

Neutron Imaging Integrated into the Development and Activities of the South African Palaeo-Scientific Community

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The South African Nuclear Energy Corporation (Necsa) is situated within the Pelindaba complex at the North East corner of the “Cradle of Human Kind”. It is on the same dolomitic band that houses the fossil deposits and would have been included within the Cradle were it not a nuclear facility. Geologically it is part of the Cradle and spatially it is right next to the Cradle. The Radiation Science (RS) Department of Necsa, which is part of its R&D Division, has recently designated heritage and heritage materials studies as one of the core focus areas of its activities in its support of the National System of Innovation and Necsa’s mandate to promote research in radiation sciences. Necsa provide access of its scientific expertise and facilities to the Cultural heritage communities to exploit the potential and capabilities. In this regard, Necsa provide capacity to exploit neutron- and micro-focus X-ray tomography scanning services (non-diagnostic) to many researchers in a variety of scientific research fields –also to the palaeosciences and archaeological sciences. The complementary nature of neutron and X-ray tomography allows for a full understanding on a non-destructive basis of the internal information of e.g. fossil bearing rock, through the creation of detailed 3D virtual images of fossil material –critical to the scientist in evaluating internal aspects of fossils.

Palaeontologists and palaeoarcheologists increasingly utilise these techniques to investigate critical internal detail of valuable specimens in a non-invasive manner with no damage to the specimens.

It makes scientific sense for a fully staffed acetic acid laboratory to be physically linked to a tomography facility and Necsa has embraced the concept and allocated on-site premises in the same building as the tomography unit for the establishment of an acetic acid laboratory. This paper will outline the needs of palaeo-researchers and how Necsa fulfils those needs.

The satellite lab will constitute an independent processing facility with full time staff to be used communally by South African and International palaeontologists and palaeoanthropologists. It has significant advantages:

- Standardizes processing and curatorial protocols.
- employment for staff drawn from the Cradle itself (vs. grant-based, term-limited employment)
- Development of a critical and unique skills base tied to stability of employment that ensures professional and consistent results.
- Minimizes the duplication of resources by South African and foreign granting agencies.
- Encourages collaborations between different scientific teams, Necsa, DAC, DST and COH WHS Management Authority
- Provides a South African based mechanism for training students, young scientists and field researchers in methods used in palaeontology and palaeoanthropology
- In the longer term the Satellite lab provides an opportunity to spread the tourism focus to another area of the Cradle (Maropeng/Sterkfontein towards the South West , and Necsa in the North East). Necsa already has an impressive visitor centre.

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