

TABLE V: CO-ORDINATED RESEARCH PROJECTS

Nuclear Power

Conservation and application of high temperature gas cooled reactor (HTGR) technology: Advances in HTGR fuel technology

Economic research on, and assessment of, selected nuclear desalination projects and case studies

Establishment of a thermophysical properties database for LWRs and HWRs

Evaluation of high temperature gas cooled reactor performance

Evaluation of radiation damage of WWER reactor pressure vessels using the IAEA database on reactor pressure vessel materials

Information management solutions for SAT applications

Intercomparison of techniques for pressure tube inspection and diagnostics

Mechanism of nickel effect in radiation embrittlement of reactor pressure vessel materials

National approaches to correlate nuclear power plant performance targets and operation and maintenance costs

Optimization of the coupling of nuclear reactors and desalination systems

Potential of thorium based fuel cycles to constrain plutonium and to reduce long term waste toxicities

Scientific basis and engineering solutions for cost effective assessments of software based instrumentation and control systems

Studies of advanced reactor technology options for effective incineration of radioactive waste

Updated codes and methods to reduce the calculational uncertainties of the liquid metal fast reactor reactivity effects

Use of a thorium based fuel cycle in accelerator driven systems (ADSs) to incinerate plutonium and to reduce long term waste toxicities

Verification of WWER steam generator tube integrity

Nuclear Fuel Cycle and Waste Management Technology

Ageing of materials in spent fuel storage facilities

Anthropogenic analogues for geological disposal of high-level and long lived radioactive waste

Chemical durability and performance assessment of spent fuel and high level waste forms under simulated repository conditions

Combined methods of liquid radioactive waste treatment

Corrosion of research reactor aluminium-clad spent fuel in water (Phase II)

Data processing technologies and diagnostics for water chemistry and corrosion control in nuclear power plants (DAWAC)

Decommissioning techniques for research reactors

Hydrogen and hydride induced degradation of the mechanical and physical properties of zirconium based alloys

Modelling of transport of radioactive substances in primary circuit of water cooled reactors

Nuclear fuel cycle aspects of the disposition of depleted uranium

Spent Fuel Performance Assessment and Research (SPAR)

Technologies and methods for long term stabilization and isolation of uranium mill tailings

Treatment of liquid effluent from uranium mines and mills during and after operation

Comparative Assessment for Sustainable Energy Development

Cost effectiveness of nuclear power compared to carbon dioxide capture and sequestration from fossil fuel power plants

Historical evolution of indicators of sustainable energy development (ISED) and the use of this information for designing guidelines for future energy strategies in conformity with the objectives of sustainable development

Impact of infrastructural requirements on the competitiveness of nuclear power

Case studies to assess and compare different energy sources in sustainable energy and electricity supply strategies

TABLE V: (cont.)

Estimating the external costs associated with electricity generation options in developing countries using simplified methodologies

Food and Agriculture

Alternative methods to gas and high performance liquid chromatography for pesticide residue analysis in grain

Assessment of soil erosion through the use of caesium-137 and related techniques as a basis for soil conservation, sustainable production and environmental protection

Assessment of the effectiveness of vaccination strategies against Newcastle Disease and Gumboro disease using immunoassay-based technologies for increasing farmyard poultry production in Africa

Automation in tsetse fly mass rearing for use in sterile insect technique programmes

Cellular biology and biotechnology including mutation techniques for creation of new useful banana genotypes

Classification of soil systems on the basis of transfer factors of radionuclides from soil to reference plants

Determination of profiles of human bacterial pathogens in foods for export by introduction of quality-assured microbiological assays

Developing, validating and standardizing methodologies for the use of polymerase chain reaction (PCR) and PCR-enzyme linked immunosorbent assay in the diagnosis and monitoring of control and eradication programmes for trypanosomiasis

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

Development of improved attractants and their integration into fruit fly sterile insect technique management programmes

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

Development of strategies for the effective monitoring of veterinary drug residues in livestock and livestock products in developing countries

Enabling technologies for the expansion of the for the Old and New Screwworm

Enhancement of the sterile insect technique through genetic transformation of arthropods using nuclear techniques

Evaluating the use of nuclear techniques for the colonization and production of natural enemies of agricultural insect pests

Evaluation of methods of analysis for determining mycotoxin contamination of food and feed

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

Genetics application to improve the sterile insect technique for tsetse control/eradication

Improved attractants for enhancing the efficiency of tsetse fly suppression operations and barrier systems used in tsetse control/eradication campaigns

Improvement of tropical and subtropical fruit trees through induced mutations and biotechnology

Integrated approach for improving small scale market oriented dairy systems

Integrated soil, water and nutrient management for sustainable rice–wheat cropping systems in Asia

Irradiation as a phytosanitary treatment of food and agricultural commodities

Management of nutrients and water in rainfed arid and semi-arid areas for increasing crop production

Molecular characterization of mutated genes controlling important traits for seed crop improvement

Monitoring of contagious bovine pleuropneumonia in Africa using enzyme immunoassays

Mutational analysis of root characters in annual food plants related to plant performance

Quality assurance of mass produced and released fruit flies for sterile insect technique programmes

Quality control of pesticide products

Use of irradiation to ensure hygienic quality of fresh, pre-cut fruits and vegetables and other minimally processed food of plant origin

TABLE V: (cont.)

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

Use of non-structural protein of foot-and-mouth disease virus to differentiate between vaccinated and infected animals

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

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

Use of nuclear techniques for developing integrated nutrient and water management practices for agroforestry systems

Human Health

Application of isotopic and nuclear techniques in the study of nutrition pollution interactions and their impact on the nutritional status of human subjects in developing country populations

Application of nuclear techniques in the prevention of degenerative diseases (obesity and non-insulin dependant diabetes) in ageing

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

Clinical application of radiosensitizers in cancer radiotherapy

Comparison of clinical application software between nuclear medicine laboratories by software phantoms developed by the Agency and the COST B2 project

Comparative assessment of teletherapy modalities

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

Development and validation of an Internet based clinical and technical study communication system for nuclear medicine

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

Development of a quality assurance programme for radiation therapy dosimetry in developing countries

Development of an improved serological kit for Chagas diagnosis using radionuclide methods

Development of techniques at Secondary Standard Dosimetry Laboratories for the dissemination of absorbed dose to water standards

Development of thermoluminescent dosimetry based quality audits for radiotherapy dosimetry in non-reference conditions

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

Electron paramagnetic resonance biodosimetry

Genotype/phenotype correlation in thalassemia and muscular dystrophy

Harmonization of protocols and procedures in the management of neonatal hydronephrosis

Harmonization of radionuclide procedures and protocols in the management of neonatal hydronephrosis

Health impacts of mercury cycling in contaminated environments studied by nuclear techniques

Human immunodeficiency virus (HIV) markers in patients treated with radiotherapy for cervical cancer

Intravascular radionuclide therapy using liquid beta-emitting radiopharmaceuticals to prevent restenosis following percutaneous transluminal coronary angioplasty

Isotopic and complementary tools for the study of micronutrient status and interactions in developing country populations exposed to multiple nutritional deficiencies

Isotopic evaluations in infant growth monitoring: A collaboration with WHO

Molecular typing of mycobacteria strains in multi-drug resistant tuberculosis

Radiochemical, chemical and physical characterization of radioactive particles in the environment

TABLE V: (cont.)

Radioimmunoassay of advanced glycation end products in the long term management of diabetes mellitus
Radiopharmaceutical imaging to predict and evaluate the response of breast cancer to neoadjuvant chemotherapy
Randomized clinical trial of radiotherapy combined with mitomycin C in the treatment of advanced head and neck tumours
Regional hyperthermia combined with radiotherapy for locally advanced cancers
Significance of viral load and virus type in hepatitis B and C for pathogenesis and treatment efficacy
Study of the relationship between recurrent lower respiratory tract infection, gastroesophageal reflux and bronchial asthma in children
Thematic CRP on isotopic and complementary tools for the study of micronutrient status and interactions in developing country populations exposed to multiple nutritional deficiencies
Thematic CRP on management of liver cancer using radionuclide methods with special emphasis on trans-arterial radioconjugate therapy and internal dosimetry
Use of isotopic techniques to examine the significance of infection and other insults in early childhood diarrhoea morbidity, mal-assimilation and failure to thrive
Use of nuclear and related analytical techniques in studying human exposure to toxic elements consumed through foodstuffs contaminated by industrial activities
Validation and application of plants as biomonitors of trace element atmospheric pollution, analysed by nuclear and related techniques

Marine Environment and Water Resources

Application of isotopes to the assessment of pollutant behaviour in the unsaturated zone for groundwater protection
Isotopic composition of precipitation in the Mediterranean Basin in relation to air circulation patterns and climate
Isotope response to dynamic changes in groundwater systems due to long term exploitation
Origins of salinity and impacts on fresh groundwater resources: Optimization of isotopic techniques

Applications of Physical and Chemical Sciences

Application of nuclear techniques to anti-personnel land mine identification
Atomic and molecular data for fusion plasma diagnostics
Comparison of compact toroid configurations
Data for molecular processes in edge plasmas
Dense magnetized plasmas
Development and applications of alpha particle spectrometry
Development and practical utilization of small angle neutron scattering applications
Development and validation of speciation analysis using nuclear techniques
Development of a database for prompt gamma-ray neutron activation analysis
Development of distance learning modules on troubleshooting of nuclear instruments
Development of kits for technetium-99m radiopharmaceuticals for infection imaging
Development of radioimmunometric assays and kits for non-clinical applications
Elements of power plant design for inertial fusion energy
Fission product yield data required for transmutation of minor actinide nuclear waste
In situ applications of the X ray fluorescence technique
Integration of residence time distribution tracing with computational fluid dynamics simulation for industrial process visualization and optimization
Nuclear model parameter testing for nuclear data evaluation (Reference input parameter library: Phase II)
Radiation synthesis of stimuli-responsive membranes, hydrogels and adsorbents for separation purposes
Standardized high current solid targets for cyclotron production of diagnostic and therapeutic radionuclides

TABLE V: (cont.)

Update of X and gamma ray decay data standards for detector calibration
Use of ion beam techniques for analysis of light elements in thin films, including depth profiling
WIMSD library update project

Nuclear Safety

Development and application of indicators to monitor nuclear power plant operational safety performance
Investigation of methodologies for incident analysis
Round robin exercise on WWER-440 reactor pressure vessel weld metal irradiation embrittlement and annealing
Safety of RBMK type nuclear power plants in relation to external events
Update and expansion of the IAEA reliability data for research reactor probabilistic safety assessments

Radiation Safety

Accident severity during air transport of radioactive material
Development of radiological basis for the transport safety requirements for low specific activity materials and surface contaminated objects
Image quality and patient dose optimization in mammography in Eastern European countries
Investigation appropriate methods and procedures to apply probabilistic safety assessment techniques of large radiation sources
Radiological aspects of package and conveyance non-fixed radioactive contamination

Radioactive Waste Safety

Use of selected safety indicators (concentrations; fluxes) in the assessment of radioactive waste disposal
