

CENTRE FOR ENERGY RESEARCH AND TRAINING

AHMADU BELLO UNIVERSITY, ZARIA

OPEN BID FOR 2009 CAPITAL PROJECTS

BACKGROUND OF THE CENTRE

The Centre for Energy Research and Training, established over two decades ago in Zaria, is the foremost institution at the forefront in the promotion of peaceful application of nuclear science and technology in Nigeria. Over the years, the Centre has installed and successfully operated vast array of highly specialized nuclear and related analytical facilities, ranging from nuclear research reactor, neutron generator, nuclear spectroscopy instrumentation, atomic absorption spectrometry, XRF/XRD facilities, α and β spectrometry systems etc. These facilities have been graciously utilized in providing highly specialized services for the socio-economic development of the country. Some of these services include, soil fertility mapping of the country, mineral ore analysis, processing and geochemical mapping, environmental impact analysis, nutritional studies, etc. In order to sustain these achievements, therefore, the Centre is in dire need to upgrade some of these facilities and also train additional personnel to operate and maintain them. Pursuance to this, the Centre hereby invites bids from reputable manufacturers and laboratories within and outside the country for the execution of the under listed jobs in the 2009 capital projects. The bids should be forwarded within two weeks of this advertisement either via email (cert@abu.edu.ng; iifuntua@yahoo.com; aamati2003@yahoo.com) or registered mail addressed to the Director, Centre for Energy research and Training, Ahmadu Bello University, Zaria – Nigeria. All bids are opened ONLY to manufacturers or their registered representatives or international accredited laboratories.

DESCRIPTION OF WORKS

1. DEVELOPMENT AND INSTALLATION OF NUCLEAR POWER RESEARCH INFRASTRUCTURE

Phase I: Establishment of NPP Simulation Laboratory

This project has two components, which include the following:

- i. Supply and installing of the following Nuclear Power Plant (NPP) simulation packages with institutional user rights; CANDU, PWR, WWER, BNR, and PCTRAN
- ii. Four weeks technical training for two personnel on the application of the packages covering cost of training, transportation and subsistence allowance.

Phase II: Upgrading of Nuclear Spectroscopy Instrumentation Infrastructure

This project has three components, which include the following:

- i. Supply and installation of 1No. High Pure Germanium (HPGe) pop top ORTEC detector, featuring high resolution and complete with MAESTRO acquisition software.
- ii. Refurbishing of 4No. HPGe detectors involving replacement of pre-amps, FET and cryostat electronics
- iii. Four weeks factory training of two technical personnel on repair and maintenance involving replacement of pre-amp, cryostat electronics and other solid state device.

2. LOT A: RESEARCH REACTOR (NIRR-1) FACILITY UPGRADE

The Nigeria Nuclear Research Reactor is a Miniature Neutron Source Reactor (MNSR) tank in pool type with nominal power of 30kW and maximum core excess reactivity of 4mk, with proven inherent safety features of negative temperature coefficient of reactivity. It went critical on February 03, 2004 at 12:00hrs. The project involves two components namely; Development of infrastructure and retraining of personnel.

LOT A1: Development of Infrastructure

This project has two components, which include the following:

- i. Design and implementation of epithermal irradiation channel using cadmium or Boron lining at one inner and one outer irradiation site of NIRR-1.
- ii. Supply and installation of complete control rod drive mechanism for NIRR-1
- iii. Supply of 2/3 dram irradiation capsules with diameter 2.8cm and length of 5.3cm

LOT A2: Re-training of Personnel

This project has two components, which include the following:

- i. Four weeks training for two personnel on advanced reactor instrumentation and control system using Microcontrollers and FPGA
- ii. Two weeks training for two personnel on efficient utilization and total quality management practices for nuclear research reactors.

LOT A3: Upgrading of XRF Analytical facilities

This project has two components, which include the following:

- i. Supply and installation of 1 No. Copper and 1 No. Tungsten XRF tube compatible with Philips model PW1729 tube XRF machine
- ii. Supply and installation of 1 No. Si-Li solid state detector featuring high resolution and complete with necessary acquisition software.

3. LOT B: TRAINING OF NEW REACTOR OPERATOR TRAINEES

NIRR-1 trainee operators require extensive training on research reactor operation and maintenance, leading to award of a trainee license. The training shall be in 2 parts; classroom instruction covering the approved requisite topics and practical modules on operation, maintenance and utilization. The requisite topic shall include but not limited to the following; General description of MNSR, Physics Design and calculation of MNSR, MNSR thermal hydraulic calculations, Reactor complex, Control Rod drive mechanism, Control instrumentation for control console and microcomputer system, Thermodynamics measurements, water production and purification system, Reactor auxiliary system, reactor flux measurement, Reactor utilization, (principles of radio analytical techniques, instrumental and radiochemical neutron activation analysis, sample digestion and drying methods), radiation protection system, operation and maintenance of rabbit systems A and B, demonstrations of addition of top Be slims, heat transfer calculations, accident analysis calculation.

The training shall be for three NIRR-1 operation personnel for a period of eight weeks.

4. SOIL FERTILITY MAPPING, MINERAL ORE ANALYSIS, PROCESSING AND GEOCHEMICAL MAPPING

The project is in two phases; development of infrastructure, field sampling and laboratory analysis.

Phase I: Development of Analytical Infrastructure:

The project involves the supply and installation of table top EDXRF spectrometer for non destructive analysis of element from Sodium to Uranium in concentrations from 100% down to ppm levels; featuring fully automated sample changer and high sensitivity/resolution silicon detector with necessary analysis software package and spare parts.

Phase II: Field Sampling and Laboratory Analysis

This project has two components, which include the following:

- i. Grid mapping of the country and sample collection
- ii. Sample storage and preparation
- iii. Irradiation of samples and analysis