FACT SHEET 2014

PERMANENT MISSION OF THE
UNITED ARAB EMIRATES
TO THE INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA

UAE-IAEA TC Project Success

First National X-ray Centre for Material Analysis in Sharjah - UAE

The X–Ray Centre for Material Analysis is a state–of–the–art national facility established at the University of Sharjah (UoS). The Laboratory is the successful outcome of the national proj–ect 'Enhancing Analytical Capabilities for Environmental and Archaeological Applications' between the UAE and the Technical Cooperation Department of the IAEA, supported by the Permanent Mission of the UAE to the IAEA. The laboratory is running as a collaborative project between the University of Sharjah and the American University of Sharjah (AUS), which uses X–ray fluorescence and other X–ray techniques in material analysis, including for cultural heritage, environmental, and forensic applications.

Value of the Centre and Use of the Laboratory

This UAE technical cooperation project is of high value, underlined by the fact that the laboratory is currently a leading regional facility in materials characterization with X-rays and related techniques, providing a wide range of services and already attracting many local and regional partners. The importance of the laboratory is hence expressed on both national and regional levels, as it offers:

- an enhanced ability to analyze historical artifacts and manuscripts;
- establishes the capability to analyse and process environmental samples (e.g. heavy metals) and forensic samples, to characterize and test new materials, and to set a basic infrastructure for that purpose.

Other services since its establishment also include:

- restoration of archaeological monuments;
- validation of gold purity in jewellery; and
- investigation of corrosion or material failure in oil or water pipelines.

NXFL Users and Beneficiaries

A range of national institutions are already in active collaboration with the Centre, including not only museums and environmental agencies, but also government and industrial partners. Some of the users over the last few years have been: Sharjah Museum of Islamic Civilization, Dubai Municipality, Sharjah department of Antiquities, Abu Dhabi Authority for Culture and Heritage (ADACH), Umm Al-Qu-wain museum, Fujairah Tourism and Antiquities Authority, Shar-jah Police forensic labs, Abu Dhabi Police forensic labs and several industrial companies.

The Laboratory's capabilities include Bruker D8 powder diffractometer equipment and scanning electron microscope with EDS enhancement, which have attracted the attention of a wide range of local and regional partners. Projects on the study of cultural heritage materials are already underway in collaboration with local heritage and antiquities departments in Sharjah, Dubai, Abu Dhabi, and the museums in Sharjah and Fujairah.

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The Project: Establishment and Progress of the Laboratory

The national laboratory was established through a technical cooperation project for the UAE with the IAEA. The project was divided to two phases, the first of which was successfully implemented between 2009 and 2012. It included the establishment of the X-ray Fluorescence Lab, through several IAEA grants, with the support of UAE Permanent Mission. The project's second phase is expected to be closed by the end of 2014, yielding a centre which already has collaborated with several national and regional partner institutions, on a wide range of services and projects.

The project is yet another successful example of technical cooperation between the UAE and the IAEA . It contributes to the transfer of knowledge and expertise related to the use of the X-ray Fluorescence Lab, training Emiratis and providing essential services for the local community.

The National X–ray Centre for Material Analysis in Sharjah

The Lab supports characterization of materials in various fields like environmental pollution monitoring, protection of cultural heritage objects, human health, agriculture, mineral prospecting, etc. It also provides valuable services to museums.

Archeological research at the X–ray Centre in Sharjah

In the research and education sector, the laboratory will have important applications in the area of forensics. Near term plans include a partnership between the centre and Police authorities to train students on the use of X-rays in forensics.

Case Study: Conservation and Restoration of Al-Dor Temple in Umm Al-Quwain

Among a wide range of services, the Laboratory uses X-ray techniques in the study of cultural heritage. An archaeological finding of the Al-Dor Temple in Umm Al-Quwain is one of the successful studies that helped to conduct more research on the heritage:

- It was first excavated by the Iraqi Archaeological Mission in 1974.
- It is the largest settlement on the southern shores of the Arabian Gulf representing the second phase of the Hellenistic Period in the UAE.
- The periods of human settlements on the site include: Stone Age, Obeid, the Bronze Age, Iron Age and Pre-Islamic periods.
- Samples were investigated using complementary techniques at the NXFL: XRF, SEM, RAMAN and XRD.
- RAMAN and XRD results confirm that the temple was built using calcite based plaster rather than gypsum.
- XRF techniques performed on mortar samples collected from five locations in the region succeed in identifying the origin of the mortar that was used for building the temple.

Archeological findings of the Al–Dor Temple in Umm Al–Quwain

Future goals would focus on partnership with local industries and enforce the sustainability of the laboratory and its services to support relevant UAE government entities and organizations.