



CASE STUDY

Environnement S.A. Industrial Site Noise Monitoring

France
Environmental
Noise Monitoring Terminals

Environnement S.A., based outside Paris, France, is a cutting edge company in the environmental quality industry. It was the first to manufacture microprocessor-based analyzers for gas, dust and water analysis; provide both fixed and mobile air quality monitoring stations; and proactively develop equipment that monitor parameters beyond industry regulations. Environnement S.A.'s innovations over the years have supplied private and public organisations alike with the tools and know-how to detect, measure and ultimately limit the impact of industry on the natural world.

In the summer of 2003, Environnement S.A. approached Brüel & Kjær for an integrable noise monitoring system that could be added to the turnkey system it was producing for a new fertilizer plant in Oman. The comprehensive environmental monitoring installation entailed real-time displays, printable reporting, and remote analysis.

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Committed to a Clean Environment

Since 1978, Environnement S.A. has worked towards the preservation of the environment, offering intelligent solutions in the monitoring and analysis of air and water quality. The recipient of numerous export development awards, Environnement S.A. has amassed a presence in over 70 countries across the globe and is now considered a leader in the sector.

State-of-the-art Instrumentation

With over 25 years of product research and development and over a thousand field installations, Environnement S.A. has the practical insight to produce innovative solutions for the environmental quality industry. It specialises in the design, manufacture and supply of ambient air, stack emission, engine gases, radionuclide and water quality monitoring equipment and systems.

The Oman India Fertilizer Company Project

Environnement S.A. has the capacity to create single unit environmental monitoring solutions as well as complete turnkey systems. For the Oman India Fertilizer Company (OMIFCO) project, it produced an exclusive turnkey system comprising a number of environmental monitoring capabilities and network communications.

The system's applications included:

- Ambient air monitoring (gas and dust)
- Continuous emissions monitoring (CEM)
- Heavy particulate monitoring
- Water quality monitoring
- Noise monitoring
- Weather monitoring
- Data acquisition, analysis and post-processing

Fig. 1 Example of the finalised Oman India Fertilizer Company turnkey system **Left:** Permanent monitoring station; **Right:** Close-up of rack setup within station containing various Environnement S.A. analyzers and Brüel & Kjær's noise level analyzer



Comparable Goals

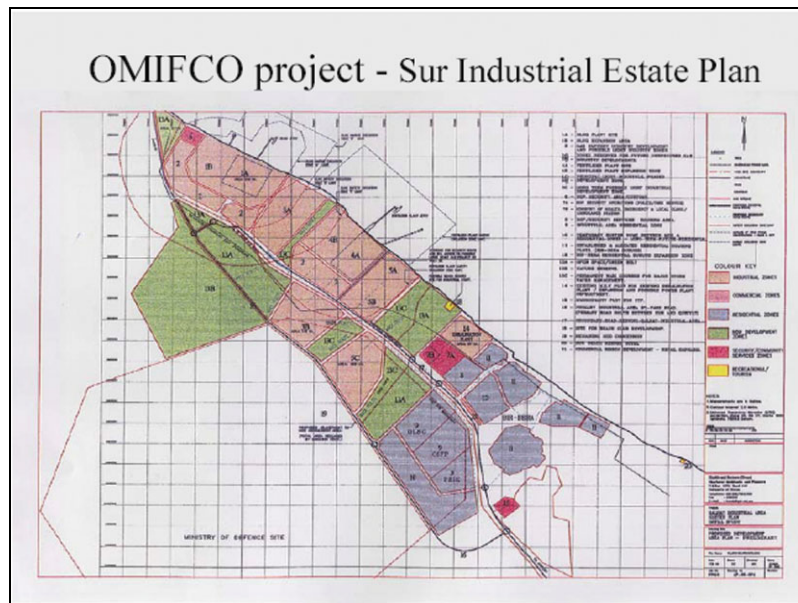
A commitment to community comfort and environmental quality seems to be the key words in the cooperation between Environnement S.A. and Brüel & Kjær. As Environnement S.A. Project Manager Dominique Riviere pointed out, “Sub-contracting Brüel & Kjær services seemed more like a cooperation between partners. Its reputation for high-quality, reliability and accuracy reflects our own values, and made Brüel & Kjær an obvious choice for us when seeking a compatible monitoring system to handle the project’s noise analyses”.

Noise Monitoring Terminals

The Oman India Fertilizer Company (OMIFCO) venture is an ambitious endeavour in many respects. The complex, a modern two-train ammonia-urea fertiliser manufacturing plant, is said to be at completion, the world's largest grassroots fertilizer complex and is the result of one of the first major agreements made between the governments of Oman and India. With a projected production of roughly 1.652 million tons of granulated urea and 248 million tons of surplus ammonia per year, it has, since its inauguration, been considered a benchmark project for the region.

Located at the Sur Industrial Estate, 150 km south of Muscat, the plant's close proximity to commercial and residential areas, as well as key natural resources, has made its environmental policies a focal point for the UNEP and Omani government. Defined operating conditions, clean technologies, and continuous monitoring were put into place to ensure compliance to both international and local environmental regulations.

Fig. 2
UNEP map of OMIFCO project. The pink areas are industrial zones, the dark pink areas are commercial zones while the blue areas are residential zones



Included in the guidelines was a noise monitoring facility that could help determine the amount of noise pollution emitted from the industrial site. For this purpose, three Noise Monitoring Terminals Type 3597 C were implemented in the stationary environmental monitoring stations.

Noise Measurements

NMT Type 3597 C is a self-contained unit, which includes a noise level analyzer, a weather-proof microphone and a modem for remote PC communication. All components, except for the microphone, are mounted in a frame for easy installation.

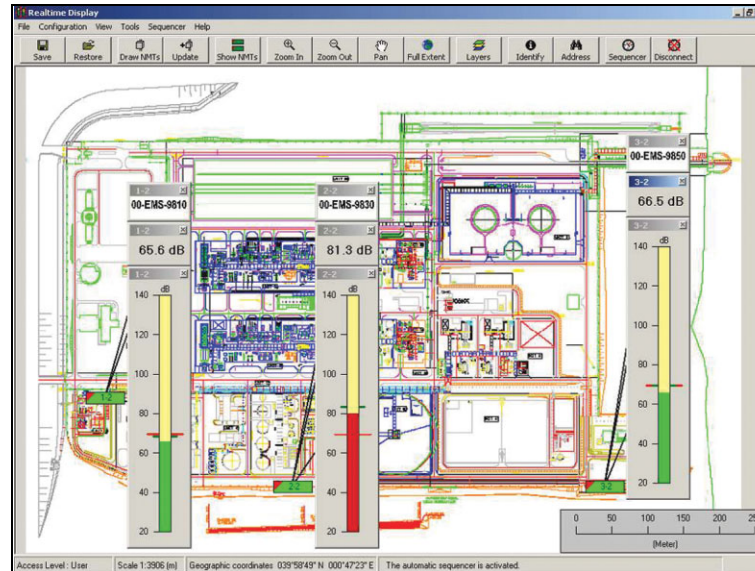
The NMTs handle the following tasks:

- Remote unmanned environmental noise measurements
- Noise data processing (broadband and 1/3-octave analyses)
- Data storage (10 gigabytes or approximately 3 months of recording)
- Real-time or user-defined download of data to a central server
- Weather-data logging
- Data transmission via RS-232 or LAN interface
- Routine acoustical and electrical calibration checks of the microphone

In addition, the software included with the NMT (Noise Monitoring Software Type 7840) provides the following:

- Configuration of NMTs
- GPS support to keep track of NMT location
- Real-time noise monitoring display
- Database support for data storage and retrieval
- Total Event Spectrum viewing

Fig. 3
Real-time noise
monitoring display



Challenges

According to the terms of the turnkey contract with OMIFCO, Environnement S.A. is to oversee installation, integration and the on-going running of the plant's environmental monitoring systems and stations. Actual monitoring involves checking both pollution concentrations and individual pollutant emissions, taking into account meteorological conditions (thus weather logging must be included). The resulting data is then analysed, mapped and compared. With these controls and measures in place, personnel will be able to predict and possibly correct future emissions.

To accomplish this, Environnement S.A. built an advanced system in which the data gathered by the monitoring sensors, are processed on a near real-time basis. Via network connections, the data streams into a server base for storage, measurement, comparison and final calculations. To ensure cost benefits, much of these processes are handled automatically with minimal human involvement.

Noise Solutions

Brüel & Kjær's NMT solution easily integrated with Environnement S.A.'s system. Noise levels, detected by the weatherproof microphone, are processed and stored in real-time by the analyzer. Through a network connection, the stored data is then transmitted to a central location where a PC with the noise analysis software programme installed, post-processes and displays the real-time data (or another user-defined time interval) for accurate mapping. The entire data collection process is controlled via the analyzer in an unmanned station and includes automatic calibration checks for hands-free maintenance of the equipment.

Impressive Results

Fig. 4
Installation of Brüel & Kjær
NMT at OMIFCO industrial
site



reliable and accurate data with a reporting system and real-time displays. With the microphones located at various positions, we were able to make measurements at the locations that counted, namely where the plant has neighbours. The current configuration and open system modularity allows us to integrate more hardware for expanded noise monitoring”.

The NMT system installation consisted of: hardware integration within the permanent monitoring stations, mounting of the microphones far enough away so that they did not pick up noise from the air conditioning system, and software installation onto the remote PC connected to the hardware via optical fibres with RS-232 emulation (connected at 9600 bauds). According to Environnement S.A. Project Manager Dominique Riviere, “The NMT systems corresponded exactly to what we needed. The installation provided

Key Facts

- Environnement S.A. is a leader in the environmental quality monitoring worldwide
- With over 25 years of industry experience and more than a thousand installations, Environnement is recognised as a market specialist
- The Oman India Fertilizer Company (OMIFCO) is one of Environnement S.A.’s most recent large-scale projects. This turnkey system contract requires the monitoring of a multitude of environmental conditions, including: water and air quality, weather and noise levels
- The OMIFCO plant is located at the Sur Industrial Estate in the country of Oman. The estate is placed in a naturally-rich area with a number of residential and commercial zones as its neighbours. Noise monitoring is, therefore, an important criteria to judge the feasibility of the plant’s location and production plans
- Environnement S.A. sub-contracted Brüel & Kjær in July 2003 to integrate three Noise Monitoring Terminals Type 3597 C and accompanying software, Noise Monitoring Type 7840, with its proprietary environmental monitoring system for noise monitoring tasks
- Data transfer occurs via a RS-232 connection to a central visualisation centre for data display, post-processing and storage
- Use of the NMT system provided accurate real-time analysis and display of noise levels across the plant site, as well as reporting capabilities

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