



CTBTO RADIONUCLIDE MONITORING STATION (RN-52) IN THE PHILIPPINES

INTRODUCTION

The Comprehensive Nuclear Test Ban Treaty (CTBT) bans any nuclear weapons test explosion or any other nuclear explosion anywhere in the world. It establishes a global monitoring system to enforce and verify compliance to the treaty. The purpose of CTBT is to enforce the adherence of all countries to contribute effectively to the prevention of the proliferation of nuclear weapons in all its aspects, to the process of disarmament and therefore to the enhancement of international peace and security.

In order to verify compliance with this treaty, a verification regime was established consisting of the following elements: ❶ an International Monitoring System, ❷ consultation and clarification, ❸ on-site inspection, and ❹ confidence building measures. At entry into force of this treaty, the verification regime shall be capable of meeting the verification requirements of this treaty.

The International Monitoring System

An International Monitoring System of 321 stations collect data worldwide and transmit them in near-real-time to the International Data Center (IDC) in Vienna. The 170 seismic, 60 infrasound and 11 hydro-acoustic monitoring stations will be capable of detecting the seismic and acoustic waves caused by a nuclear explosion. The 80 radionuclide monitoring stations, supported by 16 laboratories, will measure air samples for the presence of radioactive material.

The IDC in Vienna will collect and process data collected by the four monitoring technologies which will produce bulletins of events within 2–48 hours and distribute them to States signatories. By analyzing, integrating and comparing the data from the monitoring technologies, the time, location and nature of an event can then be determined.

The RN-52 Monitoring Station in the Philippines

PNRI was selected by Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) as the radionuclide monitoring station (RN-52) located within its compound at specific coordinates (latitude: 14°39'41"N and longitude: 121°03'26"E) in Commonwealth Avenue, Diliman, Quezon City. It is the only radiological station in the country; however, two seismic stations are being set up, one in Tagaytay (PHIVOLCS) and another in Davao (Manila Observatory). The over-all Technical Coordinator of RN-52 is Dr. Emerenciana Duran, Officer-in-Charge of the Atomic Research Division, with Ms. Teresa Y. Nazarea, Officer-in-Charge of the Health Physics Research Section as Radionuclide Monitoring Station Head.



Prior to the establishment of the radionuclide monitoring station, a radionuclide site survey was conducted by the radiological monitoring station research team which included the following information:

A. Meteorological Information

Information on long-term data on wind precipitation and temperature generated by the Philippine Atmospheric, Geophysical and Astronomical Services Administration were compiled by the research team for the CTBTO Site Survey Report. Meteorological data observed showed the existence of two climate seasons prevalent in the Philippines. These are the wet or rainy season which occurs during the months of May to November and the dry season which occurs during the months of December to April. The prevailing wind direction is southwesterly with an average wind velocity of two meters per second. The average annual precipitation was recorded at 2431.9 mm. The temperature annual mean was established at 27°C, with a relative humidity annual mean of 78%.

B. Radiological Information

The Health Physics Research Section (HPRS) collects air samples for radioactivity measurements. HPRS analyze air particulates over a period of time for Cs-137 activity concentration in air using Precision Scientific High Volume Air Sampler and Bendix Low Volume Air Sampler. The reported average Cs-137 radioactivity concentration is 0.23 mBq^{m⁻³} with a range of 0.07 to 0.62 mBq^{m⁻³}.

HPRS measured external gamma radiation in ambient air using High Pressure Ionization Chamber (HPIC) at 1 meter above the ground taking 20 readings at 10- seconds interval. The absorbed dose rate observed is 49 nGy h⁻¹ which is close to the background value obtained from the nationwide radiation survey. The HPRS has earlier established the baseline gamma radiation dose rate due to terrestrial and cosmic radiation at 44 nGy^{h⁻¹} based on nationwide radioactivity monitoring program for the Philippines.

c. The Environmental Monitoring Facility

Through various PNRI man-power development program, the Health Physics Research Section (HPRS) has strengthened its capability to monitor the environment for radioactive contamination. Well-trained researchers and a variety of nuclear instruments capable of measuring gamma, alpha and beta radionuclides in the environment identified HPRS as the PNRI Environmental Radiation Monitoring Group. This capability and credibility has been one of the reasons for CTBTO to invite PNRI to participate as its radiological station. The present capability of HPRS in this area are the following: measurement of external radiation dose rate using HPIC; field sampling and preparation of environmental samples such as soil, grass, water and food for specific radionuclide analysis; on-site sampling of dry fallout using air samplers; application of non-destructive x-ray spectrometry using HPGc; gross alpha and gross beta activity analysis for purposes of screening radioactivity in environmental samples and, specific analysis for Po-210 in marine products.

Presently, the Environmental Measurements Laboratory (EML) of HPRS is being upgraded to meet the requirements as radiological station of the CTBTO. In a recent visit by Dr. Al Ajmi, CTBTO



radiological expert, it was recommended that a 10 meter hood be installed on the roof of the building which will be attached to an air sampling device. All instruments including HPCe detector, air sampler and accessories will be provided by the CTBTO. PNRI as its commitment to CTBTO shall repair the Station infrastructure. Since collection of air samples for Cs-137 analysis will be continuous for 24 hrs, it was recommended that PNRI hire contractual workers to help the regular HPRS staff. Salaries and other incidental expenses such as maintenance and repair of instruments and supplies shall be provided by CTBTO.

National Data Center (NDC) at PNRI

Dr. Efren Abaya, Communication Officer, CTBTO Preparatory Commission, visited PNRI in November 1999 to establish the Global Communication Infrastructure (GCI) at PNRI. The Institute will serve as the National Data Center (NDC) for the CTBTO in the Philippines. A VSAT antenna and other personal earth station (PES) components of the NDC will be provided by the CTBTO and will be hooked up to the International Data Center (IDC) in Vienna. The site for the installation of a V S A T antenna was identified at about 8 meters from the designated CTBTO laboratory. The antenna will be positioned strategically to face the western side of the hemisphere where a communication satellite is located. The civil works for a cement pad is being prepared for the installation of the VSAT antenna by CTBTO contracted company (Hot Telecommunications, Ltd.) within the first semester of the year. With the establishment of the NDC, all radiological data reported by any Member State is available upon request by the monitoring stations through the NDC.

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