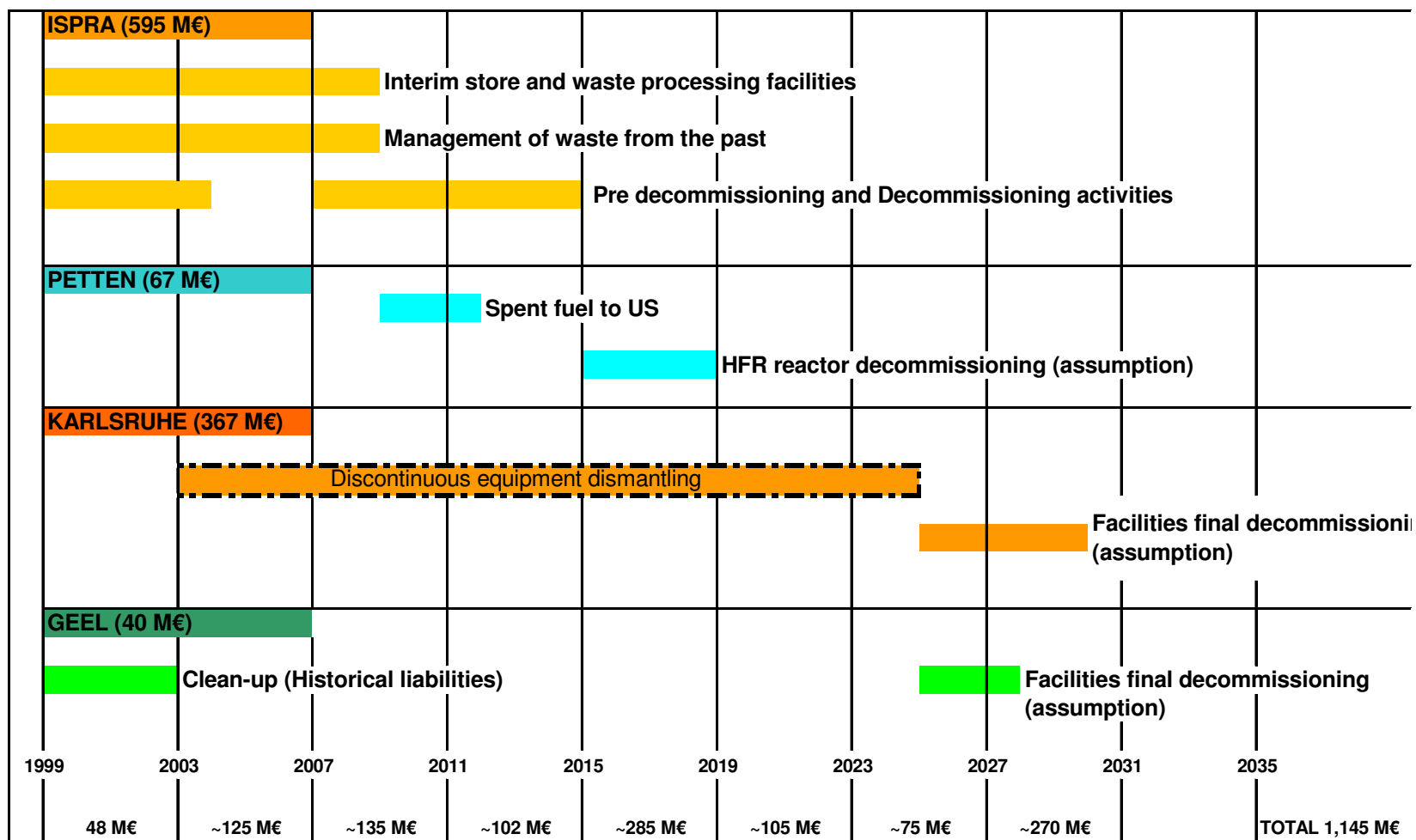
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<sup>6</sup> The estimated volumes and categories of waste include existing waste or waste from decommissioning and an estimate of the waste which will be produced by the contracted firms ("secondary" waste). These estimates are not published here since the estimated volume of waste as calculated by the tendering companies is a criterion for assessing tenders.

For the other sites, taking into account the uncertainty over the shutdown dates for the installations, the programme has been designed as if decommissioning were to start in 2015 at Petten and 2025 at Geel and Karlsruhe. Before final shutdown of the installations, programme activity at these sites will basically consist of processing existing waste and nuclear materials (fuel). At Karlsruhe, some limited dismantling of obsolete equipment (glove boxes) is also planned to take place before final shutdown of the installations. The JRC sites at Karlsruhe and Petten will also be drawing up a provisional decommissioning plan in 2004-2005. Such a plan already exists for Geel, where it is a national legal requirement, and also for Ispra, as would be expected since the programme is already well under way. This plan makes it possible to record the physical and radiological state of the installation and the estimated decommissioning cost. It is regularly updated to take account of physical and radiological changes and background developments (legislation, cost of works, storage costs, etc.).

Table 1 shows a general planning overview of the D&WM programme for the different sites, with budget amounts committed over four-year periods. There is a certain discontinuity of commitments, in particular during the period 2019-2025 owing to the end of the Ispra programme forecast for 2018, while the most important part of the Karlsruhe programme (the second in importance after Ispra) will not have started at that time. The notable peak which appears for the period 2015-2019 is due to the hypothetical assumptions of transfer of waste packages from Ispra to an Italian repository with payment of corresponding charges and decommissioning of the Petten HFR in the event of its shutdown in 2015.

**Table 1: Planning overview of the D&WM programme**



N.B.: Current euros up to 2003 and €<sub>2003</sub> thereafter.

### **4.3. The different phases of the programme**

The programme consists of three partially overlapping phases:

**The first phase (1999-2008)** includes all actions undertaken since 1999, mainly at the Ispra site, and concerns "maintenance in a safe condition", including rehabilitation and the construction of waste processing facilities and processing of existing waste. This phase corresponds to a commitment appropriation of the order of €100 million, including staff costs. It will end in 2008 with the commissioning of Ispra's interim storage facility.

**The second phase (2004~2020)** concerns the treatment of "historical liabilities". It covers the decommissioning of all installations now shut down and the processing, conditioning and storage of the resulting waste, the transfer of the Ispra waste to the Italian final repository, the dismantling of equipment now obsolete at Karlsruhe and the transfer of the waste from there to a German firm entrusted with managing it. It corresponds to a commitment appropriation of the order of €580 million. It is expected to end in 2018 for Ispra with the transfer of packaged waste to an Italian repository or 2020 if the "green field" option is applied.

**The third phase (~2015~2030)** concerns the treatment of "future liabilities". It includes the decommissioning of installations still in use at the end of 2003 and the decommissioning of waste processing facilities being constructed as part of the first phase. The corresponding budget is of the order of €465 million. It would begin with the decommissioning of the Petten HFR. If the "green field" option were applied, it would be expected to end towards 2019 for Petten (shutdown + 4 years), 2028 for Geel (shutdown + 3) and 2030 for Karlsruhe (shutdown + 5), assuming that the respective shutdown of their installations takes place in 2015 for Petten and 2025 for Geel and Karlsruhe, this being no more than a working hypothesis at the moment, as indicated above.

The content of the programme is described in detail in WD 2 in which, for a better understanding of the implementation of the various phases, a presentation per site and per project has been adopted.

### **4.4. Budget management**

On the basis of the programme presented by the Commission in 1999, the Council and Parliament approved, for the period 1999-2003, the creation of a separate budget heading. This was initially financed by the transfer of unused appropriations at the end of the financial year and, from 2001, by direct appropriation during the budget procedure possibly with an additional allocation at the end of the financial year.

During the same period the JRC's staff costs have continued to be charged to Euratom's research framework programme.

### **4.5. Cost of the D&WM programme**

#### *4.5.1 Development of the cost of the D&WM programme*

The programme cost estimate submitted in 1999 (COM(99) 114) was reviewed by the JRC in 2002 and by the Consortium in 2003, each taking into account the increased knowledge of the historical liabilities (shutdown of other installations in the period 1999-2002), the context (in

particular the final disposal cost) and future charges. The three estimates are therefore as follows:

- the JRC's 1998 evaluation for COM(1999)114 (in €<sub>1998</sub>), based on two studies by external companies;
- the evaluation made by the JRC at the end of 2002 ((€<sub>2003</sub>) after four years of experience;
- the evaluation made by the Consortium in 2003.

Table 2 below gives the results of these evaluations.

			Geel	Ispra	Karlsruhe	Petten	Total	
<b>Historical liabilities</b>	COM(99) 114	<b>Total</b>	1	<b>209</b>	10	<b>10</b>	<b>230</b>	
	JRC 2002	Specific appropriations	6	450	107	10	573	
		Staff appropriations	1	75	22	-	98	
		<b>Total</b>	<b>7</b>	<b>525</b>	<b>129</b>	<b>10</b>	<b>671</b>	
	Consortium 2003	Specific appropriations	5	467	128	11	611	
		Staff appropriations	1	111	23	-	135	
		<b>Total</b>	<b>6</b>	<b>578</b>	<b>151</b>	<b>11</b>	<b>746</b>	
	<b>Future liabilities</b>	COM(99) 114	<b>Total</b>	<b>2</b>	<b>27</b>	<b>139</b>	<b>55</b>	<b>223</b>
		JRC 2002	Specific appropriations	22	19	140	55	236
Staff appropriations			2	2	23	7	34	
<b>Total</b>			<b>24</b>	<b>21</b>	<b>163</b>	<b>62</b>	<b>270</b>	
Consortium 2003		Specific appropriations	32	15	190	54	291	
		Staff appropriations	2	2	26	2	32	
		<b>Total</b>	<b>34</b>	<b>17</b>	<b>216</b>	<b>56</b>	<b>323</b>	
<b>Total</b>		<b>COM(99) 114</b>		<b>3</b>	<b>236</b>	<b>149</b>	<b>65</b>	<b>453</b>
		<b>JRC 2002</b>		<b>31</b>	<b>546</b>	<b>292</b>	<b>72</b>	<b>941</b>
	<b>Consortium</b>		<b>40</b>	<b>595</b>	<b>367</b>	<b>67</b>	<b>1069</b>	
<b>"Green field" option</b>			<b>2</b>	<b>50</b>	<b>22</b>	<b>2</b>	<b>76</b>	

**Table 2: Evaluations of the cost of historical and future liabilities (€ million) by the JRC (1998 and 2002) and the Consortium (2003)**

The table above shows that the estimate made by the JRC at the end of 2002 (€<sub>2003</sub>941 million), almost four years after the launch of the programme, is relatively close to that made by the Consortium in 2003 (€<sub>2003</sub>1069 million). The Consortium's estimate is 13.6% higher, excluding the "green field" option.

**Comparison of JRC's estimates for 1998 (€<sub>1998</sub>453 million) and 2002 (€<sub>2003</sub>941 million) (rounded figures)**



The variation in the estimates arises from the following items:

### Exhaustive analysis of the D&WM programme

–	Waste management facilities	(+ €48 million)	+11%
–	Waste management	(+ €64 million)	14%
–	Decommissioning and management of resulting waste	(+ €101 million)	22%

The 1998 cost assessment was based on a preliminary physical and radiological inventory that was completed afterwards.

–	Reappropriation of staff costs	(+ €49 million)	11%
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All JRC staff supporting decommissioning activities are included, including those with duties linked to legal requirements (such as environmental monitoring).

### Changes in the external context

–	Final disposal of waste	(+ €122 million)	27%
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The final disposal cost was reassessed as much higher in Italy, and also increased appreciably in other countries, such as Belgium.

–	Inflation 1998-2003 (3% p.a.)	(+ €60 million)	13%
–	Legislation changes	(+ €44 million)	10%

The legislation evolved in certain Member States: revision of clearance level in Belgium, new requirements for waste characterisation and conditioning in Italy, resulting in an increase in the costs for construction, waste characterisation, conditioning, etc.

TOTAL		(+€488 million)	+108%
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### Comparison of estimates for JRC<sub>2002</sub> (€<sub>2003</sub>941 million) and Consortium<sub>2003</sub> (€1145 million) (rounded figures)

The variation in the estimate stems from the following items:

–	Waste management facilities	(+ €3 million)	+0.3%
–	Waste management	(+ €28 million)	+3.0%
–	Decommissioning and management of resulting waste	(+ €27 million)	+2.8%
–	Final disposal of waste	(+ €40 million)	+4.3%
–	Re-evaluation of staff costs	(+ €30 million)	+3.2%
TOTAL (use without building restriction)		(+ €128 million)	+13.6%
–	"Green field" option (new option)	(+ €76 million)	

TOTAL

(+ €204 million)

A first estimate of the "green field" option was made by the Consortium. It amounts to some €76 million (+7%) for all sites. The Commission intends to give preference to this option, which would definitively release it from all its liabilities. However, it will hold talks with the landowners before implementing this option.

The Consortium's estimate is therefore 13.6 % higher than that made by the JRC in 2002.

The Commission regards this difference in estimates as insignificant for a long-term programme of such complexity and taking account of the risks and uncertainties inherent in this type of programme, as mentioned in 6.2. It considers that the results of the two estimates reinforce rather than contradict each other. The Commission accordingly proposes to allocate the amount corresponding to the Consortium's estimate, including the "green field" option.

#### 4.5.2. Programme costs per site

The programme costs per site are therefore as follows :

Sites (€ million)	Geel	Ispra	Karlsruhe	Petten	Total
Level 3 ("use without restriction)	40	595	367	67	1,069
"Green field" option	2	50	367	2	76
<b>TOTAL</b>	<b>42</b>	<b>645</b>	<b>389</b>	<b>69</b>	<b>1,145</b>
% of the programme per site	3,7%	56,3%	34,0%	6,0%	100%

**Table 3: Programme costs per site**

#### 4.6. Staff costs

The D&WM programme is currently financed from budget heading B4-3400 and support staff from heading B6-12, which is part of the research budget and therefore dependent on the five-yearly decisions on the research framework programmes. Such a situation:

- is contrary to Article 9 of the opinion delivered by the European Parliament on the 1999 communication<sup>7</sup>;
- was accepted, reluctantly, in the co-decision on the sixth framework programme, by both the Parliament and the majority of the Member States in the Council, which regretted this "diversion" of financial resources normally dedicated to research;
- brings, within the given budgetary constraints, a fixed or even increasing charge into competition with the research projects to which the appropriations should have been allocated;
- weakens the implementation of the programme over the long term (30 years) by detaching the financing of the human resources from their purpose and making it contingent on the four-yearly decisions on the research programme;

<sup>7</sup> A5-0159/2000 final.

- also means, as the Court of Auditors has pointed out, that personnel costs should be included in the overall provision for implementation of the action programme (see section 9-31, 50 of 28 November 2002, p. 264).

It is clear that the only option which would guarantee the sustainability required by the institutions is to cover these staff costs under a heading of the Community's operating budget, while providing an appropriate procedure for the recruitment of specialists capable of taking on the tasks inherent in the action programme..

By the end of the sixth framework programme, the Commission therefore intends to take the necessary measures to remove all risks - financial and other - connected with the management of the staff allocated to this programme.

For the purposes of this communication, the budget presented includes staff costs financed by the R&D framework programme (€15 million provided for the sixth framework programme from 2003 to 2006).

## **5. OVERALL EVALUATION OF THE PROGRAMME**

### **5.1. Evaluation of the programme by the Consortium**

Under the terms of a contract signed in August 2002, the JRC assigned the evaluation of its D&WM programme to the Consortium referred to in chapter 2.

In general, the Consortium approves the strategy developed by the JRC to reach level 3 of decommissioning, which authorises reuse without site restrictions for any non-nuclear activity.

The Consortium also points out that the pursuit of this strategy would make it possible to reach the "green field" stage which includes the total demolition of the buildings at a relatively modest additional cost (+7%).

The Consortium nevertheless believes that this strategy should be explained by means of a "decommissioning plan" for each site. Today the Geel centre has such a plan, as Belgian legislation requires. The Ispra site has implemented a similar plan as part of its work scheduling.

The Consortium makes other recommendations which have already been, for the most part, adopted or implemented by the JRC. It is worthwhile mentioning in particular, apart from the technical recommendations specific to each site:

Concerning organisation: adaptation of organisation (see 6.5 below), retention of skills (see 6.8), staff training in the decommissioning field (see 6.8), introduction of performance indicators such as reduction of radiation doses received and minimisation of secondary<sup>8</sup> waste produced, systematic recourse to specialised companies for equipment engineering and works on site.

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<sup>8</sup> "Secondary waste": waste generated by processes used for decommissioning installations, and therefore added to the existing waste.

Control of external relations: close contact with the Italian authorities (see 4.1), relations established with the competent authorities in order to obtain acceptance criteria for waste packaging quickly if they do not exist, and/or opening of the appropriate outlets, including those for high-activity waste, reinforcement of staff dedicated to relations with the authorities, implementation of a communication programme intended for the public, clarification of the conditions for returning the site to its owner in accordance with the agreements in force in the host countries.

Technical: preparation of the radiological inventory of the installations, including the taking of samples, increasing the decontamination of waste to reduce its final volume to a minimum, approaching entities in Member States which have dealt with equivalent installations, use of the best available technology to secure a motivating environment on the sites and an exchange of expertise for the benefit of Member States and accession countries. Finally, the Consortium recommends the periodical updating of the JRC's decommissioning programme

The terms of reference of the review by the Consortium are given in WD 3.

## **5.2. Group of Experts' report on the programme**

A Group of Experts in the field of decommissioning and waste processing was proposed by the JRC and approved by its Board of Governors to advise it on the management of its D&WM programme. It is made up of eleven European experts originating from different Member States. Its advice concerns the strategy for decommissioning and waste processing, available technologies, segmentation of the programme, organisation, management of invitations to tender, management of internal resources, training, and any other aspect of the programme as described above.

The Group of Experts approved the Consortium's recommendations in general and stressed some of them in particular as indicated below, especially for the Ispra site:

- collect information relating to the conditions of use and maintenance of installations shut down, draw up an inventory of waste and nuclear materials and produce a radiological report on the installations;
- call in competent external companies, whenever possible;
- plan the decommissioning of installations as quickly as possible taking into consideration that no benefit would be gained from delayed implementation;
- reduce to a minimum the volume of waste to be stored and look for possible means to transfer ownership of the waste or provide adequate capacity for processing and/or storage of waste where such transfer is not possible (e.g. for alkali metals);
- use the safest technologies which are unlikely to cause problems for third parties, promote dialogue with them and carry out the D&WM programme in a transparent manner;
- permit the dissemination of knowledge acquired during decommissioning operations to the European institutions.

### 5.3. Opinion of the JRC's Board of Governors

The Board of Governors approved the Consortium's general conclusions and the supplementary recommendations given by the Group of Experts.

It also called for:

- drawing up a list of actions to be taken based on the recommendations of the Consortium and the Group of Experts, including the budgetary aspect;
- the recommendations of the Consortium and the Group of Experts to be taken into account in the decisions that the Commission will make concerning the D&WM programme.

The JRC has drawn up a list of actions derived from the recommendations of the Consortium and the Group of Experts. A large number of actions have already been implemented, especially at Ispra, and a timetable for implementation of other actions will be drawn up at the beginning of 2004.

The JRC's D&WM programme has been amended to take account of these recommendations. To give an example, the objective of decommissioning installations is now based on the "green field" option which includes the total demolition of buildings, unless there is a special agreement with the owner of the land to do otherwise.

## 6. MANAGEMENT OF THE PROGRAMME AND RELATED RISKS

### 6.1. General approach

The JRC is devoting itself fully to its role of "sponsor" in accordance with the recommendations of the Consortium and the Group of Experts and the request of the European Parliament<sup>9</sup>. The specialised studies, manufacturing of equipment and works on site are assigned to experienced external companies.

In order to monitor the implementation of such an important programme, still involving risks and uncertainties, the JRC has initiated a certain number of actions to eliminate or minimise risks of external (see 6.2) or internal (see 6.3) origin and has taken specific measures for the organisation and management of the programme (see 6.4 to 6.8).

### 6.2. Minimisation of external risks and uncertainties

Risks and uncertainties, especially those relating to external events, cannot be completely ruled out. The JRC has taken specific measures to eliminate or mitigate remaining risks. These include:

1. **The development of legal requirements**, particularly with regard to authorisation procedure, protection of the environment, the public and workers, definition of waste categories, characterisation of waste, waste conditioning and clearance levels. In Italy, recent developments relating to waste management have

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<sup>9</sup> Report A5-0159/2000 final, §6a.

made the characterisation and conditioning of waste much more complicated and have therefore led to a significant increase in the cost of processing existing and future waste. Despite this, uncertainties still remain as to the durability of current requirements while there is no final repository operational in Italy. The same applies to Germany, while in Belgium and the Netherlands the Commission has freed itself from any future liability having transferred its waste to the collecting body. But this is no indication as to the future storage cost for new waste, even though, as already mentioned, the Commission thinks the national bodies in charge of storage now have a better understanding of the costs.

**Commission action:** To minimise the impact of this trend, in the first place the JRC is in contact with the MAP<sup>10</sup> with the aim of drawing up an agreement for the transfer to a national body of its waste and of its interim storage facility at Ispra. Secondly it is working closely together with the Italian company in charge of managing Italy's "historical liabilities" to ensure that their respective requirements are taken into account in the new standardisation, by participating in the various UNICEN<sup>11</sup> committees responsible for laying down the rules in the matter.

2. **The duration of approval of regulatory documents** and the granting of the permissions necessary to undertake elementary operations. Through a lack of resources or equivalent "practices" and/or definitive legislation, the duration of examination of the files by the competent authorities may extend beyond what has been forecast. Delays thereby incurred may cause additional costs to the programme.

**Commission action:** To prevent such consequences, the Commission is in close communication with the authorities, particularly the APAT<sup>12</sup> in Italy, in order that potential problems can be identified and dealt with as early as possible.

3. **The increase in the cost of final disposal** of waste can be a consequence of improvements in disposal facilities and of more stringent requirements for protection of the environment and the population, as well as, sometimes, the reduction in the volume of waste which entails a de facto increase in the unit cost taking account of a number of fixed fees applied to the disposal facilities. The Commission notes significant differences between Member States on this point.

**Commission action:** To develop an approach befitting each national situation with regard to storage, availability of a waste management service and final disposal cost. The Commission will minimise the volume of waste as far as possible by decontamination, permitting nuclear waste to be reclassified as ordinary industrial waste, and by reducing the volume of nuclear waste by compaction. The Commission expects to have discussions with the bodies responsible for management and/or storage of waste in order to understand the cost structure and to optimise its waste management accordingly.

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<sup>10</sup> Ministero delle Attività Produttive (Ministry of Production Activities).

<sup>11</sup> UNICEN: Ente Nazionale Italiano di Unificazione - Commissione Energia Nucleare (Italian standards organisation).

<sup>12</sup> APAT: Agenzia per la Protezione dell'Ambiente e per i Servizi Tecnici (Environmental protection and technical services agency)

4. **Any delay in the consultation procedure** at the time of construction of new installations, particularly the interim storage facility at Ispra, and/or during decommissioning operations, would cause delays or, worse, a carry-over of the programme in the event of administrative difficulties arising during mandatory inquiries.

**Commission action:** To minimise this risk, the JRC is developing communication with the local population and the authorities, in the form of an open-door policy, with leaflets describing the objectives pursued and the nature of the operations. The Internet site describing the activities was updated in 2003 to reflect their progress.

### 6.3. Minimisation of internal risks

a) **A state of the installation different** from what is expected may result from out-of-date documentation that has not taken account of past developments or the radiological history of the installation. This may lead to changes in the conditions for planned actions, followed by increasing delays and rising costs.

**Commission action:** The Commission updates the existing documentation and carries out radiological characterisation of the installations (activity measurements, radiometric logging) in order to provide the companies involved with reliable information on the installations. For those sites that do not yet have a plan for decommissioning, namely Karlsruhe and Petten, a decommissioning plan will be established and regularly updated until the shutdown of the installations.

b) **Loss of knowledge of the installations and of their history** due to staff leaving for retirement or other employment may affect the progress of the programme.

**Commission action:** The JRC is endeavouring to "record the knowledge" of staff before their departure and to replace departing staff as quickly as possible, with an overlap if possible to allow for the knowledge to be passed on.

c) **Lack of knowledge of decommissioning** on the part of the JRC may call for training and research into suitable methods and there may be difficulties with managing a long-term multiannual programme, with the resulting consequences.

**Commission action:** The JRC has provided for assistance from an external company in running the programme at the Ispra site and for subcontracting most of the work on site to experienced companies. In addition, it has adopted a series of teamwork, training, specialist recruitment and programme management measures. These measures are described below.

d) **Any unforeseen problems arising** may cause delays and substantial cost overruns.

**Commission action:** For each major project the JRC will carry out an analysis of the technical risks with a view to optimising the systems and operations and thereby reducing the risk of technical problems arising. If an unforeseen technical problem were to occur, the same methodology would be applied making it possible to analyse the situation and work out an alternative solution as quickly as possible. In addition,

rigorous and frequently updated task planning will make it possible to keep tight control of deadlines and costs (see 6.4 below).

#### **6.4. Project management system**

The programme involves significant human and financial resources. The risk of seeing it come adrift in terms of cost and delay stems in the main from its complexity, duration (several years) and uncertainties both internal (established condition of the installations) and external (contextual developments: regulations, national policy, public opinion, availability and cost of final disposal). To avoid the internal risks, there are tried and tested methods widely used in industry for the management of major projects.

The measures described so far are intended to be taken before the implementation of the programme. In the implementation phase, the adoption of management methods appropriate to the control of major projects, coupled with the organisation and human resource management policy described below, reduces the risk of going off track in the early stages and, if this does happen, allows swift corrective action to be taken.

This approach entails the generalisation and improvement of "physical progress" methodology, which brings the project's planning component and cost component together into the same analysis. Thanks to carefully chosen indicators, it allows the work actually carried out to be compared easily with the forecast, in terms of both planning and cost. It is updated frequently (almost monthly) to allow any cost and/or planning aberrations to be picked up quickly and appropriate stopgap measures to be taken. Thus the Ispra programme has been divided into projects. Each project is split up into elementary "physical" tasks, the execution of which can be verified beyond doubt (issue of a study document, delivery of materials, completion of work on site, etc.), accompanied by planning and costing. Periodical checking of physical progress permits the project's final deadline and cost to be assessed and "as-is" to be compared with "to-be".

#### **6.5. Organisation of projects**

Ispra's Nuclear Decommissioning and Waste Management Unit will be reorganised before decommissioning as such actually starts. Concerned units of other JRC establishments will likewise be restructured when their decommissioning programmes begin. Basically, restructuring in line with the "physical progress" strategy consists in adopting a "project" type organisation (vertical structure) in place of an "activity/responsibility" type organisation (horizontal structure). This should allow even better concentration on the objectives of each project in the decommissioning programme: cost compliance, deadlines, quality and environment.

A Project Manager is appointed for each project, to receive and manage the material, financial and human resources made available for implementing that project. A few human resources are not directly assigned to a project, either because they are only slightly or briefly involved or because it is desirable for them to remain independent of the projects (e.g. safety/security manager, quality control manager and radiation protection manager).

#### **6.6. Role of the Steering Committee**

The Steering Committee set up within the JRC has the role of monitoring and directing the programme and its execution. It is made up of experienced staff of various units (technical,



budgetary, administrative, management) which are not directly involved in implementing the programme. This gives it the necessary distance to follow and guide the programme according to the analyses that are submitted to it and the outside advice from which it benefits. The Committee is chaired by the Deputy Director General of the JRC, who is responsible for nuclear matters and is authorised to impose programme implementation measures as necessary, especially corrective measures to cope with any programme anomalies.

### **6.7. The Group of Experts**

The Group of Experts meets twice a year or by request, as necessary. It issues reports (see 5.2 for example) and recommendations which are taken into account by the JRC in managing its programme.

Since the national origin of each member of the Group is different, the JRC obtains feedback from experience in the Member States in the relevant field. This makes it easier to find the best solutions for implementing the programme as regards its technical, economic, organisational and strategic aspects.

### **6.8. Human resource management policy**

The D&WM programme is very complex and demanding technically and economically and even on the legal and communication fronts. It demands good planning and management of operations. In its role as "sponsor", the JRC intends to be in full control of the legal aspects of the programme, as well as those of contract management, safety and security, quality, environment and communication.

As regards the legal aspect, the Commission's responsibility is derived from Article 8 of the Euratom Treaty, which makes the Commission responsible throughout the life of the installations, up to and including their decommissioning.

The European Commission already underlined the importance of the development function which falls to the JRC in its communication of 1999.

Taking on this essential function implies that the appropriate internal skills will be maintained within the JRC. This assertion appears repeatedly in both the Consortium's analytical report and the report of the independent Group of Experts which states "*...that is of primary importance to the programme for the capacity, competence and qualifications of the D&WM staff to be secured and if necessary enlarged, so that the JRC-staff can fully effect its responsibility for all aspects of the D&WM programme and can act as an intelligent and informed customer in relation with outsourcing. Staff development should anticipate in due time the loss of knowledge and experience and the changing competence requirements as the programme develops.*"

Besides the question of replacement and continuous training and of the management of archives, in order to prevent any loss of knowledge of the installations and waste, these comments raise the problem of the permanency of the appropriate staff for the duration of the D&WM programme. It is now certain that this will extend beyond 2025 for the Geel and Karlsruhe establishments, or even Petten.

In its report, the independent Group of Experts invites the Commission to take, as quickly as possible, the appropriate measures to reduce the risks inherent in a decommissioning and

waste management programme. The Experts emphasise, in particular, that the Commission must act as effectively as possible against the risks for which it is responsible. The management of staff allocated to this programme belongs to this category.

The JRC's human resource management policy therefore takes these recommendations into account. It takes the form of the following individual actions aimed at safeguarding and adapting staff competence to the needs of the programme:

- some of the staff going into retirement are replaced by people with different job profiles: project managers, safety/security officers, buyers, decommissioning specialists. At Ispra, for example, some 20 of the 64 people present in 2001 involved in the decommissioning programme will have taken retirement in the period 2002-2005. This allows for great flexibility in the recruitment of resources better suited to new challenges;
- a number of staff undergo specialised training in areas useful for implementation of the programme, especially for contract and project management;
- staff leaving the JRC (retirement, transfer or resignation) are replaced only at the end of a study weighing the advantages and disadvantages of maintaining the same skills internally or outsourcing them to qualified companies. Through this approach, the JRC will continue to prioritise its "sponsor" role and have recourse to the best external skills in the various technical fields.

To ensure the retention of knowledge, staff leaving the installations are asked to record their knowledge of them (inventory of materials and waste, reports of radiological incidents, modification of installations). The existing documentation has to be filed and updated, preferably by staff with a knowledge of the historical background of the installations, with a view to passing this information on to contractors at the time of invitations to tender. Wherever possible, the JRC will endeavour to obtain an overlap to facilitate the transfer of knowledge to remaining or newly recruited staff.

## 7. CONCLUSIONS

The programme presented to the Council and the European Parliament in 1999 has been completely revised in accordance with the recommendations of the two institutions and of the Court of Auditors and the JRC's Board of Governors. It has been updated to take account both of contextual developments (new legislation, new external costs) and of a more detailed study of the Commission's "historical liabilities" (conservation in a safe state, processing of existing waste and decommissioning of installations that have been shut down) and "future liabilities" (decommissioning of installations in use and processing of the resulting waste).

The JRC entrusted a Consortium of external companies with undertaking a review of the programme which the JRC updated in 2002. The Consortium approved the programme strategy and choices made and confirmed the cost assessment made by the JRC with an increase of 13%.

The independent Group of experts which advises the JRC has acknowledged the Consortium's report and approved its conclusions.

The Commission is satisfied with the process of review of its D&WM programme and the final conclusions. It considers that the cost estimate made by the Consortium supports the JRC's cost assessment. It appears to be reasonably conservative, which may compensate, if necessary, for risks that are always possible bearing in mind the uncertainties identified in this document. The Commission is grateful to the JRC's Board of Governors for the support it has given to this communication.

The Commission therefore intends to continue the implementation of its D&WM programme. It will provide annual updating and ensure a general review and an appropriate update every four years. The European Parliament and the Council will be given full information on each review.

## LEGISLATIVE FINANCIAL STATEMENT

**Title of action: Decommissioning and Waste Management Programme**

### 1. BUDGET LINE(S) + HEADING(S)

**10 05 01 Decommissioning of nuclear installations and Waste Management**

**10 01 05 Support expenditures for operations of policy area direct research (staff cost)**

### 2. OVERALL FIGURES

**2.1. Total allocation for action (Part B): €1,145 Mio in €2003 or €1,657 Mio in €current for commitment (breakdown of cost in €2003 and current is given in annexe 2)**

*This represents the total forecast spending from 1999 to around 2030.*

*It should be noted that around 64 M€ have already been committed by the end of 2003.*

The breakdown of the programme vs sites is as follow:

Site (Mio€ <sub>2003</sub> )	Geel	Ispra	Karlsruhe	Petten	Total
Level 3 ("unrestricted use)	40	595	367	67	1,069
"Green field" option	2	50	22	2	76
<b>TOTAL</b>	<b>42</b>	<b>645</b>	<b>389</b>	<b>69</b>	<b>1,145</b>
% / site	3,7%	56,3%	34,0%	6,0%	100%

**Budget purposes**    €<sub>current</sub> million (to 3rd decimal place)

**Specific credits**

		<2003	2003	2004	2005	2006	2007 >	TOTAL
<b>Geel</b>	Pre-decommissioning activities	6.149	0.400	0.123				<b>65.745</b>
	Decommissioning activities						59.074	
	<b>Total Geel</b>	<b>6.149</b>	<b>0.400</b>	<b>0.123</b>	<b>0.000</b>	<b>0.000</b>	<b>59.074</b>	
	Waste Management and support	9.741	4.582	5.138	21.125	3.216	69.174	<b>678.544</b>
<b>Ispra</b>	Waste Management Facilities Construction/Refurbishing	9.205	2.498	2.235	13.973	0.000	39.326	
	Old waste management retrieval	2.004	1.064	4.935	16.757	5.837	28.107	
	Pre-decommissioning activities	0.411	0.187	0.000	0.000	6.254		
	Decommissioning and final waste disposal						432.774	
	<b>Total Ispra</b>	<b>21.360</b>	<b>8.331</b>	<b>12.308</b>	<b>51.856</b>	<b>15.308</b>	<b>569.381</b>	
<b>Karlsruhe</b>	Pre-decommissioning activities	11.611	4.250	3.569	3.593	3.692		<b>579.181</b>
	Decommissioning activities						552.466	
	<b>Total Karlsruhe</b>	<b>11.611</b>	<b>4.250</b>	<b>3.569</b>	<b>3.593</b>	<b>3.692</b>	<b>552.466</b>	
<b>Petten</b>	Spent fuel sending to USA				11.452			<b>90.733</b>
	Decommissioning activities						79.282	
	<b>Total Petten</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>11.452</b>	<b>0.000</b>	<b>79.282</b>	
<b>GRAND TOTAL</b>		<b>39.120</b>	<b>12.981</b>	<b>16.000</b>	<b>66.900</b>	<b>19.000</b>	<b>1,260.203</b>	<b>1,414.204</b>

**Personnel cost**

	<2003	2003	2004	2005	2006	2007>	TOTAL
<b>Geel</b>	0.000	0.000	0.103	0.000	0.000	3.500	<b>3.603</b>
<b>Ispra</b>	8.789	3.394	3.465	3.730	3.874	113.379	<b>136.631</b>
<b>Karlsruhe</b>	0.000	0.015	0.051	0.105	0.108	89.358	<b>89.637</b>
<b>Petten</b>	0.000	0.000	0.051	0.105	0.000	2.416	<b>2.573</b>
<b>Personnel contingencies</b>	0.000	0.000	0.000	0.000	0.000	10.314	<b>10.314</b>
<b>TOTAL</b>	<b>8.789</b>	<b>3.410</b>	<b>3.670</b>	<b>3.940</b>	<b>3.981</b>	<b>218.967</b>	<b>242.757</b>

**TOTAL**

<b>Geel</b>	6.149	0.400	0.226	0.000	0.000	62.574	<b>69.348</b>
<b>Ispra</b>	30.150	11.725	15.773	55.585	19.182	682.760	<b>815.175</b>
<b>Karlsruhe</b>	11.611	4.265	3.620	3.698	3.800	641.824	<b>668.818</b>
<b>Petten</b>	0.000	0.000	0.051	11.557	0.000	81.698	<b>93.306</b>
<b>Personnel contingencies</b>	0.000	0.000	0.000	0.000	0.000	10.314	<b>10.314</b>
<b>TOTAL</b>	<b>47.909</b>	<b>16.391</b>	<b>19.669</b>	<b>70.840</b>	<b>22.981</b>	<b>1,479.170</b>	<b>1,656.961</b>

**2.2. Period of application:**

*From 1999 to around 2030*

**2.3. Overall multi-annual estimate on expenditure:**

a) Schedule of commitment appropriations/payment appropriations (financial intervention)  
(see point 6.1.1)

€ million (to 3rd decimal place)

Period	Euros current <sup>(1)</sup>						TOTAL
	99-02	2003	2004	2005	2006	2006 >	
<b>Commitment</b>	39.120	12.981	16.000	66.900	19.000	1,260.203	<b>1,414.204</b>
<b>Payment</b>	22.048	9.475	17.672	29.980	31.566	1,303.463	<b>1,414.204</b>

(1) Assuming inflation rate of 2.5% per annum. The same table in Euros 2003 is annexed to the present financial statement

b) Technical and administrative assistance and support expenditure (see point 6.1.2)

*Not applicable*

Subtotal a+b	<b>Euros current</b>						
<b>Period</b>	<b>99-02</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>&gt; 2007</b>	<b>TOTAL</b>
<b>Commitment</b>	39.120	12.981	16.000	66.900	19.000	1,260.203	<b>1,414.204</b>
<b>Payment</b>	22.048	9.475	17.672	29.980	31.566	1,303.463	<b>1,414.204</b>

*The funds presented from 2005 onwards are subject to the annual approval of the Budgetary Authority*

c) Overall financial impact of human resources and other administrative expenditure (see points 7.2 and 7.3)

<b>Euros current</b>							
<b>Period</b>	<b>99-02</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>&gt; 2006</b>	<b>TOTAL</b>
<b>Commitment</b>	8.789	3.410	3.670	3.940	3.981	218.967	<b>242.757</b>
<b>Payment</b>	8.561	3.410	3.670	3.940	3.981	219.195	<b>242.757</b>

*The funds presented from 2005 onwards are subject to the annual approval of the Budgetary Authority*

Subtotal a+b+c	<b>Euros current</b>						
<b>Period</b>	<b>99-02</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2006 &gt;</b>	<b>TOTAL</b>
<b>Commitment</b>	47.909	16.391	19.670	70.840	22.981	1,479.170	<b>1,656.961</b>
<b>Payment</b>	30.609	12.885	21.342	33.920	35.547	1,522.658	<b>1,656.961</b>

*The funds presented from 2005 onwards are subject to the annual approval of the Budgetary Authority*

#### **2.4. Compatibility with the financial programming and the financial perspective**

- Proposal compatible with the existing financial programming
- This proposal will entail reprogramming of the relevant heading in the financial perspective
- This may entail application of the provisions of the Interinstitutional Agreement.

*JRC performed a reassessment of its programme at the end of 2002 and the Consortium made a review of it in 2003. Two conclusions arose with respect of this:*

- The programme appears to be much costly than firstly foreseen

- The programme must be speeded up: the faster the cheaper...

*To be coherent with those recommendations, JRC reviewed the budget for all forthcoming years.*

*It should be underlined that delaying the programme will engender higher cost. For Ispra, one evaluates to 5-6 M€ per year the additional expenditure if the programme is delayed, mainly related to lower efficiency, because JRC-staff can not be decreased in a proportionate ratio (some "unique" functions remain as they are independently of the load: quality assurance, safety officer, Waste Management facilities operators, radiation protection staff, ...) and further because the duration of the maintenance programme (safestore) would be extended.*

## 2.5. Financial impact on revenue:

- No financial implications

OR

- Financial impact – the effect on revenue is as follows:

## 3. BUDGET CHARACTERISTICS

Type of expenditure 10.01.05		New	EFTA participation	Participation applicant countries	Heading Financial Perspective
NCE	NDA	NO	NO	NO	3

Type of expenditure 10.05.01		New	EFTA participation	Participation applicant countries	Heading Financial Perspective
NCE	DA	NO	NO	NO	3

## 4. LEGAL BASIS

*This programme is undertaken by the Commission on the basis of the powers conferred on it by Article 8 of the Euratom Treaty in conformity with the provisions of the Interinstitutional Agreement of 6 May 1999 on budgetary discipline and improvement of the budgetary procedure (OJ C 172, 18.6.1999).*



## 5. DESCRIPTION AND GROUNDS

### 5.1. Need for Community intervention

#### 5.1.1. Objectives pursued

*To reduce and eliminate historical liabilities from nuclear activities carried out at the JRC for the Community, and to incorporate the future liabilities resulting from the decommissioning and waste management of still operating facilities.*

*The activities that generated those liabilities were first created with the aim of establishing a European nuclear industry, in other words, engineering and prototyping tasks. These activities bear little relation to the R&D activities contained in the specific programme of the JRC now in progress.*

*In their response to the previous communication of the Commission (1999), the Council and the European Parliament requested that the programme be funded outside the R&D Framework Programme and carried out as fast as reasonably feasible in order to reduce charges related to the safe conservation of the facilities and because of the risk of changes in nuclear requirements related to safety and waste storage, which could render the programme more expensive.*

#### **In the short term,**

*At Ispra, the needs to be met in the short term relate to the treatment and conditioning of existing waste, which are in a situation not acceptable in regard of the new Italian regulations. Treatment and conditioning of waste require the construction of waste management facilities or the refurbishment of existing facilities (see annex 2 of the Communication) and to make available an interim storage facility since Italy does not provide for a national storage facility at the time being. The corresponding budget for the period 2004-2006 amounts to 66 M€ (55 M€ for specific credits and 11 M€ for staff cost).*

*At Petten, the HFR is still in operation, probably until 2015 or beyond, but some nuclear materials (nuclear fuel) must be sent to USA before 2006 since the USA are likely not to accept those materials beyond this date. The resultant budget amounts to 10 M€ for specific credits (only).*

*At Karlsruhe, some gloves boxes and hot cells containing nuclear materials must be dismantled because of the limit on total radioactivity given by the site-license. Not dismantling this equipment would put at risk the possibility to continue research works. The resultant budget amounts to 11 M€ for the period 2004-2006 (11 M€ for specific credits and 0.3 M€ for staff cost).*

*At Geel, no short term need are foreseen at the moment, since some equipment has already been dismantled since the start of the programme in 1999 and existing facilities are expected to be operated until 2025 or beyond.*

***Budgetary constraints** for the period 2004-2006 are such that the programme may have to be reviewed in order to postpone some of the works (discussions in the Commission are still going-on in the frame of the APS2005 at the time where this statement is written). The JRC is studying an alternative to allow integrating the budgetary constraints, if they are confirmed, while limiting the impact on the total cost of the programme. As a matter of fact, a delay in*

*the implementation of the Ispra's programme is estimated to generate a cost increase of 5-6 M€ per year. Today, budgetary constraints put at risk the timely implementation of the Interim store (this store is needed since Italy does not provide for a national repository at the time being. Further, an Ispra's store is needed before triggering the dismantling activities to house the arising waste). Thus, JRC may envisage refurbishing some old building in order to make room for the waste or, at least, to allow sufficient space to accommodate the existing reconditioned waste and to start the dismantling works. This alternative would add an extra cost to the overall programme, but should remain less costly than a waiting strategy.*

**In the long term,**

*All existing wastes must be treated, conditioned and finally stored at national storage facilities; all facilities must be dismantled and the arising wastes must be treated in the same way as the existing ones.*

*At Ispra, where all facilities are already shutdown (except those for waste management), the availability of the interim store will trigger the start of dismantling operations. Therefore, dismantling operation is assumed to start off in 2008 when the interim store will have been commissioned (assuming that construction of the interim store starts in 2004).*

*Other sites are assumed to stay in operation until or beyond 2015 for Petten and 2025 for Geel and Karlsruhe. On the long term, only Karlsruhe will need specific credits, around 3 M€<sub>2003</sub> per annum, to make room to other activities as already explained above.*

*The overall objective is to dispose of all waste and facilities up to stage 3 of IAEA, i.e. to discharge all Commission nuclear liabilities by transfer of waste to national bodies and allow reuse of the building without restriction to non nuclear activities or return to "green field".*

*Detailed objectives have been set up and divided into site-projects along with related estimated budgets, time scheduling and phasing. Detailed data are available but not disclosed into this Communication because of its potential interaction with future calls for tenders. Achievement of objectives are monitored against performance indicators like the timed annual objectives set in table 5 or even more operational indicators set up in the frame of the "physical progress" methodology that will be used to monitor the programme (see § 8.1 of the present statement and § 6.4 in the Communication).*

**5.1.2. Measures taken in connection with ex ante evaluation**

*The information contained in the document is consecutive to an intermediate evaluation (external evaluation carried out in 2003) of the D&WM programme, updated to take into account detailed internal and external analysis made by the JRC and a Consortium of competent companies from the host countries.*

*It is meaningful to recall that the programme was started off in 1999. A Communication was presented to the Council and the European Parliament in 1999 -COM(1999)114-. The JRC made the first evaluation of the programme on the basis of two studies provided by external companies. This first evaluation allowed issuing of the 1999 Communication, which should be considered as the ex ante evaluation of the programme. Specifically, the 1999' Communication presents the needs to be met in short and long term, even if short term objectives are given more emphasis than long term ones. The objectives and results expected are clearly spelled out and the volume of appropriations is assessed with, at that time, the*

*uncertainty related to a poor appraisal of details of works to be achieved. In 2002 Court of auditors requested an "independent examination" of the programme.*

### *5.1.3. Measures taken following ex post evaluation*

Following the analysis referred to above, the whole programme has been restructured in projects. The future liabilities has been wholly reconsidered and incorporated into the programme. To respond to the request of the Court of auditors (OJ 28-11-2002, page 264) for an "independent examination" of the programme, a Consortium of competent companies was asked to review the programme and to reassess its cost. The present Communication is mainly based on their findings and recommendations, specifically the following recommendations have been, or will be at proper time, implemented on each site:

- Concerning organisation, an adaptation of the organisation, the retention of skills, training of staff in the field of decommissioning, introduction of performance indicators such as reduction of radiation doses received and minimisation of secondary<sup>13</sup> waste produced, systematic recourse to specialised companies for equipment engineering and works on site,
- Control of external relations: close contact with the Italian authorities, relations established with the competent authorities in order to obtain quickly acceptance criteria for waste packaging, if they do not exist, and/or the opening of the appropriate outlets, including those for high-activity waste, reinforcement of staff dedicated to relations with authorities, implementation of a communication programme intended for the public, clarification of the conditions for returning the site to its owner according to the agreements in force in the host countries.
- Technical: preparation of the radiological inventory of the installations, including the taking of samples, reinforcement of decontamination of waste to minimise its final volume, approaching entities in Member States which have dealt with equivalent installations, recourse to best available techniques to obtain an exchange of expertise for the benefit of Member States and Accession Countries. Finally, the Consortium recommends the periodical updating of the JRC's decommissioning programme

Further to the Consortium recommendations, the JRC has set up two main measures to direct the D&WM Programme:

- The setting up of a Steering committee, chaired by the Deputy General Director of JRC
- The implementation of industrial project management tools, namely the "physical progress analysis", which allows for a permanent (monthly) comparison of actual expenditures with foreseen ones based on estimated values of deliveries.

*The JRC Review Panel set up to Review the Report presented by the Consortium gave its opinion in July 2003 (see annexe 1 attached hereafter). The Group of Independent Experts (GIE) also issued recommendations for the strategy as well as for the technical aspect of the programme that corroborate the Consortium recommendations. A list of recommendations of*

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<sup>13</sup> "Secondary waste": This is waste produced by processes used to dismantle installations and which are therefore added to the existing waste

*both the Consortium and the GIE has been established and related actions are being enforced.*

## **5.2. Actions envisaged and arrangements for budget intervention**

*The actions envisaged and, for some, engaged (mainly at Ispra), are as follow:*

- To evacuate all nuclear materials (fuel) from the site and possibly other liquid effluents (alkaline metals) and solid waste
- To construct or refurbish waste management facilities on site in Italy since outside waste management operator does not exist at the present time
- To retrieve and treat the existing waste to conform to new regulations
- To commence pre decommissioning activities: decontamination, radiological characterisation, small dismantling
- To build an Interim store at Ispra since no waste management operator can take care of the JRC's waste in Italy
- To achieve the dismantling of the main facilities (up to stage 3 of IAEA) and the treatment of arising waste
- To dismantle the waste management facilities (Ispra only) and to complete stage 3 up to "green field"

*The above works shall be funded by Community budget as explained in the Communication. Financial schedule of the Programme is given above in paragraph 2 above and in paragraph 4.2, table 1 of the Communication.*

## **5.3. Methods of implementation**

*The operations on site are carried out by external contractors and monitored by the JRC's staff. A steering committee decides of the strategy and follows up the implementation of the programme. An Independent Experts Group provides advice to the Programme managers and the Steering Committee. Chapters 6.4. through 6.8 of the Communication provide further details on the method of implementation of the programme.*

## **6. FINANCIAL IMPACT**

### **6.1. Total financial impact on Part B - (over the entire programming period)**

*The total cost of the proposed programme was assessed taking account of:*

- *Staff costs based on 2003 staff cost in the four concerned JRC sites;*
- *Estimated cost of appropriations needed to carry out the planned programme (direct expenditure for operation, equipment and contracts).*

### 6.1.1. Financial intervention

Commitments in € million (to the 3rd decimal place)

Period	Euros current <sup>(1)</sup>								
	99-02	2003	2004	2005	2006	2007	2008	2009	2010
<b>Commitment</b>	39.120	12.981	16.000	66.900	19.000	39.884	27.729	32.858	26.369
<b>Payment</b>	22.048	9.475	17.672	29.980	31.566	34.245	37.464	29.953	31.290

Period		2011	2012	2013	2014	>2014	TOTAL
<b>Commitment</b>		22.154	29.190	25.708	23.530	1,032.782	<b>1,414.204</b>
<b>Payment</b>		26.674	27.248	26.174	25.040	1,065.374	<b>1,414.204</b>

(1) Assuming inflation rate of 2.5% per annum

*This is the financial statement for the share financed by the Commission's contribution. A few additional resources (range 7-20 M€) could be funded by a decommissioning fee derived from the commercial services provided by the HFR at Petten. It is not taken into account in the above figures due to the uncertainty on the HFR operation outcome.*

### 6.1.2. Technical and administrative assistance, support expenditure and IT expenditure (Commitment appropriations)

Euros current									
Period	99-02	2003	2004	2005	2006	2007	2008	2009	2010
<b>Commitment</b>	8.789	3.410	3.670	3.940	3.981	5.966	6.352	6.511	6.674
<b>Payment</b>	8.561	3.410	3.670	3.940	3.981	5.966	6.352	6.511	6.674

Period		2011	2012	2013	2014	>2014	TOTAL
<b>Commitment</b>		6.969	7.143	7.321	7.642	164.390	<b>242.757</b>
<b>Payment</b>		6.969	7.143	7.321	7.642	164.618	<b>242.757</b>

### 6.2. Calculation of costs by measure envisaged in Part B (over the entire programming period)

- Refurbishing and construction of waste processing facilities (~€130 Mio) 8 %
- Processing and conditioning of waste from the past (~€180 Mio) 11 %
- Facilities dismantling and management of arising waste (~€600 Mio) 36 %
- Cost for final storage of waste (~€400 Mio) 24 %

–	Commission's staff cost	(~€230 Mio)	14 %
–	"Green field" option	(~€117 Mio)	7 %
	<b>TOTAL</b>	<b>(€1 657 Mio)</b>	<b>100 %</b>

*Those costs are the results of a detailed analysis at project level*

## 7. IMPACT ON STAFF AND ADMINISTRATIVE EXPENDITURE

### 7.1. Impact on human resources

Types of post		Staff to be assigned to management of the action using existing and/or additional resources		Total	Description of tasks deriving from the action
		Number of permanent posts	Number of temporary posts		
Permanent officials or Temporary staff	A	16		16	<i>Monitoring of the programme, i.e., safe conservation of facilities, procurement, security of operations, quality assurance, and relation with stakeholders.</i>
	B	11		11	
	C	9		9	
Other human resources			5	5	
Total		36	5	41	

Based on forecast figure for 2004. Being a long term project the proposed staff could evolve in time.

*The need for JRC's human resources is covered by the allocation granted to DG JRC in the context of the budgetary procedure.*

### 7.2. Overall financial impact of human resources

Type of human resources	Amount €	Method of calculation *
Officials	3,380,000	Average projected cost
Temporary staff	290,000	
Other human resources (give budget line)	p.m.	
Total staff cost 2004	3,670,000	

### **7.3. Other administrative expenditure deriving from the action**

*Not applicable*

## **8. FOLLOW-UP AND EVALUATION**

### **8.1. Follow-up arrangements**

*The whole programme is managed as an industrial programme. The quantitative and qualitative indicators and criteria used to assess the results of the programme are derived from "Earned Value Analysis" methodology, more generally called "physical progress methodology" which enables a direct comparison between "actual" and "scheduled" performances (see § 6.4 of the Communication). This method is well adapted to monitor and control heavy and long-term (multi-annual) programme. In short, it consists of breaking down the works into elementary tasks easily identifiable ("physical" and therefore measurable), and allocating to each task a budget, along with a time scheduling. Expenditures related to each task are registered separately and, when the task is ended (study published, equipment provisioned, waste conditioned, etc), the actual cost is compared to the forecasted one. Once in place, the physical progress analysis is renewed every month. This allows of to fine tune up the programme and take necessary measures whether a negative deviation occurs.*

*The nature and the monthly frequency of the internal analysis process should enable the Commission to satisfy its obligations.*

*The results will be reported to the members of the JRC Board of Governors and published in an annual report where possible.*

### **8.2. Arrangements and schedule for the planned evaluation**

*For each project carried out specific ex post reporting is made. Moreover, starting in 2004, monthly analysis of the main projects are performed under "physical progress methodology" as presented above and in chapter 6.4. of the Communication. In addition, monthly reports are made towards the Steering committee that has been set up at directorate level in the JRC.*

*A review of the Programme is made on a yearly basis. And JRC will provide for an annual updating and ensure a general external evaluation and updating every four years.*

## **9. ANTI-FRAUD MEASURES**

*Audit and internal control programme by Joint Research Centre officers, covering the industrial and budgetary aspects, reporting to the JRC Director and to the Board of Governors, and access for the Court of Auditors.*

*Control of the circulation of fissile materials is covered by Euratom and the IAEA.*

Re.: Finalisation of Study Contract No. 19555-2002-07 F1EP KAR BE –

### Opinion of the JRC Review Panel on the Review Report presented by the Consortium

In August 2002, DG JRC has placed a contract for the external evaluation of its Decommissioning and Waste Management Programme<sup>14</sup> by a Consortium composed of: SCK•CEN (Consortium leader), Tractebel Ingegneria s.p.a., Forschungszentrum Karlsruhe GmbH (FZK), Nuclear Research and Consultancy Group (NRG).

The Court of Auditors has asked for such an external evaluation in its 2001 Annual Report. It has been deemed necessary by the JRC itself as successive internal assessments highlighted significant increases of the overall cost of the Programme because of a wide range of uncertainties, already identified by the 1999 Communication.

The Report supports the strategy followed by the JRC for its D&WM Programme and provides a best estimate for the programme costs, based on the data available.

The Consortium has presented the main conclusions of the Report to the JRC D&WM Review Panel and to the Independent Expert Group (IEG) established by the 1999 Communication to assist the JRC in the implementation and monitoring of the Programme.

The IEG has issued an opinion fully supporting the recommendations made in the review, which has been performed “to a good quality level and with the maximum detail allowed by the information available”.

The Consortium has submitted the final Report on 19 June 2003. The evaluation process included a series of iterations of focused exchange of information between the JRC and the Consortium with a view to get a final document of high quality. Given the complexity of the programme, the contracting parties agreed to finalise the review later than originally envisaged in order to ensure a comprehensive and reliable evaluation.

The JRC Board of Governors, to which the Report has been presented on 1 July 2003, supported the conclusions of the study that will provide the basis for a new Communication of the European Commission to the European Parliament and to the Council on the D&WM Programme.

The JRC Review Panel declares itself satisfied with the review and considers that it has answered to all the requirements in the contract and in the technical specifications (including a cost estimate for the transfer of sites to “green field”).

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<sup>14</sup> COM (1999) 114 final “Historical Liabilities resulting from nuclear activities carried out at the JRC under the Euratom Treaty” – Decommissioning of obsolete nuclear installations and waste management”.



**Financial planning in Euros Current and Euros 2003**

**Specific Credits**

	€curr.	Euros 2003							
Period	99-02	2003	2004	2005	2006	2007	2008	2009	2010
Commitment	39.120	12.981	15.610	63.677	17.643	36.133	24.508	28.333	22.183
Payment	22.048	9.475	17.555	28.895	30.114	31.990	34.456	26.608	27.283

Period		2011	2012	2013	2014	2015>	TOTAL
Commitment		18.183	23.373	20.083	17.933	638.409	<b>978.169</b>
Payment		22.678	22.570	21.110	19.716	663.670	<b>978.169</b>

	Euros current								
Period	99-02	2003	2004	2005	2006	2007	2008	2009	2010
Commitment	39.120	12.981	16.000	66.900	19.000	39.884	27.729	32.858	26.369
Payment	22.048	9.475	17.672	29.980	31.566	34.245	37.464	29.953	31.290

Period		2011	2012	2013	2014	2015>	TOTAL
Commitment		22.154	29.190	25.708	23.530	1,032.782	<b>1,414.204</b>
Payment		26.674	27.248	26.174	25.040	1,065.374	<b>1,414.204</b>

**Direct Human Resources**

	€curr.	Euros 2003							
Period	99-02	2003	2004	2005	2006	2007	2008	2009	2010
Commitment	8.789	3.410	3.580	3.750	3.697	5.405	5.614	5.614	5.614
Payment	8.561	3.410	3.580	3.750	3.697	5.405	5.614	5.614	5.614

Period		2011	2012	2013	2014	2015>	TOTAL
Commitment		5.719	5.719	5.719	5.824	98.544	<b>167.000</b>
Payment		5.719	5.719	5.719	5.824	98.772	<b>167.000</b>

	Euros current								
Period	99-02	2003	2004	2005	2006	2007	2008	2009	2010
Commitment	8.789	3.410	3.670	3.940	3.981	5.966	6.352	6.511	6.674
Payment	8.561	3.410	3.670	3.940	3.981	5.966	6.352	6.511	6.674

Period		2011	2012	2013	2014	2015>	TOTAL
Commitment		6.969	7.143	7.321	7.642	164.390	<b>242.757</b>
Payment		6.969	7.143	7.321	7.642	164.618	<b>242.757</b>

**TOTAL (Specific credits + Direct human resources)**

Subtotal a+b+c	€ curr.	Euros 2003							
		2003	2004	2005	2006	2007	2008	2009	2010
Period	99-02								
Commitment	47.909	16.391	19.190	67.427	21.340	41.538	30.122	33.947	27.797
Payment	30.609	12.885	21.135	32.645	33.811	37.395	40.071	32.222	32.897

Period		2011	2012	2013	2014	2015>	TOTAL
Commitment		23.902	29.092	25.802	23.757	736.953	<b>1,145.169</b>
Payment		28.397	28.289	26.829	25.540	762.442	<b>1,145.169</b>

Subtotal a+b+c	99-02	Euros current							
		2003	2004	2005	2006	2007	2008	2009	2010
Period									
Commitment	47.909	16.391	19.669	70.840	22.981	45.850	34.081	39.369	33.042
Payment	30.609	12.885	21.342	33.919	35.548	40.211	43.816	36.464	37.964

Period		2011	2012	2013	2014	2015>	TOTAL
Commitment		29.123	36.332	33.029	31.172	1,197.172	<b>1,656.961</b>
Payment		33.643	34.391	33.495	32.682	1,229.992	<b>1,656.961</b>