



International Society for Tracer
and Radiation Applications

Volume 03

n e w s l e t t e r

Issue
05/2020

First Field Testing of Industrial Gamma Computed Tomography System in Ghana

The radiotracer laboratory of the National Nuclear Research Institute (NNRI) of the Ghana Atomic Energy Commission (GAEC) carried out its first field test of a gamma computed tomography (CT) system (for industrial applications) donated by the International Atomic Energy Agency (IAEA) through one of its triangular projects with Ghana coordinated by Dr. Hannah Asamoah Affum. The portable industrial gamma Computed Tomographic (CT) system, an imaging tool, meant for process flow diagnostics and material integrity assessment was designed and fabricated by the Korea Atomic Energy Research Institute (KAERI).

Gamma-ray tomography is based on the principle of measuring the attenuation of a beam of radiation transmitted through an object. Based on a large number of such attenuation measurements along several paths through the object, an image of the absorption coefficients within the scanned section is reconstructed. The CT image is a map of the distribution of the linear attenuation coefficient, μ . This is the probability of the attenuation of gamma-rays per unit length within the object, and is a function of material density, atomic number and the energy of the incident photons. A team of four scientists and engineers - Dr Hannah Asamoah Affum, Mr. Godfred Appiah, Mr. Alexander Coleman and Mr. Ishmael Iddisah Mumuni, conducted a CT scan on an industrial crude palm oil slurry line with the aim to investigate the condition of the process line as well as troubleshoot the process flow. The sludge line was selected for the scan due to its tendency to foul as well as ease of accessibility. The industrial CT system was equipped with collimated gamma ray source of Cs-137 of activity 1.6 GBq and a collimated 2-inch NaI scintillation detector for data collection. The in-situ reconstructed image of the pipe cross-section revealed that pipe was in good condition and its contents homogeneously mixed at the time of the scan.



However, some loss of lagging at certain parts around the pipe was observed. Marginal pipe scaling was also detected.

The team is grateful for the support and cooperation of the plant personnel and for the opportunity to demonstrate the capabilities of the industrial CT equipment and its contribution to process plant optimisation.



Team mounting CT gantry on sludge line



International Society for Tracer
and Radiation Applications

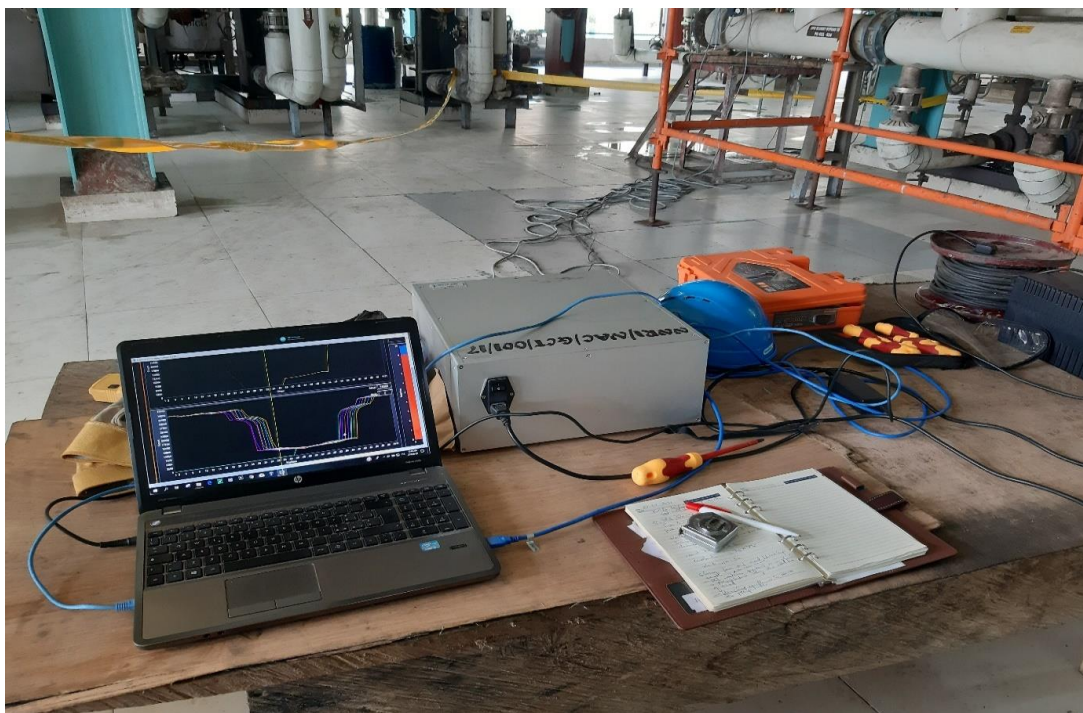
Volume 03

newsletter

Issue
05/2020



Mounted CT gantry with detector and source



CT controller and display



International Society for Tracer
and Radiation Applications

Volume 03

newsletter

Issue
05/2020



Team of scientists from NNRI, GAEC

text and photos: Hannah Asamoah Affum