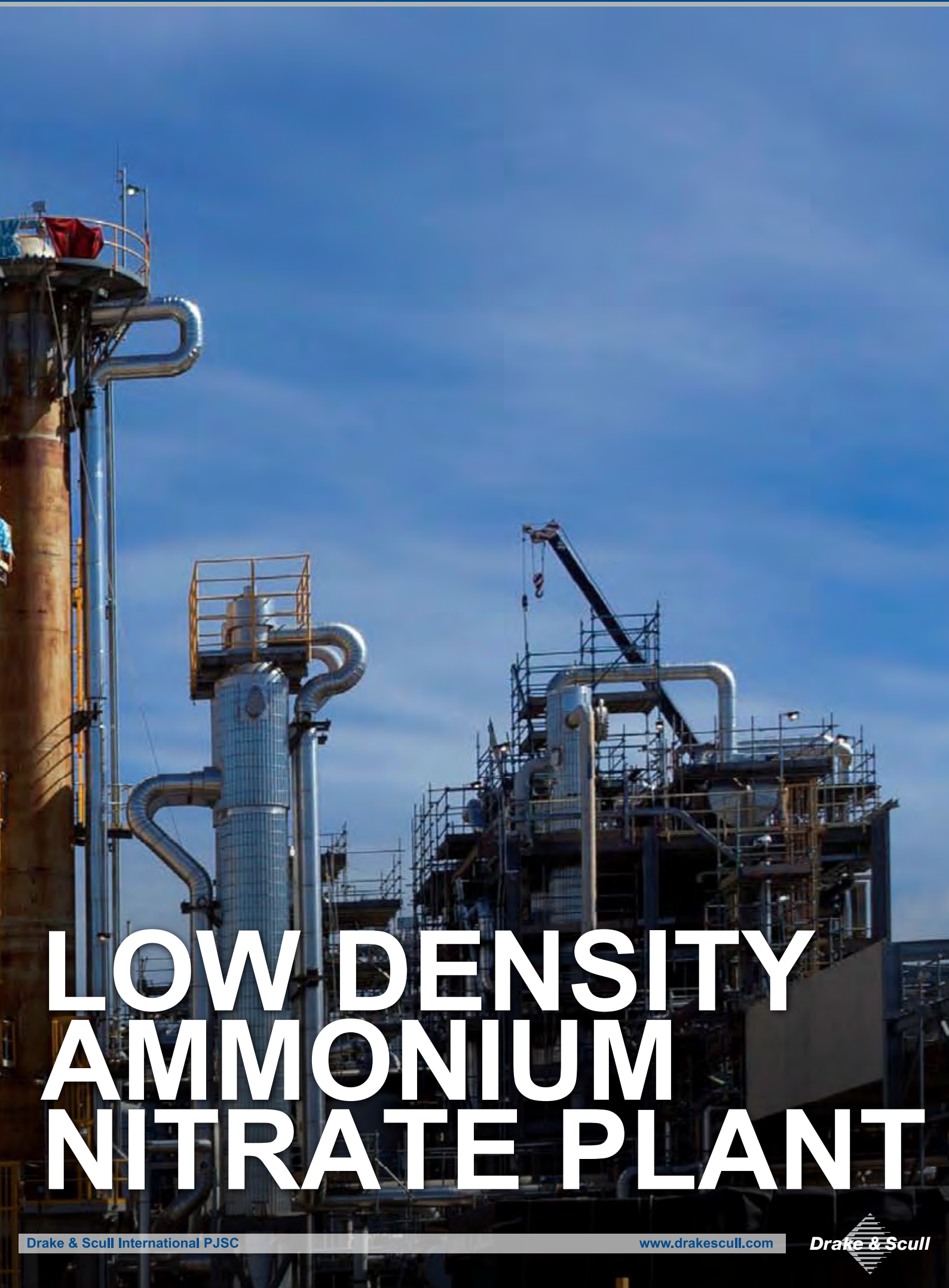

LOW DENSITY AMMONIUM NITRATE PLANT

Concept & Location

Egypt Hydrocarbon Corporation S.A.E, one of Egypt's major petrochemical companies, envisioned the creation of a Low Density Ammonium Plant (LDANP) in Egypt. The purpose of the LDANP was to facilitate the production of Mining Grade Ammonium Nitrate which is used in the production of explosives for mining and other blasting applications, such as in construction.

The project presented an opportunity for the private sector development in Egypt, foreign exchange earnings and revenues for the government. The LDANP was commissioned to provide employment opportunities for up 2000 Egyptian staff during the construction period and for up to 220 people during the facility operation.

The Low Density Ammonium Nitrate Plant at Ain Sokhna (Egypt's industrial hub), consists of a nitric acid unit and ammonium nitrate unit; where the nitric acid is consumed in the production of ammonium nitrate. The ammonium nitrate unit uses a single-stage, neutralization process.

The facility consists of a 925 MTPD (metric ton per day) nitric acid unit and a 1060 MTPD low density ammonium nitrate unit. Storage capabilities at the plant site consist of tanks for nitric acid, sulphuric acid, caustic sodium hydroxide and hydrochloric acid. A storage tank for refrigerated ammonia is located offsite having a storage capacity of 40000 MT. The plant facilities were installed at the western end of a tract of land owned by EHC, with a total area of 500,000 square meters oriented northwest to southeast and located west of the Suez-Hurgada Highway.

The dry product of ammonium nitrate will be handled, bagged and stored at the onsite Low Density Ammonium Nitrate (LDAN) product storage facilities of capacity 14000 tons. Stored products will then be transported by trucks to local distribution locations or transported to the Adabiya Port to be loaded onto ships for export. The facility also consists of associated utilities and offsite support facilities. The offsite and utility systems will enable the stand-alone operation of the plant with backup power supplied from the local grid.

The estimated electric power demand for the facility is approximately 12 megawatts (MW); 6 MW of which will routinely be generated from natural gas turbine generators or in the case of emergencies from the local grid and an on-site 1MW diesel generator. The remaining 6 MW will be self generated by converting the heat release from exothermic reaction using steam turbines.

Brackish water will be drawn from onsite water wells and would be further processed for use in the facility. Wastewater from the proposed facility will be collected and treated in evaporation ponds (i.e. zero liquid discharge).

The ammonium nitrate plant will operate 24 hours a day, seven days a week. Scheduled shutdowns for inspection and maintenance are planned to occur every two years. A maintenance building staffed with dedicated skilled labour will also be provided to support all maintenance activities for the facility. The major components of the ammonia plant have been designed to have a life of more than 30 years.

The plant is expected to become a major hub for the production of Ammonium Nitrate in the region. The supply/demand balance forecasts projected up to 2020 suggest that the LDANP will become a premier source to place tonnage in the Middle East, Africa, and Asian markets. The demand for Ammonium Nitrate is expected to climb to 4.03 million tonnes while supply is forecast to increase by 3.84 million tonnes product. The LDANP alone will account for 8.7% of the projected incremental demand.

Scope of work:

Drake & Scull Oil and Gas were invited by the clients to undertake the monumental task of constructing the massive LDANP. Drake & Scull Oil and Gas were chosen for their strong experience in Egypt and their history of petrochemical projects across the MENA for over 4 decades.

The primary portion of Drake & Scull Oil and Gas' works was to assume responsibility for the civil, mechanical and steel structure works. Drake & Scull's scope of works covered the Storage Tanks, Control Building, Piping, Steel Structure (which includes 5,000 tons of steel rebar), 6000 tonnes of mechanical erection and 40,000 m3 of concrete.

Drake & Scull Oil and Gas spearheaded the construction activities on site, taking a leadership role in co-coordinating the works between the various teams on site. Drake & Scull also undertook periodic evaluations of designs and offered their suggestions and recommendations to bolster the efficiency of construction operations on site.

The efficient planning and contingency measures allowed the project construction to progress briskly, overcoming sudden delays in delivery of material and engineering drawings, thanks to strong resourcing of material and equipment on site as well as fast track mobilization of crucial personnel. More than 1200 DSI employees and laborers worked round the clock to accelerate the pace of progress on site.

Drake & Scull Oil and Gas achieved some major milestones during its time on site. These include:

- 375,000 M3 of earth works (cut and fill)
- 35,000 M3 of Concrete works
- 30,000 M2 of Formworks works
- 5,500 tons of Reinforcement Rebar Bending works
- 6,500 M of Drainage works
- 500 M3 of Ground works
- 10,000 M2 of Pavement finishing works (e.g. venial Easter, epoxy etc.)
- 2,500 M3 of Concrete Paving works
- 40,000 M2 of Asphalt Pavement works
- 35,000 M3 of Concrete works
- 2000 Tons of Static equipment
- 1000 Tons of Rotating equipment
- 600 Tons of Conveyer built and Equipment
- Installation and alignment of more than 130 pumps
- Installation of 32 heavy lifts
- More than 2000 tons of tanks works
- 900 Tons of stainless steel piping works
- 600 Tons of Carbon steel piping works
- 6000 Tons of Steel structure works
- 35,000 M2 of Cladding works

Drake & Scull Oil and Gas' expertise proved crucial to the rapid development of the project which launched on schedule. As Drake & Scull Oil and Gas' maiden project in North Africa, the LDANP is a fine example of Drake & Scull's project management skills, well suited to the petrochemical sector.