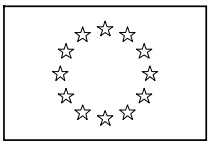

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REPORT FROM THE COMMISSION

JRC ANNUAL REPORT 2001

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Foreword from the Commissioner for Research

I have been pleased with the efforts the JRC has made over the last year to concentrate resources more on its core tasks and ensure that its work is driven by customer demand, with a clear-cut service orientation. A significant proportion of Community legislation is science-based. We must make all possible efforts to ensure that the science supporting it is of the highest quality. In this regard, the JRC, supported by an extensive networking structure, can help to play an important role in ensuring that effective and reliable scientific support is given to Community policy-making.

The JRC will support a European system of reference for science and technology, by targeting its resources on:

– developing reference materials and methods, common databases and information exchange systems;

– validating methods in key policy areas such as the environment and food safety.

As a European research organisation, the JRC will need to play its part in creating a European Research Area in so far as it can provide a platform generating real added Community value from networking and scientific collaboration. The proposals for the Sixth Framework Programme recognise the contribution the JRC can make to integrated research training – its facilities should be used to provide access to young researchers and ensure regular exchange of researchers with Member States and applicant countries in a multidisciplinary scientific setting. I am keen to ensure that the large JRC facilities are more intensively and widely used, including for reference measurement and fundamental research.

I am confident that, under its new Director-General, the JRC will make a valuable contribution to the creation of the European Research Area.

Philippe Busquin

Research Commissioner

Comments from the Chairman of the Board of Governors

The year 2001 marked the onset of a period of profound change for the JRC involving the restructuring of institutes and concentration of activities. The changes were achieved with the active support and collaboration of the staff and their representatives. I am also pleased to recognise the strong effort being made to develop a service culture in the organisation. This, in my view, has significantly contributed to the improved attitude of the Council and Parliament towards the JRC and indeed of those Directorates-General of the Commission that receive scientific support from the JRC.

The new Director-General, Barry McSweeney, took up his post last April. Since his first day on the job, Barry brought along his characteristic energy and enthusiasm to work with all the members of staff in order to shape the JRC of the years to come. He distinguished himself by the drive and confidence he showed in the ability of the organisation to adapt to the needs of its key customers and to provide the best possible scientific and technical support to Community policymaking and, in particular, to the creation of the European Research Area.

The structure of the Board of Governors itself changed; a number of working groups were created aiming at linking the Board more closely to the strategy and operation of the JRC Institutes. This process of change proved particularly fruitful as the advice of the Board to the Director-General on strategic decisions was consistently taken up by the JRC management. This enhanced the effective support of the Board for management decisions and to the strategic direction of the JRC. I welcome the emphasis the JRC is putting on supporting the enlargement process. Support for the European Research Area and for enlargement are indeed vital activities very appropriate to the function of the JRC.

The Board looks forward to the development and consolidation of all these changes in 2002.

Fernando Aldana

Message from the Director-General

The year 2001 was a year of change and focusing for the JRC, change brought about through a process of aligning our Institute activities to Community policies in order to give the best added value to our main customers. As a result, we replaced the Institute for Advanced Materials with the Institute for Energy, and fused activities of the Space Applications Institute into the Institute for Environment and Sustainability and the Institute for the Protection and Security of the Citizen. It was also a tough year as we had to accommodate a 175-post reduction following the recommendation of the Commission Expert Group. These changes have been successfully implemented with the support of all staff including the staff representatives.

Developing a service culture and attending to customer demands have become the main drivers of JRC activity. All JRC projects now have the endorsement of its customers. A High-Level Users Group consisting of the Directors-General of all Commission services using JRC work has been established and meets regularly to steer and monitor the orientation of our activities. We will ensure that research institutes in the Member States are included in our projects. In this way, the knowledge base enabling the JRC to support Community policy effectively will be as comprehensive and well-grounded as possible.

Ensuring that the science produced by the JRC and used in the service of EU policy is of the highest quality is a key objective. Seeking high scientific quality certified by rigorous peer review and benchmarking of the JRC scientific output and the management processes that lead to it against the output of comparable organisations in the EU were two of the initiatives undertaken in the course of 2001.

Defining the customer need for everything we do is at the heart of project prioritisation. In our drive towards higher cost-effectiveness, all our activities are being reviewed with a critical eye on the actual need for JRC action. A process of project integration has already commenced aiming at providing better scientific value for money in key Community policy areas. All our future projects will meet strict criteria of EU, added value and non-duplication of Member State effort.

The JRC strongly supports the development of the European Research Area. Our extensive network base, involving 2000 external research groups, and our commitment to research training are essential in this respect. We will continue to invest in exploratory research projects in selected areas, as this is vital for our scientific credibility as well as being an instrument enhancing our capability to provide scientific support to future policy needs. A key facet of our activities will be to provide research training for young scientists and scientific staff of competent authorities from the EU and applicant countries through a mix of short-term visits, research cooperation and hosting PhD and post-doctoral level research. In addition, the JRC’s own staff is strongly encouraged to spend limited periods of time in the service of other Commission Directorates-General or relevant organisations in the Member States.

Special emphasis has been put on supporting the enlargement process. Several of our projects were extended to include applicant countries and we have modified our approaches to tackle the specific problems these countries face in our domain of work. We have foreseen specific instruments aimed at efficient exchange of knowledge and provision of specialised training in scientific methods and techniques to facilitate the enforcement of the "acquis communautaire" in key Community policy areas.

In closing, I would like to thank the JRC Directors and staff, the Board of Governors and Commissioner Busquin for their encouragement and support in the work of the JRC during this period of change.

Barry McSweeney

Observations from the Board of Governors

The year 2001 marked the onset of a period of profound change for the JRC involving a stronger orientation towards its customers and users, the concentration and focusing of activities, enhanced collaboration with the Member States, the opening up and networking with other organisations, and the monitoring and benchmarking of scientific quality.

These changes are in line with the combined conclusions of the various external and internal evaluation exercises carried out in 2000 and 2001 (i.e. the Scientific Audit, the Five Year Assessment, Peer Group report, Davignon report, Activities Prioritisation Audit, the benchmarking initiative and the Total Quality Management exercise), as well as the objectives given by Commission Communications COM (2001) 714 final, COM (2001) 594 final and COM (2000) 612 final.

In this context, the Board wishes to make the following observations on the 2001 Annual Report of the JRC:

– The JRC 2001 Annual Report shows in its new format a consolidated corporate image which serves as an improved communication tool with its customers and users.

– Nuclear safety and other energy-related activities have been concentrated at the JRC site in Petten, within the new Institute for Energy. Two new institutes, the Institute for Environment and Sustainability (IES) and the Institute for the Protection and Security of the Citizen (IPSC), were created in order to integrate and focus the activities of the former Space Applications Institute (SAI), the Environment Institute (EI) and the Institute for Systems, Informatics and Safety (ISIS). The Board recognises the efforts made by the JRC to increase the coherence of its activities in line with its mission. It acknowledges that changes were achieved with the active support and collaboration of the staff and their representatives. However, a job satisfaction survey of the staff carried out in the framework of Total Quality Management has also revealed challenges, which the Board encourages the management to address.

– The Board was involved in the selection and appointment of the new Director-General, Barry McSweeney, and three new Directors heading the Science Strategy Directorate, Resources Directorate, and the Institute for Health and Consumer Protection (IHCP). The Board looks forward to continuing the good collaborative relationships already developed with the new JRC management team.

– The operational procedures of the Board of Governors have also been adapted to enhance its contribution to the JRC corporate strategy and main lines of activities. Four working groups of the Board have thus been created: Strategy and Finance; Food, Chemicals and Health; Environment and Sustainability; and Energy. The aim is to improve interaction of Member States and applicant countries with the JRC management and the Institute directors. The experience has proven successful and should continue to be further developed.

– Strong efforts are being made to develop a service culture in the organisation. In this respect, the contribution of the new High-Level Users Group and its importance for JRC governance is acknowledged.

- The Board of Governors appreciates the efforts of the JRC to achieve the highest scientific quality through internal and external reviews and through benchmarking with other organisations.

- The JRC has undertaken preparatory work in 2001 with the aim of contributing to the creation of the European Research Area. The Board will continue to support this process and will collaborate with the JRC management to define strategic objectives and actions in this regard, including mechanisms for networking, the implementation of a Common Scientific Reference System, the contribution to the EU Enlargement process, and enhancing the role of the JRC in research training through its facilities.

- The Board of Governors encourages the JRC management to continue to improve gender balance and to make the JRC a family friendly and equal opportunity organisation. It supports the efforts of the 'JRC Women and Science network' in this respect.

- The Board will use its endeavours to enhance the progression and consolidation of these changes in 2002 and beyond.

1. NEW STRUCTURE, NEW FOCUS

The Joint Research Centre is one of the two Directorates-General of the European Commission under the responsibility of Research Commissioner, Philippe Busquin. Its mission is to provide scientific and technical support to Community policy-making through its own research and through bringing together the research capabilities of its extensive scientific networks.

The period 2001-2002 is a time of change for the JRC. Within the last year the number of JRC Institutes was reduced from eight to seven. The remaining Institutes were restructured resulting in the creation of three new ones, the Institute for the Protection and Security of the Citizen, the Institute for Environment and Sustainability and the Institute for Energy. A consequent reduction in the overall number of units followed.

Our main objective for the year 2002 will be the consolidation of these changes in order to render the JRC operation more efficient and to further focus its customer-driven activities. In this context, a High-Level Users Group comprising the Directors-General of all Commission services supported by the JRC scientific work and chaired by the JRC Director-General was set up in July 2001. The Group regularly reviews the top priorities for scientific support to EU policy-making so that the work programme of the JRC can properly reflect those priorities.

In addition to the High-Level Users Group, the JRC Board of Governors provides an increasingly effective link between the JRC research strategy and the priorities of EU Member States. The Board of Governors consists of one representative of each EU Member State, as in the appendix.

The JRC management includes Director-General Barry McSweeney, Deputy Director-General Hugh Richardson, and a team of Directors (appendix).

Several new key elements are being introduced in the JRC operation in order to reinforce its role as provider of scientific and technological support to Community policy-making and as a catalyst for scientific and research networking and integration in Europe. They include:

- building up a significant number of mobile young scientific staff who work at the JRC for limited periods of time.

- enhancing the training capacity of the JRC and integrating research training into its research work programme. Special emphasis is put on the needs of Candidate Countries in designing and implementing the research training programme.

- promoting greater transparency and simplification of administrative procedures.

- promoting staff exchange with other Commission services. This will also be extended to research organisations in the Member States.

2. KEY ACHIEVEMENTS

2.1. Water is Essential

Fresh water is crucial for human and ecosystem health, a threatened commodity in Europe, and a major consideration for economic growth. Recognising the need to protect fresh water in Europe, the EU adopted the **Water Framework Directive** in late 2000. The directive is now being implemented in the Member States, with significant technical and scientific support from the JRC. It introduces the watershed approach, which aims at evaluating all activities in the river basin with the impact on inland and coastal waters with respect to ecological and human health.

In 2001, the JRC assisted DG Environment in setting up the scientific and technical working groups required by Community legislation. It also contributes to the analysis and monitoring activities on priority chemicals as part of the Water Framework Directive, and coordinates pilot testing of river basins for compliance purposes. In addition, the JRC provides expertise in ecological quality assessment of surface waters and development of inter-calibration of water analyses for regulatory purposes in the Member States. In these endeavours, the JRC works in close collaboration with the national and regional competent authorities in Member States, and with other services of the Commission. The aim is to harmonise efforts towards sustainable management, use and protection of EU's common fresh water resources. The JRC research contributes to reducing uncertainty, providing reference measurements and protocols, and linking space, land and water observation strategies.

2.2. Climate Change

On the international scene, 2001 has been a year of paramount importance for climate change. In the research arena, the Intergovernmental Panel on Climate Change (IPCC) published its Third Assessment Report (TAR), stating that "most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations". In the policy arena, the IPCC meetings in Bonn and Marrakesh succeeded in translating the Kyoto Protocol into legal text that is now ready for ratification. This year the JRC has been actively involved in the process. JRC scientists acted as Lead Author and Contributing Author in the IPCC TAR. They contributed to chapters dealing with the role of atmospheric chemistry and aerosols in climate change, areas where they have strong competencies. IPCC TAR identifies major uncertainties related to aerosol climate effects, which prevent accurate predictions of future climate change. It also points to the role of aerosols in air pollution, acid deposition, and health and hence to the relationship between climate change issues and conventional air pollution.

The importance of atmospheric chemistry and aerosols in climate studies was highlighted at the Symposium "A Changing Atmosphere" organised by IES and DG Research, which took place in Turin during September 2001. This attracted 250 scientists from Europe and beyond. During the symposium an evening session was organised, open to the general public, in which Commissioner Philippe Busquin debated with key representatives from research and industry what is effectively being done about climate change.

During 2001, the JRC set up collaboration with DG Environment, the European Environment Agency (EEA) and the Member States to study and improve the quality of CO_2 sequestration estimates in the biosphere (the "sink"). This is currently of key

importance, since the Bonn and Marrakesh Accords allow Parties to use CO_2 sequestration in the biosphere as a way to comply with the Kyoto Protocol greenhouse gas reduction targets. It is believed that most of the 5.2% reduction required by the Protocol will be achieved by appropriately managing the biosphere sink. However, huge methodological problems plague sink measurements, and many inconsistencies exist in approaches between the Member States. Parallel to its work with DG Environment, EEA and the Member States, the IES continues its strong collaboration with the CarboEurope initiative of DG Research which aims at a scientifically sound verification system for greenhouse gas emissions and sinks that would have EU-wide applicability.

2.3. Fire: A threat to European Forests

Every year, on average, 50,000 forest fires occur in the EU Mediterranean region burning more than half a million hectares of forested areas. Often fire damage is irreversible due to the fragile condition of some Mediterranean ecosystems. The European Commission and the EU Member States spend millions of euro trying to mitigate forest fire damage.

The JRC is working with the Member States and the Directorates-General for Environment and Agriculture to improve fire prevention and fire damage evaluation. The Permanent Network of National Correspondents (PNNC) of the Member States recognises the need for the evaluation of forest fire impacts at the European scale. In response to this need, since 1999, the JRC has had a strong liaison with the fire prevention and firefighting services at the EU and national levels. The JRC is also part of a scientific network that deals with the development and implementation of methods to compute fire risk and evaluate fire damage. It is through the further expansion of these networks that the JRC aims to contribute to the development of the European Research Area in this field.

Fire prevention is based on the use of forest fire risk maps which are used for determining areas at high risk of fire, and consequently for planning strategies to minimise fire damage. These strategies include the allocation of aerial means, ground machinery, and human resources. The knowledge of fire risk is important not only at the national, but also at international level, because forest fires often cross national boundaries.

During 2001, periodic meetings were held with networks of national experts on fires from the Member States to evaluate the requirements of the users in terms of products, formats, frequency of deliverables, etc. Based on the needs of the Member States, the JRC initiated the development of a system to provide information on the fire risk forecast, evaluate the extent of burnt areas and assess the fire damage to European forests. The first component of this system, which integrates the use of satellite-derived and geo-information for forest fire prevention is called the **European Forest Fire Risk Forecasting System (EFFRFS)**. The EFFRFS constitutes a pre-operational service in which the JRC, in coordination with the Commission's Environment DG, provides one- and three-day forest fire risk forecast maps to civil protection and forest fire services in the EU. Fire risk forecast maps arrive at all the services every morning through the Internet. The EFFRFS, which started in 2000 covering only the Mediterranean region, operates during the peak of the forest fire season, i.e. from June to September. It has been expanded in 2001 to cover other EU countries that requested the provision of fire risk maps, such as Austria, Finland, Germany, and Ireland, and some EU pre-accession countries such as Bulgaria.

The EU Member States have appreciated the operation of the system and have asked for the continuation and the improvement of EFFRFS towards a European Forest Fire Information System. This is a clear example of establishing a structured dialogue with

users and other stakeholders that can lead to an operational service for civil protection and forest fire services across the EU. This JRC contribution is in line with the EU's role to provide environmental information and services that can be aggregated to other existing global environmental information products in support of the Global Monitoring for Environment and Security (GMES) initiative.

2.4. BSE

The safety and quality of food are of increasing concern to every citizen in the European Union, and protecting the health of consumers is high on the EU policy agenda. The JRC assists European and national authorities in addressing this concern by supplying independent and authoritative scientific reference and support. Its principal contribution in the wake of the Bovine Spongiform Encephalopathy (BSE) crisis has been the development and validation of detection methods to ensure the absence of central nervous tissue in food products and animal meat and bone meal (MBM) in feeding stuff, and identification of BSE- infected animals.

During 2001, the JRC validated two commercially available test methods for the detection of tissue from the central nervous system (CNS) such as brain in food products. The results showed that both methods are able to detect CNS tissue in processed meat products such as sausages. The JRC likewise improved an analytical method for the determination of a specific marker (nervonic acid) from CNS in food products.

The JRC continued the development and validation of methods able to detect MBM in feeding stuff, including the refinement and validation of an alternative method for the determination of heat treatment of MBM according to European legislation. At the request of DG Health and Consumer Protection the JRC started to look for appropriate markers to be added to MBM and fat from rendering plants. A specific marker (trienantine) was evaluated for its suitability, and was eventually proposed as an appropriate marker.

In 2001, the JRC continued to evaluate tests to detect the infection of cattle with BSE. Five newly developed post-mortem BSE tests were evaluated awaiting approval in the European Union.

When post mortem testing for BSE became compulsory in the EU on 1 January 2001, the JRC organised a proficiency-testing programme of the EU National Reference Laboratories (NRL) in collaboration with the Central Veterinary Agency in the UK, which is the Community Reference Laboratory for BSE. Non-infected and infected samples were prepared and sets were sent out to 14 of the 15 EU Member States. The results revealed a generally high standard of performance of the NRLs.

The JRC will continue to reinforce its capacity to integrate its know-how into this key area of Community interest and assist the EU in re-establishing the confidence of public and consumers in the way that food is produced, regulated and controlled, by streamlining its research to respond to the needs of both the Commission and the Member States.

2.5. Animal Traceability

As part of its ongoing effort to make the payment of agricultural subsidies easier to monitor and less prone to fraud, the Agriculture DG launched the four-year IDEA (Identification Electronique des Animaux – Electronic Identification of Animals) project, at the beginning of 1998. Its main objectives were: firstly, to assess the feasibility of

electronic identification as a system to trace individual farm ruminants from birth to the abattoir; secondly, to validate under field conditions the performance of different passive identification devices, as well as the readers, to automatically read the information on them; and thirdly, to pave the way for a possible full-scale implementation in the European Union. Approximately one million animals from three species (440,000 cattle, 490,000 sheep and 30,000 goats) in six EU Member States (France, Germany, Italy, the Netherlands, Portugal and Spain) were fitted with three different types of electronic tags: (1) injectable transponder, (2) ruminal bolus and (3) electronic ear tag.

The JRC was responsible for providing the technical and scientific support to the IDEA participants, performance testing and certification of the electronic identification devices, quality control of the equipment, definition and establishment of a central database (operational since 1999), data transmission and recording during the duration of the project, and global evaluation of the results. A preliminary analysis of the results indicates that, on average, the retention rate for the three types of electronic tags used in the IDEA project is higher than commonly observed retention rates for plastic ear tags, currently used for animal identification. In-field testing included tagging, reading and recovery of the electronic identifiers. Examination of the organisational structure, data recording, information transfer and database management systems demonstrated the feasibility of an electronic identification system to trace animals from birth to the abattoir. Improvement in livestock monitoring is expected not only to reduce financial fraud, but also to reduce the spread of animal-borne diseases. Such a system - tracing-back of animal origin - would have allowed for improved management of the recent BSE and Foot and Mouth disease crises.

The results of these electronic animal-tagging trials will feed into new legislation proposals regarding livestock identification. The experience gained during the four-year project showed not only that clear legislation needs to be put in place, but also that further accompanying measures are needed - on testing and certification laboratories to check conformity of tagging and reading equipment, on training of operators, on in-field procedural guides and on data recording. A sound management system is fundamental to success.

2.6. Genetically Modified Organisms (GMOs)

In 2001, the European Commission proposed the JRC as the Community Reference Laboratory (CRL) for GMOs. This proposition was based on the recognition of the activities of the European Network of GMO Laboratories (ENGL), comprising national enforcement laboratories from EU Member States and applicant countries. ENGL together with the JRC will form the basis for the Community Reference Laboratory. Within ENGL, advances have been made particularly on method validation and on sampling of seeds, grains and food. Also, a cooperation agreement has been reached between the JRC and the GMO industry to validate methods for GMO detection and to supply materials for the production of GMO certified reference material (CRM) for which the JRC is still the main producer worldwide. In 2001, JRC produced a new stock of CRMs for soya beans (Roundup ready) and a third generation of GMO CRM (T25 maize) is currently certified.

2.7. Safety of Chemicals

The year 2001 was marked by the adoption by the Commission of the White Paper on a future strategy for the safety of chemicals. In addition to supporting the implementation of the current legislation on dangerous substances, the JRC has actively contributed to the

drafting of the follow-up legislation by participating in a number of the working groups created by the Commission's Environment and Enterprise Directorates-General. In addition, it produced a report highlighting how alternative (non-animal) tests and testing strategies could be developed and used in support of the future policy on chemicals in the EU. During the year, three *in vitro* tests for embryotoxicity were endorsed by the Scientific Advisory Committee of the European Centre for the Validation of Alternative Methods (ECVAM) as scientifically valid and ready for consideration for use in regulation.

2.8. Alpha-immunotherapy

Alpha-immunotherapy is a new approach to treating certain types of cancer. It relies on very short length, short-lived radiation given off by an emitter attached to cancer-cell-seeking antibodies. Under financing from the European Commission, the JRC in collaboration with the German Cancer Research Centre (DKFZ) in Heidelberg began a Phase I clinical trial for Non-Hodgkin's lymphoma and other B-cell malignancies in March 2001. The pre-clinical work was carried out in a network of European hospitals in Heidelberg, Düsseldorf, Ghent and Hasselt. The JRC contributed to the development and testing of the chelates used for binding bismuth (^{213}Bi) to antibodies specific to cancer cells, and established the efficacy of the ^{213}Bi-labelled construct on relevant cell lines. In DKFZ, the *in-vivo* stability of the radioimmunoconjugate was proven and its toxicity in mice evaluated. The data indicated that radioimmunoconjugates were safe and effective, due to the high cell-killing potency of the alpha-emitter.

Since April 2001, nine patients with B-cell malignancies, coming from three different German hospitals, have been treated in DKFZ at three dose-levels (15, 30 and 45 mCi of ^{213}Bi). Major toxicity has not been observed in the treated patients. A continuation of these trials with a higher dose level is planned and the trial will be extended to other centres, including the University Hospital in Düsseldorf.

The results obtained in a recent collaboration between the JRC and the Nuclear Medicine Hospital of the Technical University of Munich suggested that ^{213}Bi-radioimmunoconjugates could be effective against diffuse-type gastric carcinomas. The first application in clinical therapeutic trials involving patients with solid gastro-intestinal tumours is expected in the near future.

Actinium-225 (^{225}Ac), the parent nuclide of ^{213}Bi, may be even more efficient in the treatment of certain cancer types. Up to now, the major limitation in evaluating its potency has been the lack of a suitable chelate. During 2001, a JRC team developed a new chelate for ^{225}Ac, and preliminary tests indicate efficient binding. Pre-clinical experiments will commence in the near future in order to prove the suitability of the new chelate for clinical use.

Another major issue in radioimmunotherapy is the quality of the radionuclide used. The separation of ^{225}Ac from Radium-225 (^{225}Ra) or ^{226}Ra using cation exchange is a lengthy process. The longer the Ra/Ac product remains on the resin, the greater the risk of radium contamination in the final product. To overcome these problems and to reduce the separation time and elution volume, the JRC has studied new forms of resin. The newly developed separation process has small elution volumes, short separation time and extremely high purity of the product.

2.9. Nuclear Forensics

Illicit trafficking in nuclear materials and associated environmental issues have led to the development of a new discipline: nuclear forensic science. The JRC Institute for Transuranium Elements (ITU) is a key contributor to the European effort in nuclear forensics and is recognised as a centre of excellence in this area by Europol. ITU collaborates closely with the German Federal Police Office (BKA) and Federal Environment Ministry (BMU) – it is the laboratory designated by the BMU for investigation of seized nuclear materials. In the affair concerning the theft of nuclear material from the reprocessing plant WAK (Wiederaufarbeitungsanlage Karlsruhe), which is being decommissioned, the ITU was asked by the German authorities during summer 2001 to analyse the material found in the environment and the private apartments and in cars of the suspects in order to establish information about the origin, age, type and composition of the material and to find out whether further, not yet detected, highly radioactive material was brought out of WAK. A combination of techniques was required, from non-destructive analyses (e.g. low-level gamma measurements), through chemical, elemental and isotopic analysis, up to investigations of the remaining parts of the samples and particles by electron microscopy. ITU participated in all the associated meetings with the German authorities and compiled a final report for use by law enforcement authorities.

JRC staff serve on the International Technical Working Group (ITWG) on Nuclear Smuggling, and participated in two successful exercises involving 'seized' plutonium and highly enriched uranium. In collaboration with the International Atomic Energy Authority (IAEA), the JRC has developed a model action plan for dealing with seized nuclear material that can be used as a framework for developing national response plans. A fully developed version was approved for use recently in the Ukraine and is now being implemented in most of the enlargement countries with dedicated JRC support.

In this area, JRC also fosters close contacts with law enforcement agencies – Europol, Interpol, the World Customs Organisation and national police forces – and develops techniques to optimise collaboration between standard forensic techniques and the special requirements of the nuclear scientist: in February 2001, the JRC made the first ever identification of a fingerprint on an alpha-contaminated object. The JRC maintains a team on standby at ITU at all times to respond immediately to a seizure of illicit nuclear material, so that an analysis can be delivered to the appropriate authorities within 24 hours of arrival at the Institute.

2.10. Cybersecurity

With the rapid advancement and globalisation of the Information Society, the right to privacy is becoming an increasingly difficult concept to sustain. The nature of 'on-line' business and e-commerce - where personal information can be readily transferred in digital form - has led to a situation where fundamental privacy issues are systematically threatened on a global scale. The EU has responded to the problems of on-line privacy protection by drawing up privacy legislation that places stringent controls on the management and processing of personal data by third parties. However, legislation can only offer partial protection; technology has a vital role to play in ensuring appropriate levels of privacy within on-line information management systems.

The JRC provides scientific support to the European Parliament and Commission services, including the Information Society, Justice and Home Affairs, Internal Market, and Health and Consumer Protection Directorates-General, in areas that are crucial for protecting the security of citizens and consumers in cyberspace. These JRC activities focus on privacy- and fraud-related risks to citizens arising from information infrastructure vulnerabilities, and include related prospective and socio-economic impact assessment studies.

During 2001, a benchmark platform for Internet content filtering tools, designed to protect against harmful Internet content, was completed. The 'EU implementation' model of the World Wide Web Consortium's (W3C) P3P (platform for privacy preferences) standard was developed and was adopted as the definitive model for the current P3P specification.

In support of DG Information Society, and in line with the requirements of the Commission's *e*Europe 2002 action plan, the JRC is investigating the technological requirements for privacy management, and has provided scientific and technical advice on the appropriate steps to be taken to keep the EU at the forefront of e-commerce growth. The JRC has also given scientific advice to the European Parliament on future policy issues relating to privacy and identity in cyberspace.

2.11. The electronic-Payment Systems Observatory

The electronic-Payment Systems Observatory (ePSO**),** a 24-month project, co-financed under the DG Enterprise-led ISIS-Programme (Information Society Initiatives in Standardisation) reached full maturity in 2001. Electronic payment systems will play a pivotal role in the development of e-commerce in Europe. The primary objective of the Observatory was to enhance information exchange in this field with a view to promoting commonality of approach, interoperability and eventually standardisation of e-payment systems. The ePSO has set up an electronic Forum of relevant actors and experts and facilitates a systematic exchange of strategic opinions – across borders and sectors – in order to assist standardisation and help regulatory bodies keep pace with the progress of underlying technologies. A high-level Steering Group guides the Observatory. Christa Randzio-Plath, MEP, President of the Economic and Monetary Affairs Committee of the European Parliament chairs the Steering Group, while experts from the industry and related Commission services take part in it. The final ePSO conference will take place in February 2002. Further information on the project can be found on the website: http://epso.jrc.es/

3. HIGHLIGHTS OF THE JRC INSTITUTES

3.1. Institute for Reference Materials and Measurements (IRMM)

IRMM is the JRC's specialised Institute for production, certification and marketing of reference materials and development of measurement methodologies. Its multi-faceted work scope ranges from food quality and safety, in-vitro diagnostics and biometrology to nuclear safety and safeguards. During 2001, the Institute has provided the basis for the JRC's rapid response to the BSE crisis and has produced soya bean and maize certified reference materials and genomic DNA reference materials for food borne pathogens. IRMM has brought together the key players in *in-vitro* diagnostics and biometrology to create global networks aiming at providing reliable and internationally equivalent results in forensic testing, genetics identification, biotechnology product analysis and clinical diagnostic markers. As part of its nuclear safety and safeguards activity, it has certified ten uranium isotopic standards on behalf of the South American Safeguards Organisation. Finally, it has extended its International Measurement Evaluation and Training in Metrology in Chemistry Programmes to over 340 laboratories from applicant countries and awarded more than 300 certificates.

3.2. Institute for Transuranium Elements (ITU)

ITU is the JRC Institute dedicated to nuclear science and its many applications on nuclear safety and safeguards, radioactive waste management and health. In 2001, it made an important effort towards promoting nuclear research training. It organised the first Actinide Science Summer School and started an Actinide User Laboratory to allow young researchers and students to obtain hands-on experience in working with transuranium elements. ITU has participated in drawing up the European Roadmap for developing Accelerator Driven Systems (ADS) for nuclear waste incineration, and has contributed experimentally to the study of the behaviour of irradiated fuel in long-term storage. Finally, the Institute has progressed towards the clinical testing of alpha-immunotherapy for cancer treatment.

3.3. Institute for Energy (IE*)*

In the course of 2001, the Institute for Advanced Materials (IAM) was transformed into the Institute for Energy (IE), in order to focus on supporting EU energy policy development. All of its projects were critically reviewed and adjusted to increase their bearing on Community policy-making. The three main scientific priorities of the new Institute are: nuclear safety, non-nuclear energy and, as a spin-off, nuclear medicine.

IE focuses on operating and providing its services as the reference laboratory to major European networks in the energy sector (four on nuclear and two on non-nuclear energy). In trying to consolidate the energy-related activities of the JRC and to provide validated and harmonised information to Community policy-makers, IE set up the Sustainable Energy Technologies Reference and Information System, along with the Institute for Environment and Sustainability, the Institute for Prospective Technological Studies and the Institute for Transuranium Elements. In addition, support to enlargement progressed further, in particular, in improving the safety of eastern European-type nuclear reactors. The support of the JRC to the TACIS-Phare programmes increased by 40% this year compared with 2000.

3.4. Institute for the Protection and Security of the Citizen (IPSC)

IPSC came into being in September 2001, as a result of a fusion between the Institute for Systems, Informatics and Safety (ISIS) and part of the Space Applications Institute (SAI). The new Institute aims to provide research-based, systems-oriented support to EU policies so as to protect the citizen against economic and technological risk. In preparation for the Sixth Framework Programme its expertise in information, communication, space and engineering technologies has been consolidated and focused in order to provide direct support to Commission Directorates-General and Services through actions in three broad areas. These include the development and assessment of systems to enhance compliance with EU regulations and the application of technologies in fraud identification and prevention; the provision of decision support in economic and technological risk management; and the provision of support in verifying compliance with the Euratom Treaty and other international treaties aimed at preventing the proliferation of weapons of mass destruction.

3.5. Institute for Environment and Sustainability (IES)

The Institute for Environment and Sustainability was created by merging the former Environment Institute and parts of the former Space Applications Institute (SAI). The goal was to create a multidisciplinary team capable of dealing with the multiple facets of science supporting protection of the environment and the EU sustainable development strategy. The expertise currently available combined experimental sciences, modelling, geomatics and remote sensing. Thematically, IES has taken up an integrated approach to environmental problem-solving. In this context, it has played a major role in supporting EU air- and water-related policies such as the Clean Air for Europe programme and the Water Framework Directive. It also helped set the basis for a new "Reference System for EU greenhouse gas emissions and sinks" - a key issue for the implementation of the Kyoto Protocol after the Agreement in Bonn and Marrakesh. In 2001, IES continued to support the Commission's Directorate General for Environment (DG ENV) on radioactivity monitoring in the environment and the transfer of policy-relevant soil information from the Member States to the relevant Commission DGs (Agriculture, Environment, and Development). Finally, the work of IES on renewable energies will be proactively integrated in the Sustainable Energy Technologies Reference and Information System.

3.6. Institute for Health and Consumer Protection (IHCP)

In 2001, the IHCP validated and developed several analytical methods in the food safety and quality area (for example, the detection of central nervous tissue in meat products); it also concluded a cooperation agreement with industry in order to validate methods for detection of genetically modified organisms (GMOs) and to supply materials for the production of certified reference material. This year the European Commission recommended the JRC, together with the European Network of GMO laboratories (ENGL), as the Community Reference Laboratory for GMO detection and identification. In the area of chemical substances, the IHCP European Chemicals Bureau (ECB) continued its work within the context of the White Paper on a strategy for the future EU Chemicals Policy, and the European Centre for the Validation of Alternative Methods (ECVAM) endorsed three *in-vitro* tests for embryotoxicity as scientifically valid and ready to use for regulatory purposes in 2001. The Institute continued to provide IT support to the European Medicine Evaluation Agency (EMEA) for the exchange of authorisation dossiers on medicinal products among Member States under the mutual recognition system through EudraNet (EU Drug Regulatory Authorities' Network), while in the biomedical materials

area, the IHCP signed an agreement with Amersham Health concerning the setting-up of a plant for production of the radiopharmaceutical flurodeoxyglycose (FDG). Moreover, in a move that will enhance training and technology transfer within the European Research Area, in 2001 the Commission designated the bio-cyclotron, located at IHCP, as an official Marie Curie Training Site for biomedical testing using radiotracers.

3.7. Institute for Prospective Technological Studies (IPTS)

IPTS' foresight activities in 2001 have been largely focused on applicant countries, and the **"Enlargement Futures"** project on the techno-economic and societal impact of enlargement was completed. It was based on five thematic reports ("Economic Transformation", "Technology, Knowledge and Learning", "Employment and Societal change", "Sustainability, Environment and Natural Resources", and “Information and Communication Technologies”), the results of which were presented to the Slovenian government's "Bled Forum" on 2-4 December 2001. Furthermore, IPTS, in collaboration with its Enlargement Foresight Network, has provided support to the Czech, Hungarian and Slovenian foresight exercises.

IPTS carried out three prospective studies at the request of the European Parliament on: the mobility of academic researchers, future bottlenecks in the information society (for the Industry, External Trade, Research and Energy (ITRE) Committee) and the impact of technological and structural change on employment-horizon 2020 (for the Employment Committee).

The European Integrated Pollution Prevention and Control Bureau (EIPPCB), hosted by IPTS, finalised the preparation of Best Available Techniques Reference Documents (BREFS) for tanning, large volume organic chemicals, refineries and waste water and gas in the chemical industry. These BREFS are indispensable if Member States are to meet the requirements of Directive 96/61/EC.

In 2001, the European Science and Technology Observatory (ESTO) network started operating under a new framework contract which will cover the period 2001-2006. ESTO is a network of 26 research organisations from 15 countries operating as a pool under IPTS leadership. ESTO aims at detecting, at an early stage, scientific or technological breakthroughs, trends and events of potential socio-economic importance which may require action at a European Union decision-making level.

Moreover, IPTS formally established a joint work programme, covering the period 2001-2002, with the newly established Directorate for technology foresight and socio-economic research of DG Research, and launched preparatory work for the development of joint activities with other JRC Institutes – including IE, IES and ITU, for the definition of a proposal for a Sustainable Energy Technologies Reference and Information System; with IPSC on cybersecurity; and with IRMM on genetic testing.

4. SUPPORTING EU POLICY

A key element of the JRC mission is employing JRC scientific and technical competencies directly in support of European policy-making. In this way, the JRC serves the common interest of EU Member States and European citizens, while remaining completely independent of individual, commercial and national influences.

JRC contributed scientific support to both ongoing and new EU legislation in addition to providing deliverables to Member State organisations. The JRC also provided representation on international technical committees and working groups, including 11 ISO committees, 14 CEN committees, and 4 OECD working groups.

4.1. Thematic priorities

JRC activities focused on the three key areas: food, chemical products and health; environment and sustainability; and nuclear safety and safeguards, which were underpinned by JRC competencies in: technical foresight; reference materials and measurements; and public security and anti-fraud.

Specific activities addressed a series of major themes, including:

– climate change – keeping the EU at the forefront of efforts to fight a global threat;

– combating fraud – from cybersecurity to agriculture;

– emissions and air quality – avoiding impacts on health and the environment;

– genetically modified organisms – improving GMO detection and risk assessment;

– future EU strategy on safety of chemical substances – providing scientific and technical support to both the implementation of the existing Community legislation on chemicals and the drafting of the follow-up legislation to the White Paper on the future chemicals policy of the EU;

– nuclear safeguards – detecting proliferation of nuclear material, equipment or technology from peaceful applications to military use, and combating illicit trafficking;

– nuclear safety – reducing risks from nuclear operations;

– nuclear waste – improving management and storage;

– safety and quality of the food chain – re-establishing confidence in food production;

– sustainable energy – security and safety of energy supply and renewable energies; and

– water quality – preventing pollution.

4.2. The Work Programme 2001

The scientific themes highlighted above were addressed through the projects outlined in the table in the appendix.

4.3. Contributing to European standardisation

Research contributing to the European standardisation process is an important function associated with the JRC mission. Many JRC activities – including harmonising methods, benchmarking and identification of best practices – contribute to the development of the necessary consensus for the establishment of European standards. A cooperation agreement signed in 1998 between the JRC and the Comité Européen de Normalisation (CEN) has strengthened the collaboration between the two organisations in the context of pre-normative and co-normative research (CEN-STAR committee dedicated to Standardisation and Research).

Several activities emerged in 2001, as a result of this collaboration:

- 61 new or renewed certified reference materials have been produced for use within the framework of European standardisation;
- the JRC chairs the CEN working group for test and evaluation of metal detectors in the context of civilian demining, and is also evaluating with CEN and ISO the feasibility of harmonisation in accidental risk management; and
- it contributes to the 'bio-express' study identifying measurement-related barriers (e.g. lack of measurement capability) to the exploitation of emerging technology in key areas of biotechnology, such as medical and agri-food applications. Options will be proposed to overcome these barriers through pre-normative research.

Moreover, the JRC actively participates in several CEN technical committees for the development of standards in the fields of food (TC275, 174 and 194), air quality (TC 264), pressure vessels, materials (TC 121, 138, 184), electronic commerce (ISSS/WS-EC), etc.

4.4. The quest for excellence

Over the past few years, the JRC has taken very structured steps to enhance its effectiveness and efficiency. The quest for excellence and accountability continued in 2001.

4.4.1. A benchmarked organisation

In 2001, a taskforce on benchmarking was formed to undertake a thorough analysis of how the JRC had performed in 2000. Data on 11 key performance indicators, together measuring 25 outputs, were drawn up according to three themes:

- support to EU policy and improvement in the everyday life of the European citizen (i.e. achieving the JRC mission);
- demonstration of scientific competence in mission-related areas; and
- value as a place to invest in research (management of financial and human resources).

The indicators will gauge internal progress. They reflect the specialised nature of the JRC mission and are not readily comparable with those used for other research organisations.

4.4.2. Research benchmarking in Europe

A parallel exercise of benchmarking with 17 of Europe's top and most comparable research organisations was also undertaken. Here, indicators were focused on 'scientific productivity' and 'the management of financial and human resources'. Although this was a voluntary and highly time-consuming exercise, the response rate was 100%.

The volume of JRC publications in peer-reviewed journals was, as expected, lower than that of pure research organisations, with an average of 12 per 100 staff against a mean of 28. On the other hand, publications in conference proceedings (normally refereed) were comparatively high, at 33 per 100 staff against a mean of 39.

In a comparison of gender across the organisations, 26% of JRC staff is female – which, although low, compares favourably with the average for the sample, which stands at 23%.

4.5. Total Quality Management

Total Quality Management activities have also been fostering this process of organisational improvement using ISO9001 and EN45001, as well as the EFQM excellence model. In 2001, customer and staff surveys were also performed. The TQM assessments have identified areas of weaknesses on which action was taken in 2001; the progress made in 2001 will be assessed during 2002. The results are also being used to set challenging targets in the JRC's Management Plan and to benchmark with centres of excellence in the Member States.

4.6. Women and Science

The gender perspective in research and gender equality at the JRC are both being addressed by the "JRC Women and Science Network" which was established in early 2000 and includes representatives from all JRC Institutes and Directorates.

Some of the actions which where carried out in 2001 and which will have a follow-up in 2002 include the production of the "2001 JRC Gender Perspective report", a report on a maternity leave survey at the JRC and the drafting of a code of good practice on maternity leave replacement, the launching of the "JRC Women and Science Network" Intranet website as an information and communication tool, and the integration of the gender issue in the preparation of the JRC specific programmes under the Sixth Framework Programme 2002-2006. Moreover, the gender issue will continue to be monitored via the appropriate JRC mechanisms such as in the Total Quality Management self-assessment guidelines and the JRC Task Force on Benchmarking, created in 2001.

The JRC gender mainstreaming activity is performed in close collaboration with other Commission services, mainly DG Research and in particular the Women and Science Unit in charge of the gender mainstreaming in the research policy, DG Employment and Social Welfare, and DG Personnel and Administration, for their respective areas of competence. During 2001, contacts with the European Institute of Florence took place in order to organise joint activities on gender matters.

5. CONTRIBUTING TO THE EUROPEAN RESEARCH AREA

The development of a real European Research Area, i.e. the coordination and integration of research activities at a European level, is the most important policy objective of the Commission in the field of research. The JRC aims to contribute to its establishment within its mission and in its areas of competence. Its strategy encompasses networking, research training and mobility and support to the enlargement process.

5.1. Networking

The JRC has sought to network with Member State, associate state and applicant country organisations with a view to catalysing and coordinating research activities through knowledge sharing and dissemination, particularly where integrated action is needed at EU level.

Through its networking activities in 2001, when it co-ordinated and participated in over 150 scientific networks involving 2000 research groups, the JRC has striven to:

– establish or strengthen scientific and technical reference networks for policy making (e.g. GMO detection, emissions, air quality and the sustainable energy technologies reference and information system),

– support the coordination of research activities in selected areas (for example, nuclear safeguards, nuclear medicine and technology foresight),

– contribute to the integration of research efforts in Europe (e.g. in actinide research and in metrology),

– explore and build up competence in new areas (e.g. authenticity of organic food).

5.2. Research training and mobility

One of the key strategies of the JRC is to stimulate the strongest possible mobility of researchers, as the collaboration of mobile researchers plays a key role in the networking of European research.

During 2001, full use was made of the different mobility instruments that the Commission has at its disposal (visiting scientists, grant holders, detached national experts, Marie Curie instruments) in order to integrate the exchange of staff as a key support measure for networking. Ambitious quantitative targets have already been set in that respect for 2002.

Training through research, in particular taking advantage of the large research infrastructure and special research tools of the JRC, has been a key component of research integration, coordination and reference. These include, for example, the High Flux Reactor in Petten, the linear accelerator in Geel, and the bio-cyclotron and the reaction wall in Ispra. In 2001, the bio-cyclotron also received the status of an official Marie Curie training site for research training in biomaterials testing using radiotracers.

6. PROGRESSING SUPPORT TO EU ENLARGEMENT

Enlargement is one of the main dimensions of the European Research Area. Since mid-1999, 12 applicant countries have joined the Fifth Framework Programme (FP5) as associate members and benefit from full participation in all EU research programmes (seven countries have also subscribed to its nuclear part).

In 2001, the JRC implemented a specific action – which had already started in 1999 – to strengthen collaboration with applicant country research organisations. The aims are to achieve full integration of applicant countries by the end of FP6, and support the adoption and implementation of the body of EU law (acquis communautaire").

Support to applicant countries comprises an integrated package of measures and instruments, ranging from individual projects to hosting applicant country scientists at the JRC, as follows:

6.1. Progressive opening up of the JRC programme

In 2001, 18 JRC enlargement projects were initiated. Several applicant country workshops were organised in Ispra and other JRC sites, addressing concerns about environment, nuclear safety and safeguards, harmonisation of measurements, agriculture, food safety and quality, prospective analysis and modelling.

6.1.1. Hosting and training staff from applicant countries

Between August 2000 and September 2001, JRC Institutes hosted 33 non-statutory staff from applicant countries as either detached national experts, visiting scientists or grant holders. It also devised a scheme of short-term stays, tailored to the needs of applicant country research managers or administrators, for example, one to three month visits in combination with *ad-hoc* training schemes. Integrated training activities in partnership with policy Directorates-General have also been explored and will be extended in 2002.

6.1.2. Research collaboration

In its fields of core competence, the JRC played a catalysing role in drawing research organisations from applicant countries into European project networks. Since 1999, 41 shared-cost projects have involved over 60 organisations from these partner countries.

6.1.3. Enhancing communication

Information days featuring senior representatives of the research community were organised in Bratislava, Prague Riga and Warsaw to raise awareness of the opportunities offered by collaboration with the JRC. A specific enlargement section (http://www.jrc.cec.eu.int/enlargement) has been developed within the JRC corporate website.

7. STRENGTHENING INTERNATIONAL RELATIONS

In fulfilling its mission as a science and technology reference centre, the JRC needs to work with a large network of partner organisations in the European Union, applicant countries and beyond. Consequently, various terms of reference – memoranda of understanding, collaboration agreements and implementing arrangements – are mutually agreed with the international partners. Because the work of the JRC and its partners involves both original research and applied knowledge generation, the attribution of intellectual property rights also has to be regulated to mutual satisfaction.

7.1. Global dimension

In 2001, the Energy and Transport, Research and JRC Directorates-General signed an implementing arrangement with the American Department of Energy in the field of non-nuclear energy in the framework of the 1998 science and technology agreement between the EU and the USA. The JRC focus is on finding socio-economic solutions for greenhouse gas mitigation, improved waste and biomass combustion processes, the safe use of alternative fuels such as hydrogen in the context of fuel cells, and optimisation of the integration of decentralised energy generators such as photo-voltaic cells into power grids.

Globalisation therefore encompasses the progressive development of internationally recognised terms of reference, including:

– regulations relating to environment, trade, risk, etc., which are mutually interconnected; and

– codes for construction and design, as in earthquake engineering, power generation, car manufacturing and many other areas.

The JRC is also involved in developing air emission standards, for example, regarding particles from car exhaust gases and other mobile sources using internal combustion engines. At Commission level, this is done in close cooperation with the Energy and Transport and the Environment DGs. The activity is linked to a world-wide testing cycle which involves the US Environmental Protection Agency and a number of Japanese institutions. The JRC recently signed a memorandum of understanding with the Japanese Petroleum Energy Centre to structure this joint work better.

7.2. Nuclear issues

In the nuclear field, scientific cooperation with foreign partners in Argentina, Brazil, China, Japan, Korea, Australia, the USA and the applicant countries is complemented by direct assistance to Community programmes – either through implementation of a part of such programmes, or support to the DGs in charge of their overall implementation.

The JRC is also directly supporting the Russian authorities in the establishment of a reliable safeguards system in Russia. In the area of nuclear safety, it is acting as the technical expert ensuring the follow-up of the TACIS programme and projects starting from the definition phase.

Finally, the US Administration's intention to launch a world-wide exercise called Generation IV, concerning future development of nuclear energy, has initiated interest and expectation in several Member States that the JRC could play a key role.

8. MANAGING TECHNOLOGY TRANSFER

The year 2001 saw the creation of two spin-off companies, in-depth negotiations on another two, the opening of an incubator facility and participation in the second Descartes competition for innovation. Filed patent applications ranged from improved materials for biomedical implants to sensing systems based on optical fibres. In addition, the Commission formally agreed that, as of 2002, the JRC would assume responsibility for managing its own intellectual property portfolio.

8.1. Spin-offs

Two young brothers, one a former JRC staff member, created the 3D-Veritas enterprise in Italy early in 2001. This already has four employees, and plans to create ten jobs within the next two years. Its innovative technology permits the rapid creation of realistic three-dimensional models of large buildings and structures, with unprecedented visual quality. Potential applications range from safeguarding architectural heritage, through civil engineering, to the production of films and games.

DYNALAB, another recent JRC spin-off, is an engineering consultancy providing services for construction and use of measurement devices in testing and improving the impact properties of materials, primarily steels. Principal clients will include university research and testing laboratories, steel producers and the automotive industry. Several contracts with major industrial companies are currently under negotiation.

8.2. Descartes finalist

The JRC adaptive brain interface (ABI), a finalist in the prestigious René Descartes EU science competition, was developed to improve the autonomy and quality of life for severely physically handicapped people. Features of the device include:

– its non-invasive character – the user wears a cap with electrodes for the detection of EEG signals from the brain;

– the exclusive reliance on brain signals; and

– the ability of the system to adapt to individual users' specific brain patterns.

Two participants in the JRC entrepreneurship training programme in 2000 are well advanced in the creation of a spin-off that will license technology from the Commission.

9. THE JRC IN FIGURES (I)

9.1. Statutory Staff

The statutory staff of the JRC (M-male, F-female) is composed of the following categories:

Statutory staff (December 2001) (including auxiliaries)	2000 M	2000 F	2000 Total	2001 M	2001 F	2001 Total
Officials	600	159	759	589	161	750
Temporary agents on 5-year renewable contracts	612	187	799	588	205	793
Temporary agents on 3-year non-renewable contracts	78	44	122	77	38	115
Auxiliary staff (1-year contracts)	110	106	216	96	115	211
TOTAL	**1400**	**496**	**1896**	**1350**	**519**	**1869**

Numbers reflect the situation at the end of the year. During the course of the year, the total number of staff (excluding auxiliary agents) fell by around 22, the number of departures exceeding the number of new recruits. The implementation of the Commission policy for staff financed on the research budget (NPPR) was continued. The objective of this policy was to reach 40% of the total statutory staff as officials, 35% of the statutory staff as temporary agents under indefinite or five-year contracts, and 25% of the flexible portion on short-term non-statutory and statutory contracts, such as grant holders, visiting scientists, national detached experts, auxiliary agents and temporary agents on three-year contracts.

Staff Distribution (including auxiliaries)	2001		
	M	F	TOTAL
DG and Scientific Strategy Directorates	38	41	79
Institute for Reference Materials and Measurements	131	44	175
Institute for Transuranium Elements	171	46	217
Institute for Energy	128	25	153
Institute for the Protection and Security of the Citizen	224	68	292
Ispra services attached to the Director of IPSC	42	5	47
Institute for Environment and Sustainability	221	74	295
Institute for Health and Consumer Protection	95	76	171
Institute for Prospective Technological Studies	44	18	62
Directorate for Resources	256	122	378
Total	**1350**	**519**	**1869**

9.2. Collaborative Staff with Member States and Third Countries

Trainees, grant holders, visiting scientists and seconded national experts.

	2000 M	2000 F	2000 Total	2001 M	2001 F	2001 Total
Trainees	42	52	94	23	34	57
Post-graduate grant holders	69	34	103	50	35	85
Post-doc grant holders	55	23	78	66	22	88
Visiting scientists	19	2	21	16	8	24
Seconded national experts	23	5	28	23	6	29
TOTAL	**208**	**116**	**324**	**178**	**105**	**283**

9.3. Equal Opportunities

Since 2000, the JRC has taken a markedly proactive stance with regard to promoting equal opportunities and, in particular, gender equality in its working environment. It has been operating a JRC-wide network on Women and Science, which includes representatives from all JRC Institutes and Directorates.

During 2001, the JRC launched a call for applications for JRC training through research grants and, within the selected young researchers, the 40% target for JRC female grant holders (post-graduate and post-doctoral) was exceeded.

Moreover, for the first time in 2001, targets for the recruitment and appointment of women were set for the research budget as it had been done for the operating budget. Recruitment of women at the JRC in grades A8/A7/A6 in 2001 was increased to 31%. The most important achievement is that the pool of women is being increased not only by recruitment but also by promotion; hence, more women will be eligible for access to middle management positions in the near future.

9.4. Budget (budget and expenses - institutional activities)

The available credits to the JRC are subdivided into staff expenses, means of execution (maintenance of buildings and equipment, electricity, insurance, consumables, etc.), operational credits (direct scientific activities) and nuclear decommissioning credits.

The credits come from the institutional budget, made available directly from the European budget to the JRC for the Fifth Framework Programme. In the institutional budget, the following sums were made available:

(in M€ - rounded)	**1999**	**2000**	**2001**
Staff expenses	157	160	160.4
Means of execution	59	49	48.9
Operational appropriations	46	50	40.4
Total	**262**	**259**	**249.7**
Decommissioning and waste management	**4**	**4**	**7.1**
Total JRC	**266**	**263**	**256.8**

Additional sources of appropriations are made available through contributions from PECO countries, the European Economic Area (EEA), and competitive activities.

9.5. Competitive Activities

The JRC concluded 87 new shared-cost activity contracts in 2001. Competitive activities outside the Framework Programme were defined through the conclusion of 9 new contracts. Third Party work originates from a range of 57 major clients.

(inscribed in 2001 accounts)	**2000**	**2001**
Shared-cost activities	13.3	14.1
Competitive activities outside the FWP	9.5	9.3
Third Party work	8.9	11.4
TOTAL	**31.7**	**34.8**

9.6. Publications

INSTITUTE	EUR reports	Conference papers	Articles	Special publications	TOTAL
Reference Materials and Measurements	16	95	67	24	**202**
Transuranium Elements	2	100	90	-	**192**
Advanced Materials (to 31/8/2001) **Institute for Energy** (from 1/9/2001)	8 4	50 20	28 1	6 6	**92** **31**
Systems, Informatics and Safety (to 31/8/2001) **Institute for the Protection and Security of the Citizen** (from 1/9/ 2001)	23 15	76 73	24 10	19 10	**142** **108**
Environment Institute (to 31/8/2001) **Institute for Environment and Sustainability** (from 1/9/2001)	18 15	90 121	34 24	9 13	**151** **173**
Space Applications (to 31/8/2001)	10	100	48	16	**174**
Health and Consumer Protection	19	125	75	27	**246**
Prospective Technological Studies	28	26	14	12	**80**
General Management	1	-	4	26	**31**
TOTAL	**159**	**876**	**419**	**168**	**1622**

10. THE JRC IN FIGURES (II)

In the context of the administrative and financial reform and the measures adopted by the Commission in the March 2000 White Paper (COM (2000) 200 final), each Director-General is required to present an annual report. The first annual report covers the 2001 financial year. To guarantee the uniform presentation of information, the JRC thought it appropriate to give in its annual report identical information to that summarised in the annual activity report of the Director-General of the JRC. This information relates to the implementation of the appropriations allocated by the budgetary authority with respect to its institutional activities and information relating to its competitive activities (work for third parties).

	Appropriations €				Execution of Appropriations €					
Institutional (EC + EAEC)	Initial Appropriations 2001	Modifications + other appropriations AELE, PECO	Appropriations reported from 2000	Total	Current Appropriations 2001	Appropriations reported from 2000	Total	Rate	Carry over to 2002 (art. 96 FR)	Appropriations cancelled
I	1	2	3	4=1+2+3	5	6	7=5+6	8=7/(4-9)	9	10=4-7-9
Commitment	256.800.000,00	22.668.383,10	1.522.384,86	280.990.767,96	268.208.715,62	1.518.579,17	269.727.294,79	99,91%	11.018.183,12	245.290,05
Payment	265.700.000,00	30.007.041,35	1.603.151,03	297.310.192,38	257.423.874,06	1.535.908,91	258.959.782,97	93,99%	21.786.398,36	16.564.011,05
Competitive	N/A	Contracts signed in 2001	Contracts signed before 2001	Total	Competitive activities	N/A	Total	N/A	Carry over to 2002 (art.96 FR)	Carry over to 2002 (SCA)
II	1	2	3	4=1+2+3	5	6	7=5+6	8	9=4-7	10
Commitment	0,00	34.815.247,87	134.964.431,87	169.779.679,74	49.225.035,65	N/A	49.225.035,65	N/A	118.184.726,43	2.369.917,66
Payment	0,00	8.211.573,71	115.479.318,27	123.690.891,98	48.978.620,06	N/A	48.978.620,06	N/A	74.712.271,92	N/A
Global financial resources	Initial Appropriations 2001	Modifications + other appropriations + contracts signed in 2001	Carry over	Total	Current Appropriations + contracts 2001	Carry over	Total	%	Carry over to 2002 (art.96 FR)	Appropriations cancelled
III=I+II	1	2	3	4=1+2+3	5	6	7=5+6	8	9	10=4-7-9
Commitment	256.800.000,00	57.483.630,97	136.486.816,73	450.770.447,70	317.433.751,27	1.518.579,17	318.952.330,44	N/A	129.202.909,55	2.615.207,71
Payment	265.700.000,00	38.218.615,06	117.082.469,30	421.001.084,36	306.402.494,12	1.535.908,91	307.938.403,03	N/A	96.498.670,28	16.564.011,05

Human resources	authorised establishment plan staff	2077
	allocated equivalent man/year	**2088**

Notes:

– The allocated staff includes visiting scientists, fellows and seconded staff. All staff is allocated to operational tasks.

– The support to the Decommissioning activity belongs to the EAEC programme.

– The allocated staff repartition is:

– 1665 officials + 208 auxiliaries + 215 visiting scientists, grant holders and seconded staff = 2088.

Appendices

Appendix 1

BOARD OF GOVERNORS OF THE JOINT RESEARCH CENTRE OF THE COMMISSION OF THE EUROPEAN COMMUNITIES

Prof. Fernando ALDANA Oficina de Innovación y Tecnología Empresarial E. Técnica Superior de Ingenieros Industriales E - 28006 Madrid	**CHAIRMAN**
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Appendix 2

JOINT RESEARCH CENTRE – DIRECTORS

Director-General	Barry McSweeney
Deputy Director-General (Acting Director-General 01.01.2001 – 31.03.2001)	Hugh Richardson
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Resources Directorate	Jean-Pierre Vandersteen
Institute for Health and Consumer Protection	Kees van Leeuwen
Institute for Environment and Sustainability	Jean-Marie Martin
Institute for the Protection and Security of the Citizen	David R. Wilkinson
Institute for Energy	Kari Törrönen
Institute for Transuranium Elements	Roland Schenkel
Institute for Reference Materials and Measurements	Manfred Grasserbauer
Institute for Prospective Technological Studies	Jean-Marie Cadiou

Appendix 3

INSTITUTIONAL RESEARCH ACTIVITIES

1. Safety of food and chemicals, and health related issues

JRC WORK PROGRAMME LINES	IRMM	ITU	IE	IPSC	IES	IHCP	IPTS
Control of quality and safety of food and related items (development, validation and harmonisation of analytical methods)						X	
Reference materials for agricultural, food and consumer products	X						
Reference measurements for agricultural, food and consumer products and databases	X						
Support to the implementation of the Community policy on biotechnology, including the detection of genetically modified organisms (GMOs) in environmental and in food samples						X	
Environmental integrity and human health					X		
The validation of alternative methods - ECVAM						X	
Chemical products, risk assessment						X	
International comparability of chemical measurements	X						
Chemical reference methods and measurements for normalisation and certification	X						
Boron Neutron Capture Therapy (BNCT)			X				
Alpha-immunotherapy		X					
Minimally invasive Medical Systems (MIMES)						X	
REliability of bioMEdical Devices (REMED)						X	
Biomedical certified reference materials for clinical diagnostics	X						
Life science and impact on society							X

2. Environment

JRC WORK PROGRAMME LINES	IRMM	ITU	IE	IPSC	IES	IHCP	IPTS
Structural safety under fast transients				X			
Research in support to the implementation and validation of the EUROCODES; research for structural vulnerability assessment, strengthening/repair techniques for civil and cultural heritage structure under earthquakes (SEISPROTEC)				X			
Natural hazards					X		
Environment and society (Part 1: EAS)							X
Euro-landscape: geo-information for development and environmental monitoring					X		
European Integrated Pollution Prevention and Control Bureau (EIPPC)							X
Water quality - European Laboratory for Water Protection					X		
Impact of Waste Emissions on Soils (IWES)					X		
Coastal monitoring and management (COAST)							
Integrated air quality assessment (IAQA)					X		
Reference materials for pollution control	X						
Energy and climate change							X
Global Environment Information System (GEIS)					X		
Atmospheric processes related to regional and global changes					X		
Photovoltaic and solar electricity (SOLAREC)					X		
Advanced Electricity Storage (ADELS)					X		
Clean and efficient waste incineration, waste to energy and biomass combustion (CLEANWEB)			X				
Sustainability in transport and mobility							X
CORSE					X		
European Soil Bureau					X		
Population dynamics and Security (PD+S)					X		
Safety of pressure equipment and component containing hydrogen (SPEECH)			X				

3. Dependability of information systems and services

JRC WORK PROGRAMME LINES	IRMM	ITU	IE	IPSC	IES	IHCP	IPTS
Telematic systems for the EU pharmaceutical regulatory activity (ETOMEP)						X	
Electronic business							X
Dependability of information technology systems				X			
Networks, multimedia and education				X			
Medical and health telematics - Validation and accreditation of methods and procedures on medical and health activities				X			
Statistics support: European statistical laboratory (ESL)				X			
S&T Support to implementation and monitoring of anti-fraud policy				X			
Safety and emergency management systems for man-made and natural hazards				X			
Civilian de-mining				X			
European Co-ordination Centre for Aircraft Incident Reporting Systems (ECCAIRS)				X			
Scientific knowledge assessment and information technology				X			
Monitoring Agriculture with Remote Sensing (MARS)					X		
Advanced statistics for clearance of accounts (ASCA)				X			
Animal Tagging (the IDEA project)				X			
Building the information society							X
GI and GIS: Harmonisation and interoperability					X		
New technologies for monitoring fishing vessels				X			
Galileo Support					X		

4. Nuclear safety and safeguards

JRC WORK PROGRAMME LINES	IRMM	ITU	IE	IPSC	IES	IHCP	IPTS
Reference measurement for neutron-materials interaction	X						
Neutron reference measurements for environmental protection	X						
Reference measurements for neutron data standards	X						
European Network for Inspection Qualification (ENIQ)			X				
Ageing Materials Evaluation and Studies (AMES)			X				
Network for Evaluation of Structural Components (NESC)			X				
Safety of Nuclear Fuel		X					
Basic Actinide Research		X					
Partitioning and Transmutation		X					
Exploitation of Neutron Data	X						
Spent Fuel Characterisation in View of Long-Term Storage		X					
Critical issues in nuclear reactor safety			X				
Safeguards Research and Development at Ispra				X			
Safeguards Research and Development at Karlsruhe		X					
Metrology and Quality Assurance for Nuclear Safeguards	X						
Support to Euratom Safeguards office		X		X			
Support to the International Atomic Energy Agency (IAEA)		X		X			
Radioactivity Environmental Monitoring (REM)					X		
Measurement of Radioactivity in the Environment		X					
High Temperature Reactor Technological network (HTR-TN)		X	X				
Network on Neutron Techniques Standardisation (NET)			X				
European Network for Medical radio-isotope and beam Research (EMIR)		X	X				
Safety for Eastern European type Nuclear Facilities (SENUF)			X				

5. Horizontal activities

JRC WORK PROGRAMME LINES	IRMM	ITU	IE	IPSC	IES	IHCP	IPTS
The "Futures" project							X
BCR and industrial certified reference materials	X						
Metrology in chemistry and traceability	X						
Radionuclide metrology	X						
Knowledge and skills: Perspectives for Europe							X
Technology assessment and validation, demonstration, partner, search and transfer							X
Enlargement: building linkages on prospective activities							X
Mediterranean and regional perspectives							X
Network and knowledge management							X
European Science & Technology Observatory (ESTO)							X