

## CO-ORDINATED RESEARCH PROJECTS

### Nuclear Power

Establishment of a thermophysical properties database for materials of LWRs and HWRs: 1999–2003  
Evaluation of high temperature gas cooled reactor performance: 1998–2002  
Information management solutions for systematic approach to training (SAT) applications: 2000–2003  
Intercomparison of techniques for pressure tube inspection and diagnostics: 1998–2001  
Mechanism of nickel effect in radiation embrittlement of reactor pressure vessel materials: 2000–2003  
National approaches to correlate nuclear power plant performance targets and operation and maintenance budget: 1999–2003  
Nuclear power plant outage coding systems: 1999–2000  
Optimization of the coupling of nuclear reactors and desalination systems: 1998–2001  
Potential of thorium based fuel cycles to constrain plutonium and to reduce long term waste toxicities: 1995–2000  
Scientific basis and engineering solutions for cost effective assessments of software based instrumentation and control systems: 1999–2003  
Surveillance programme results application to reactor pressure vessel integrity assessment: 2000–2003  
Updated codes and methods to reduce the calculational uncertainties of liquid metal fast reactor reactivity effects: 1999–2003  
Use of a thorium based fuel cycle in accelerator driven systems (ADS) to incinerate plutonium and to reduce long term waste toxicities: 1996–2000

### Nuclear Fuel Cycle and Waste Technology

Ageing of materials in spent fuel storage facility: 1999–2003  
Anthropogenic analogues and their use in confidence building with regard to the disposal of high level, long lived radioactive waste: 1999–2003  
Chemical durability and performance assessment of spent fuel and HLW forms under simulated repository conditions: 1998–2002  
Combined methods of liquid radioactive waste treatment: 1997–2001  
Corrosion of research reactor aluminium clad spent fuel in water: 1995–2000  
Decommissioning techniques for research reactors: 1997–2001  
Evaluation of the safety, environmental and non-proliferation aspects of the partitioning and transmutation of actinides and fission products: 1996–2000  
Hydrogen and hydride induced degradation of the mechanical and physical properties of zirconium based alloys: 1998–2003  
Long term behaviour of low and intermediate level waste packages under repository conditions: 1997–2002  
Modelling of transport of radioactive substances in primary circuit of water cooled reactors: 1996–2001  
Spent fuel performance assessment and research (SPAR): 1997–2002  
Technological development and practice in on-line monitoring of water chemistry related to fuel behaviour and activity transport: 1995–2000  
Technologies and methods for long term stabilization and isolation of uranium mill tailings: 2000–2004  
Treatment of liquid effluent from uranium mines and mills during and after operation: 1996–2001

### Comparative Assessment of Energy Sources

Estimating external costs of electricity generation in developing countries using simplified approaches: 1999–2001  
Impact of infrastructural requirements on the competitiveness of nuclear power: 1999–2002  
Role of nuclear power and other options in meeting international goals on greenhouse gas emission reductions: 1999–2001

### Food and Agriculture

A molecular and genetic approach to develop sexing strains for field application in fruit fly sterile insect technique programmes: 1994–2001  
Alternative methods to gas and high performance liquid chromatography of pesticide residues in grains: 1997–2002  
Assessment of soil erosion through the use of caesium-137 and related techniques as a basis for soil conservation, sustainable production and environmental protection: 1995–2001

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Assessment of the effectiveness of vaccination strategies against Newcastle Disease and Gumboro Disease using immunoassay based technologies for increasing farmyard poultry production in Africa: 1998–2002

Automation in tsetse mass rearing for use in sterile insect technique programmes: 1994–2001

Cellular biology and biotechnology including mutation techniques for the creation of new useful banana genotypes: 1994–2001

Classification of soil systems on the basis of transfer factors of radionuclides from soil to reference plants: 1998–2003

Determination of profiles of human bacterial pathogens in food for export by introduction of quality assured microbiological assays: 1998–2003

Developing, validating and standardizing methodologies for the use of PCR and PCR-ELISA in the diagnosis and monitoring of control and eradication programmes for trypanosomosis: 1999–2004

Development and validation of standardized methods for using polymerase chain reaction and related molecular technologies for rapid and improved animal disease diagnosis: 1997–2001

Development of improved attractants and their integration into fruit fly sterile insect technique management programmes: 2000–2006

Development of management practices for sustainable crop production systems on tropical acid soils through the use of nuclear and related techniques: 1999–2004

Enhancement of the sterile insect technique through genetic transformation of arthropods using nuclear techniques: 1994–2002

Evaluating the use of nuclear techniques for the colonization and production of natural enemies: 1999–2004

Evaluation of methods of analysis for determining mycotoxin contamination of food and feed: 1998–2003

Genetic applications to improve the sterile insect technique for tsetse control/eradication: 1997–2003

Genetic improvement of underutilized and neglected crops in low income food deficit countries through irradiation and related techniques: 1998–2003

Improved attractants for enhancing the efficiency of tsetse fly suppression operations and barriers systems used in tsetse control/eradication campaigns: 1994–2002

Improvement of tropical and subtropical fruit trees through induced mutations and biotechnology: 2000–2005

Irradiation as a phytosanitary treatment of food and agricultural commodities: 1998–2003

Management of nutrients and water in rainfed arid and semi-arid areas for increasing crop production: 1997–2002

Molecular characterization of mutated genes controlling important traits for seed crop improvement: 1999–2004

Monitoring of contagious bovine pleuropneumonia in Africa using enzyme immunoassays: 1997–2002

Mutational analysis of root characters in annual food plants related to plant performance: 1999–2004

Quality assurance of mass produced and released fruit flies: 1999–2004

Quality control of pesticide products: 2000–2005

Use of isotope techniques in studies on the management of organic matter and nutrient turnover for increased, sustainable agricultural production and environmental preservation: 1995–2000

Use of non-structural protein of the foot and mouth disease virus to differentiate between vaccinated and infected animals: 1999–2004

Use of nuclear and colorimetric techniques for measuring microbial protein supply from local feed resources in ruminant animals: 1996–2001

Use of nuclear and related techniques to develop simple tannin assays for predicting and improving the safety and efficiency of feeding ruminants on tanniferous tree foliage: 1998–2003

Use of nuclear techniques for developing integrated nutrient and water management practices for agroforestry systems: 1998–2005

Validation of thin layer chromatographic screening methods for pesticide residue analysis (in vegetables): 1996–2001

### Human Health

Application of nuclear techniques in the prevention of degenerative diseases (obesity and non-insulin dependent diabetes) in ageing: 1998–2002

Aspects of radiobiology applicable in clinical radiotherapy: Increase of the number of fractions per week: 1998–2005

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Assessment of levels and health effects of airborne particulate matter in mining, metal refining and metal working industries using nuclear and related analytical techniques: 1996–2000

Bone single photon emission computer tomography in the management of patients with unexplained back pain: 1997–2000

Clinical application of radiosensitizers in cancer radiotherapy: 1994–2001

Comparison of clinical applications software between nuclear medicine laboratories by software phantoms developed by the IAEA and COST-B2: 1999–2003

Comparative assessment of teletherapy modalities: 2001–2002

Comparative evaluation of ictal brain single photon emission computer tomography, magnetic resonance imaging and X ray computerized tomography of the brain in the management of patients with refractory seizures: 2000–2003

Comparative international studies of osteoporosis using isotope techniques: 1994–2000

Development and validation of an Internet based clinical and technical study communication system for nuclear medicine: 1998–2001

Development and validation of an Internet based clinical and technical study communication system for nuclear medicine: 1998–2001

Development of a Code of Practice for dose determination in photon, electron and proton beams based on measurement standards of absorbed dose to water: 1997–2002

Development of a quality assurance programme for radiation therapy dosimetry in developing countries: 1995–2000

Development of an improved serological kit for Chagas diagnosis using radionuclide methods: 1999–2001

Dosimetry in X ray diagnostic radiology: An international Code of Practice: 2000–2003

Electron paramagnetic resonance biodosimetry: 1998–2000

Evaluation of technetium-99m based radiopharmaceuticals in the diagnosis and management of breast cancer patients: 1997–2000

Genotype/phenotype correlation in thalassemia and muscular dystrophy: 1998–2000

Health impacts of mercury cycling in contaminated environments studied by nuclear techniques: 1999–2004

Human immunodeficiency virus markers in patients treated with radiotherapy for cervical cancer: 1999–2001

In vivo imaging for infection and inflammation: 1997–2000

Intravascular radionuclide therapy using beta emitting radiopharmaceuticals for the prevention of re-stenosis following percutaneous transluminal coronary angioplasty: 2000–2004

Isotopic evaluations in infant growth monitoring: 1999–2002

Local production and evaluation of primary reagents for the radioimmunoassay of alpha feto protein: 1997–2000

Management of liver cancer using radionuclide methods with special emphasis on trans-arterial radioconjugate therapy and internal dosimetry: 2000–2005

Molecular typing of mycobacteria strains in the management of multi-drug resistant tuberculosis: 1997–2000

Radiochemical, chemical and physical characterization of radioactive particles in the environment: 2000–2005

Radioimmunoassay of advanced glycation end products in the long term management of diabetes mellitus: 2000–2003

Randomized clinical trial of radiotherapy combined with mitomycin C in the treatment of advanced head and neck tumours: 1994–2003

Reference Asian Man Project (Phase 2): Ingestion and organ content of trace elements of importance in radiological protection (RCA): 1995–2000

Regional hyperthermia combined with radiotherapy for locally advanced cancers: 1997–2002

Relationship between recurrent lower respiratory tract infection, gastro-esophageal reflux and bronchial asthma in children: 1999–2003

Relationship between vesico-ureteral reflux, pyelonephritis and renal scarring in children with recurrent urinary tract infection: 1997–2000

Significance of viral load and virus type in hepatitis B and C for pathogenesis and treatment efficacy: 1999–2002

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Use of isotopic techniques to examine the significance of infection and other insults in early childhood to diarrhoea morbidity, mal-assimilation and failure to thrive: 1999–2003

Use of radiotherapy in advanced cancer: 1995–2000

Validation and application of plants as biomonitors of trace element atmospheric pollution, analysed by nuclear and related techniques: 1997–2002

#### **Marine Environment, Water Resources and Industry**

Application of isotope techniques to the assessment of aquifer systems in major urban areas: 1997–2000

Application of isotopes to the assessment of pollutant behaviour in the unsaturated zone for groundwater protection: 2000–2003

Development of agents for imaging central neural system receptors based on technetium-99m: 1995–2000

Development of kits for radioimmunometric assay of tumour markers: 1998–2000

Development of kits for technetium-99m radiopharmaceuticals for infection imaging: 2000–2003

Development of radioactively labelled cancer seeking biomolecules for targeted radiotherapy: 1997–2001

Isotope response to dynamic changes in groundwater systems due to long term exploitation: 1997–2000

Isotope techniques for the assessment of slow moving deep groundwater and their potential application for the assessment of waste disposal sites: 1997–2000

Isotopic composition of precipitation in the Mediterranean Basin in relation to air circulation patterns and climate: 2000–2004

Nuclear analytical techniques in archaeological investigations: 1996–2000

Optimization of synthesis and quality control procedures for the preparation of fluorine-18 and iodine-123 labelled peptides: 1997–2000

Origins of salinity and impacts on fresh groundwater resources: Optimization of isotopic techniques: 2000–2005

Radionuclide transport dynamics in freshwater resources: 1997–2000

Radiotracer technology for engineering unit operation studies and unit process optimization: 1998–2000

Sedimentation assessment studies by environmental radionuclides and their application to soil conservation measures: 1995–2000

Standardized high current solid targets for cyclotron production of diagnostic and therapeutic radionuclides: 2000–2003

Use of isotope techniques in investigating acidic fluids in geothermal exploitation: 1998–2001

Use of radiation processing for sterilization or decontamination of pharmaceuticals and pharmaceutical raw materials: 1999–2001

Use of tracers and stable isotopes in surface water pollution studies: 1997–2000

Validation of nuclear techniques for the analysis of precious and rare metals in mineral concentrates: 1997–2000

Validation of protocols for corrosion and deposit evaluation in pipes by radiography: 1997–2000

Worldwide marine radioactivity studies: 1998–2001

#### **Physical and Chemical Sciences**

Application of MeV ion beams for development and characterization of semiconductor materials: 1997–2000

Application of nuclear techniques to antipersonnel land mine identification: 1999–2002

Applications and development of small angle neutron scattering: 2000–2003

Atomic and plasma-wall interaction data for fusion reactor divertor modelling: 1995–2000

Bulk hydrogen analysis using neutrons: 1997–2000

Charge exchange cross-section data for fusion plasma studies: 1997–2002

Comparison of compact toroid configurations: 1998–2002

Development and applications of alpha particle spectrometry: 2002–2004

Development of agents for imaging central neural system receptors based on technetium-99m: 1995–2000

Development of a database for prompt gamma ray neutron activation analysis: 1999–2003

Development of computer based troubleshooting tools and instrument: 1996–2000

Development of kits for radioimmunometric assay of tumour markers: 1998–2000

Development of kits for technetium-99m radiopharmaceuticals for infection imaging: 2000–2003

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Elements of power plant design for inertial fusion energy: 2000–2005  
Fission product yield data required for transmutation of minor actinide nuclear waste: 1997–2001  
In situ applications of X ray fluorescence techniques: 2000–2004  
Nuclear analytical techniques in archaeological investigations: 1996–2000  
Nuclear model parameter testing for nuclear data evaluation (reference input parameter library: Phase II): 1998–2002  
Optimization of synthesis and quality control procedures for the preparation of fluorine-18 and iodine-123 labelled peptides: 1997–2000  
Update of X and gamma ray decay data standards for detector calibration: 1998–2002  
Use of ion beam techniques for the analysis of light elements in thin films, including depth profiling: 2000–2003  
Validation of nuclear techniques for the analysis of precious and rare metals in mineral concentrates: 1997–2000  
WIMS Library update project: 1998–2001

### **Nuclear Safety**

Development and application of indicators to monitor nuclear power plant operational safety performance: 1999–2003  
Investigation of methodologies for incident analysis: 1997–2000  
Round robin exercise on water cooled and moderated reactor pressure vessel (WWER-440) reactor pressure vessel weld metal irradiation embrittlement and annealing: 1996–2001  
Safety of RBMK type nuclear power plants in relation to external events: 1997–2002

### **Radiation Safety**

Accident severity during air transport of radioactive material: 1998–2001  
Appropriate methods and procedures to apply probabilistic safety assessment techniques of large radiation sources: 2000–2003  
Cytogenetic biodosimetry: 1998–2002  
Development of a radiological basis for the transport safety requirements for low specific activity materials and surface contaminated objects: 1997–2001  
Image quality and patient dose optimization in mammography in eastern European countries: 1999–2003  
Limitations of radioepidemiological assessments for stochastic radiation effects in relation to radiation protection: 1994–2000  
Radioactive Waste Safety  
Biosphere Modelling and Assessment methods (BIOMASS): 1998–2002  
Formulation of approaches to compare the potential impacts of wastes from electricity generation technologies: 1997–2000  
Improvement of safety assessment methodologies for near surface disposal facilities for radioactive waste: 1997–2000  
Use of selected safety indicators (concentrations; fluxes) in the assessment of radioactive waste disposal: 2000–2005

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