Alcatel·Lucent

CONOCOPHILLIPS, AUSTRALIA
PROVIDING INTEGRATED COMMUNICATIONS AND SECURITY FOR A LIQUIFIED NATURAL GAS PLANT

ConocoPhillips needed an integrated communications and security solution to improve employee mobility and efficiency and tighten security at its new liquefied natural gas (LNG) plant in Darwin. Working on a tight timetable, Alcatel-Lucent delivered a turnkey integrated communications and security solution for the entire plant, working in a demanding and hazardous plant construction environment while meticulously documenting the complex project.

CHALLENGES

For ConocoPhillips's new Darwin liquid natural gas (LNG) plant, on-time completion was essential. The communications and security component – a small but vital part of the overall project – was therefore subject to a stringent schedule. In this context, key challenges included:

> **Managing technical complexity:** The communications and security solution involved some 16 equipment manufacturers and required robust systems engineering methodologies to design and integrate systems and manage subcontractors and suppliers.

> **Ensuring plant security and safety for personnel:** All subsystems had to be certified for use in hazardous areas, and the plant secured against vandalism, theft and acts of terrorism.

> **Meeting needs for mission-critical communications:** In addition to standard corporate communications, ConocoPhillips needed instantaneous communications for its mobile field personnel, and connectivity for its Distributed Control System (DCS) for monitoring and control of the plant.

The company's engineering, procurement and construction (EPC) contractor, Bechtel, sought a communications and security contractor with the technical expertise and supply management experience to meet these challenges, selecting Alcatel-Lucent for the job.

SOLUTION

Alcatel-Lucent delivered a turnkey, integrated communications and security solution in a "smooth-sailing," eventless construction process. The solution included:

> **Passive network** (fiber-optic and copper cabling): outside plant and structured cabling providing physical connectivity for the entire plant, including security, control, radio, LAN and telephony systems.

> **Professional Mobile Radio** (PMR): UHF analog radio system and VHF marine radio, enhancing workforce mobility and productivity.

> **Security:** access control system with intrusion detection, CCTV monitoring, plant alarm system, gates and turnstiles to prevent unauthorized access.

> **Power systems:** uninterrupted power supply (UPS) and batteries to provide protection against power failure.

The solution was meticulously documented at every stage, and regular review cycles were performed throughout the project.

BENEFITS

> Enhanced safety for personnel and security for the plant.

> Minimized operational risk, the result of a vendor-agnostic approach of choosing proven, best-of-breed equipment.

> Single point of accountability for the communications and security solution, enabling Bechtel to focus on the larger construction project.
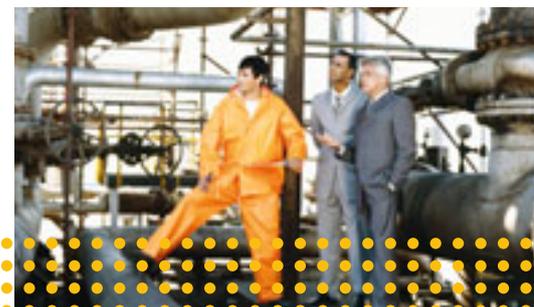
ABOUT CONOCOPHILLIPS

> An international energy corporation based in Houston, Texas, ConocoPhillips was created through the merger of Conoco Inc. and the Phillips Petroleum Company in 2002 and today employs over 30,000 people in 40 countries.

> ConocoPhillips – the second-largest refiner in the U.S. and the fifth largest in the world – is active in exploration and production of oil, natural gas and natural gas liquids, production of chemicals and plastics, and development of new energy sources.

> The LNG plant in Darwin, Australia, employs a liquefaction technology that can reduce the natural gas product to around 1/600 of its starting volume, reducing costs for transportation to overseas markets.

"Alcatel-Lucent took a professional approach to design requirements, adherence to specifications and selection of components with superb results that were surpassed only by its on-site installation, testing and commissioning work ."

**Clifford H. Artz, Construction Manager
Darwin LNG Project
ConocoPhillips Australia Pty. Ltd.**

Alcatel-Lucent's Perspective

CUSTOMER REQUIREMENTS

For the new ConocoPhillips LNG plant in Darwin, prime contractor Bechtel required a partner experienced in oil and gas projects to deliver a fully compliant multi-vendor communications and security solution. It selected Alcatel-Lucent to deliver the end-to-end solution and to ensure on-time delivery to avoid any delay to the overall plant construction project.

OUR METHODOLOGY

Alcatel-Lucent's project methodology consisted of best practices centered on meticulous documentation, and involved the following steps:

1. **Detailed analysis of customer requirements** to ensure full compliance with specifications.

2. **A stringent request for quotation (RFQ) process** to chose the best equipment for each subsystem.

3. **Detailed design** of the subsystems and overall system using computer-aided design (CAD) drawings, which were subject to a rigorous review cycle.

4. **Off-site integration and testing** of certain subsystems before shipment to the Darwin LNG plant.

5. **Factory acceptance testing** (FAT) of all equipment to validate that it met specifications.

6. **Inspection test plans** and site integration test plans used in the commissioning process to ensure the implemented solution met customer requirements.

DELIVERY CHALLENGES

- **Hazardous Area Certification for equipment:**
  All equipment to be installed in defined hazardous areas required the appropriate level of design certification.

- **Hazardous Area Certification for personnel:**
  Staff accreditation was required for installers and inspectors to ensure the hazardous area equipment was installed to specification. Achieving accreditation required specialized training as well as on-site work experience.

- **Implementation in the physical plant environment:**
  Implementation engineering challenges included performing structural assessments, mounting the equipment to different structures and handling environmental considerations. Installation challenges included running cable on trays located 10 to 30 meters above ground.

- **Construction site regulations:** The project had to comply with regulations for occupational health and safety (OH&S), industrial relations (IR), work hours, site access, etc.

- **Schedule dependency on prime contractor:**
  The telecommunications project was highly dependent on infrastructure provided by other parties, e.g., cable trays, buildings, jetty, etc. The prime contractor often made changes to the schedule, which had to be tracked and managed closely.

THE ADDED VALUE

Alcatel-Lucent's key value add was to provide the systems engineering and project management methodologies that guaranteed that the small – but mission-critical – communications and security solution was delivered to specification, on time and on budget. This allowed Bechtel to focus on the big picture of construction of the overall plant.

Darryl Rooke
Alcatel-Lucent
General Project Manager

"The ConocoPhillips project was a challenge because of the constraints and hazards of the oil and gas construction environment. As end-to-end network integrator, Alcatel-Lucent met that challenge, delivering a complex and innovative communications and security solution."

THE BUSINESS SOLUTION

For the new ConocoPhillips LNG plant in Darwin, Australia, prime contractor Bechtel needed a partner experienced in oil and gas projects to deliver a multi-vendor communications and security solution. Alcatel-Lucent implemented a meticulously documented end-to-end solution that included over 16 subsystems.

The solution, which is fully compliant with industry and corporate standards, enables efficient communication among employees and enhanced security at the plant, with CCTV monitoring, access control and intrusion detection.

THE TECHNICAL SOLUTION

Passive Network

- Fiber-optic and copper cabling
- Outside plant and structured cabling to provide physical connectivity for the entire plant, including security, control, radio, LAN and telephony systems

Professional Mobile Radio (PMR)

- 5-channel conventional UHF analog radio system based on Motorola MXD1500 base stations
- VHF marine radio based on Sailor RT4822 technology to provide communications with ships up to 19 nautical miles from shore
- Integration of handsets, desktop terminals and the PBX with an Omnitronics DX-64 operator console
- 50-meter tower

Physical Security

- Hernis closed-circuit television (CCTV) cameras for hazardous and safe areas, backhauled to Hernis matrix switch over redundant fiber paths to maximize availability
- Digital video recording
- IP-based video transmission to allow flexible viewing from anywhere connected to the LAN
- Microwave-based intrusion detection system (IDS) to protect the shoreline
- Plant-wide public address and general alarm (PA/GA) system for emergency evacuation
- Access control system
- Gates and turnstiles

Power

- Power reticulation to communications and security subsystems
- UPS's and batteries to provide protection against power failure

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