

Particulate radionuclide monitoring in the South Pacific and compliance with the comprehensive nuclear-test-ban treaty (CTBT)

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Following the opening for signing of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) by the United Nations member countries, in September 1996, verification of Treaty compliance is now an important international issue with NRL atmospheric monitoring stations becoming part of the global verification network. In 2000 major upgrades to stations at Kaitaia, New Zealand, and Rarotonga, Cook Islands, were completed, and a new atmospheric monitoring station installed at Chatham Islands, New Zealand. These stations now comply with the CTBT technical specifications. Major equipment at these stations consist of thin window 50% Broad Energy Canberra Ge detectors and PTI 900 m³ high-volume air samplers. Stations operate daily with a 24 hours sampling period, a 24 hours decay period, and a 24 hours gamma spectrometric analysis. Acquisition data and station state of health information (eg. Indoor temperature and humidity) are sent via the Global Communication Infrastructure every 2 hours. Data is analysed by the International Data Centre (IDC), Vienna, and the NRL. A station is graded on its ability to achieve a Ba-140 (half-life = 12.8 days) Minimum Detectable Concentration (MDC) of less than 30 $\mu\text{Bq}\cdot\text{m}^{-3}$ and to maintain 95% data availability (a maximum of 14 days down time a year). The Ba-140 MDC at Kaitaia and Chatham Islands stations were recorded at 5 $\mu\text{Bq}\cdot\text{m}^{-3}$, while at Rarotonga an MDC of 10 $\mu\text{Bq}\cdot\text{m}^{-3}$ was measured. To support a 95% data availability, a comprehensive spare parts inventory is maintained in addition to a

robust quality management system for preventative maintenance. An overview of CTBT requirements, station operations and management will be presented. Analytical data obtained at these stations, including minimum detectable concentrations and daily naturally occurring radionuclide trends, will be presented and interpretation of observations suggested.