

JDR Cable Systems:

MAKING THE VITAL CONNECTION

Bringing proven technologies and expertise
to the renewable energy sector



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Oil and gas industry expertise

JDR Cable Systems has been involved in the oil and gas industry for decades, providing highly engineered towed cables and air gun umbilicals for the seismic market with our Marine Cables unit and dynamic and static subsea power cables and umbilical systems to major projects around the world through our Umbilical Systems unit. This extensive experience and expertise is readily transferable to the renewable energy market, including wind farms and wave and tidal energy converter devices. Currently, JDR is participating in several renewable energy projects in both business units, including what will be the world's largest offshore wind farm when it is completed in 2010, the Greater Gabbard project off the UK's east coast and the largest offshore wave energy farm off the UK's south west coast due for completion in 2011.

"JDR has built our legacy on exceptional performance by exceptional people in the oil and gas industry. As the mosaic of energy changes to renewable sources toward the end of this decade, JDR has chosen to lead the way by not only applying our knowledge and experience borne from that legacy but also we are making tangible investments in our ability to deliver on that legacy to the future. We are doing this at a time when conventional wisdom would say we shouldn't - but isn't that what leaders are expected to do?"

Pat Herbert, Group Chief Executive Officer, JDR Cable Systems (Holdings) Ltd.



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JDR Cable Systems: Making the Vital Connection

The UK Government believes the renewable energy industry, primarily wind farms, can provide a significant portion of electrical energy to the country, with a stated goal of 15% by the year 2020 as it opened its third round of leasing for offshore wind farms in 2008. In June 2009 the UK Department of Energy and Climate Change further stated that offshore wind energy can provide more than a quarter of its electricity needs, with the potential for an additional 25GW of new electricity generation in addition to the 8GW already installed or planned. Additionally, the UK Government began work to provide up to £1 billion of loans for offshore wind projects as well as up to £10 million of government grants for offshore wind technology development.

JDR, the only UK Original Equipment Manufacturer for subsea power cables, has invested in the future of renewable energy despite the current economic recession. The company's newest power cable and umbilical manufacturing facility at Hartlepool Dock on the UK's east coast will provide important employment opportunities, as it is strategically and ideally suited to service this evolving market with design, engineering and scientific support.

JDR's oil and gas industry experience has enabled the company to offer



Steven Parfitt, left, General Manager of JDR's Hartlepool manufacturing facility, shows the Greater Gabbard project cable to Iain Wright, Member of Parliament for Hartlepool, during the opening of the plant in July 2009.

flexible and innovative design approaches for inter-turbine array cables coupled with new termination and installation technology that will set the standard for future projects.

Like its subsea marine cables and umbilicals for the oil and gas industry, JDR's products for the renewable energy markets are engineered and manufactured in-house. Strategically located facilities in the UK (Hartlepool and Littleport), The Netherlands (Rotterdam), and Thailand house state-of-the-art equipment and machinery, full assembly and termination facilities, and fully integrated testing and qualification systems to meet virtually every challenge.

JDR's extensive industry experience is the key

JDR Cable Systems has more than 80 years of experience in the design and manufacture of custom cable and umbilical systems in support of the oil and gas, and seismic exploration industries. The company was formed by the combination of two highly respected names in cable and umbilical technology: Jacques Cable Systems in the UK and De Regt Special Cable in the Netherlands.

Since its formation, JDR Cable Systems has continued to provide umbilicals and power cables to an increasingly demanding global industry as exploration wades further offshore and into deeper waters. JDR meets this demand with the development of innovative technology — and closely guarded intellectual property — that delivers products for oil and gas installations that can reach several kilometres in length in extremely dynamic, hostile environments. JDR builds inter-turbine array cables for offshore wind farms; subsea power cables for the oil and



Subsea production umbilical.



JDR's custom-engineered marine seismic cable systems and products are renowned throughout the world.

gas industry; marine seismic streamer tow cables and airgun umbilicals; sub-sea production umbilicals; intervention workover control systems (IWOCS) umbilicals with workover reeler and spool packages and tactical defense sonar array towed cable systems — all with full termination and installation support.

JDR Umbilical Systems' experience is a natural fit for the offshore renewable energy sector

The company's experience around the globe is replete with many successes. BP's Horn Mountain spar, ExxonMobil's Hoover/Diana project, Murphy Oil's Medusa spar, Dominion Exploration & Production's Devil's Tower, and Anadarko's Gunnison spar, all located in the Gulf of Mexico, are but a few examples in the deepwater sector in North America. BP's Thunder Horse development, also in the Gulf of Mexico, presented unique challenges at the time, which required two 8,000 ft IWOCS. Those umbilicals utilised a newly developed thermo-plastic hose with a working pressure of 15,000 psi in a ¼-in. diameter bore, and three individual steel tubes each housing three fibre optic elements.

In West Africa JDR provided power cable and umbilical systems for Exxon-Mobil's Kizomba A and B developments offshore Angola, tying a tension-leg platform (TLP) with a floating production, storage and offloading (FPSO) vessel. The project provides power from the FPSO to the TLP and into the field.

JDR designed and manufactured three 13,124 ft umbilicals designed for up to 5,000 ft of water depth for the Sea Stallion plough system for Engineering Business (EB). Conventional designs using steel wire armouring proved too heavy for the intended application, so JDR's design team developed an Aramid fibre-reinforced neutrally-buoyant umbilical for the strength member. This also provided the added benefits of plough deployment in harsher weather conditions with minimal vessel downtime. JDR also provided special terminations and performed extensive testing of the prototype umbilical

prior to deployment. Several ploughs eventually were built to bury cables for the telecommunication industry until that market collapsed. Interestingly, after remaining idle for several years, EB is now using the umbilicals for burying inter-turbine array cables for the Thornton Bank wind farm offshore Belgium and the Gunfleet Sands wind farm offshore Essex, UK.

An 8,000m continuous length of power and fibre optic subsea cable was built and installed for Genesis Oil & Gas, on behalf of Burlington Resources' River Field Development tieback in the Irish Sea, off the Isle of Man in 2004. In China, the company built four 15kV power subsea cables for Anadarko Petroleum and CNOOC in the South China Sea.

JDR was contracted to supply ten 240m power and fibre optic subsea cables for Amec for installation offshore UK during 2008 and 2009, and was awarded a contract calling for a 24kV, 10.5km power and fibre optic subsea cable for ConocoPhillips' North Belut field in the Natuna Sea offshore Indonesia.

Marine Cables unit pursues renewable energy projects

In the Netherlands, JDR Marine Cables designs and manufactures custom-engineered, dynamic cables for special uses. Products include tow leaders and airgun umbilicals for offshore seismic exploration and oceanographic research and cables for ROV systems that are used to either directly deploy the ROV or to control the ROV utilising a tether management system. The design and manufacturing processes for ROV cables are designed to provide high flexibility and durability, neutral buoyancy and minimum drag for optimal maneuverability.

For the defence industry, JDR's tow cables are used by navies around the world for their various active or passive sonar systems. JDR Marine Cables can supply complete, fully terminated, torque-balanced cable assemblies, including underwater mateable connections.

Marine Cables is actively working on project proposals for renewable en-



JDR will provide the cable for OPT's PowerBuoy wave energy converter. (photo courtesy of Ocean Power Technologies)

ergy applications where dynamic cable applications are necessary, such as wave energy projects in several areas of the world and building cables for new wave and tidal projects off Continental Europe.

Focus on JDR's core competency

"We have stayed focused on our sub-sea oil and gas core competencies in offshore, harsh environments and have used those to build a significant market leadership position in the subsea power cable segment," said Pat Herbert, JDR's Group CEO. "This expertise translates to offshore wind energy power cable needs directly, as does our legacy in innovative terminations and installation engineering.

"With this background, the company became extremely interested in applying our vast experience to the burgeoning renewable energy industry. The company commissioned a market/industry study in 2005, which culminated in a business model completed in mid-2007. The group changed ownership when purchased by Vision Capital at that time, and the new owners immediately lived up to their name and approved the

company's renewable energy business launch," Herbert went on to say.

JDR establishes leadership in the manufacture of wind farm array cables

"The UK Round 1 wind farms had perhaps 10-20 turbines each," said Patrick Phelan, Managing Director of JDR Umbilical Systems. "We are now delivering cables for Round 2 with wind farms in the 100+ figure. Round 3 will be even larger, where projects could total 3,000 to 4,000 offshore turbines, with one project having several hundred turbines," Phelan noted.

"Importantly, the costs for wind farm installations will be lowered as experience is gained and technology is forthcoming, increasing demand," said Herbert. "For example, a lot of effort is going into providing more efficient turbines, and there have been numerous innovations in their ability to deliver a more constant stream of power per range of blade speed — and more is learned with each installation." Herbert continued. "Offshore wind farms and wave energy companies still have to deal with the subsea and offshore world, which is a very corrosive and hostile environment from an engineering perspective and foreign to many utility companies entering the market. This is where JDR comes in! We fit into



the offshore renewable energy market because that is where we operate all of the time. The offshore renewable energy market is a natural fit for us and we believe we are the most obvious partner for the utility companies."

Renewable energy comprises both static and dynamic markets

JDR Cable Systems divides the renewable energy projects along the lines of its expertise. For example, projects that call for cables to be installed and used in a static system, such as offshore wind turbines, are provided by the company's Subsea Power Cables division of Umbilical Systems. For projects requiring dynamic cables, such as power buoys that generate electricity from wave motions or buoys that generate electricity from tidal changes, the Marine Cables business unit steps in.

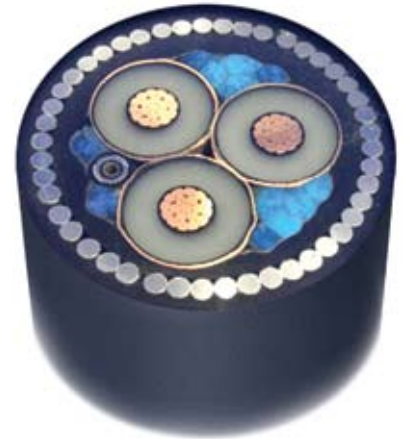
"Offshore renewable energy projects really are an extension of our core competency," Herbert explained, "and that not only relates to the cables but also because we are a system supplier, not just a cable supplier. We can provide the pull-in tools, hang-offs, and connection and termination technology — the complete system — for any and all of the foreseen projects".

JDR also offers experienced engineers and technicians to see each project through from beginning to end, including supervising installation.

"We can alleviate the utility company's lack of experience and advance their learning curve," Herbert emphasized. "There is no one else like that in the industry."

There are cable suppliers that can provide power cables, and some might even provide the terminations; however, those companies typically end their business model at the dock after delivering the cables on board, essentially saying: "Here's your cable, it's all yours."

"We don't operate that way," Herbert explained. "While we also eventually say, 'here it is, it's all yours,' that won't typically occur until the cables are installed and your wind turbines or power buoys are connected and fully functional. That's our business model approach."



Greater Gabbard cable with three-phase power core and fibre optic communications.

First wind turbine experience dates back to 2004

Prior to the completion of JDR's renewable energy business model, they participated in the Beatrice offshore wind farm demonstrator project in the North Sea in 2004. Energy generated by the turbines was to power the Beatrice AP platform, reducing the use of fossil fuels. The demonstrator project was expected to operate for about five years to examine the feasibility and benefits of creating a commercial deepwater wind farm at the site.

In 2006, Talisman Energy (UK) Ltd. and Scottish and Southern Energy awarded JDR the contract to design, manufacture and test two composite subsea power cables to control two jacket platform-based wind turbines linked to the Talisman-operated Beatrice platform.

Each composite bundle, 970m long connecting the turbines to each other and 1,920m long from the turbine to the platform, comprised three-phase, 70mm², 33kV power cores, data cables, backup power cables and fibre optic communications. The bundles were engineered to provide the smallest diameter while still maintaining the strength and weight required to suit the field installation and service conditions. The terminations included JDR's high-strength, flexible pull-in head, designed and developed in-house. JDR also provided experienced technicians to terminate the cables offshore during the installation phase.

JDR and the world's largest offshore wind farm

JDR's stated philosophy of providing a complete system to its clients resulted in the company being contracted by Fluor for the supply of inter-turbine array cables for the Greater Gabbard offshore wind farm in the North Sea. This project is being developed by Airtricity, the renewable energy development division of Scottish and Southern Energy, who is also a partner in the Beatrice demonstrator project.

Upon completion in 2011, Greater Gabbard, off the Suffolk coast, will become the world's largest offshore wind farm with 140 turbines. It will provide more than 500 MW of carbon-neutral, renewable electricity to power 415,000 homes, approximately equivalent to the domestic demand of Suffolk, England.

JDR will provide more than 200 km of 33 kV, three-phase power cables that will link each 3.6 MW turbine generator and the Gabbard and Galloper offshore substations. The cables include fibre optics and application-specific terminations. Half of the cables have already been fabricated in JDR's manufacturing facility at Littleport in Cambridge and are ready for deployment. The remainder of the cables will be manufactured in the Hartlepool facility.

Of special note, JDR has developed a new mechanical termination system for the Greater Gabbard project that cuts installation time from about eight hours to one hour or less.

Bespoke terminations developed for offshore wind farms

"We developed a new system specifically for wind farms that makes it easier to connect a termination," said Peter Worrall, Technical Director, Subsea Power Cables. "They are specifically designed for easier, quicker installation and more reliability in the hang-off system in the turbine. The termination is designed for ease of assembly offshore for a field fit termination, even though it requires a bit more manufacturing due to the use of casting technology. The result is a better engineered solution.

"We will have nearly 300 terminations, so we can afford a production route. That means we can design the assembly with a lot of functionality and design them in such a way as to make it very easy for the offshore technician to install the termination," Worrall said.

"We put a lot of our design resources into these reliable terminations," said Patrick Phelan, Managing Director, Umbilical Systems. "They are very easy to assemble offshore, reducing the amount of installation time and cost involved. No other company has the mechanical termination technology that we currently offer to the industry, and we have applied for global patents to protect our position."

"The patent-pending mechanical termination technology does not require a resin pool and associated curing time for the termination, which is a major selling point," said James Young, Technical Director, Umbilical Systems. "The fact that the termination is made with a mechanical clamping mechanism rather than relying on resin potting results in faster installation and a significant reduction of expensive installation vessel time. In a typical hang-off, the system is completely fabricated with no optimised parts. There are no tools to aid assembly and no special temporary hang-off. The armour wires are squeezed into the hang-off and termination and because of the resin pool used to secure the termination, curing time could take up to eight hours. While this typical installation method is appropriate for one-off installations, it is too time consuming and costly when the project calls for nearly 300 terminations, as in the case of the Greater Gabbard project."

With JDR's mechanical field fit termination, the installation process can take one hour or less with various assembly aids. JDR incorporated field fit installation tools that aid the technician and enable easier assembly of the termination. The termination system itself includes an assembly jig and other tools that tell the technician the correct location to cut the wires after the cable is pulled in normally and fit-



Power cable for Greater Gabbard wind farm project in the North Sea.

ted to a special temporary clamp. The technician then uses an assembly tool that enables him to form the wires after they have been splayed out using a specialised tool. A mechanical clamp encapsulates the armour and prevents it from being removed from the termination, which completes the termination assembly. The result is a fully air tight seal with galvanic isolation that provides a highly reliable termination.

In addition to requiring only minimal assembly and installation time, the installation is much safer for the technicians installing the array cables. "We have told the industry, and continue to tell the industry, that the safety concerns of installing these cables are critical and that JDR provides the safest methodology and termination technology to date," Herbert said.

World's largest wave energy project

Experience and expertise in the emerging renewable energy market led to JDR's next major contract to design and manufacture the export subsea power

cable for South West Regional Development Agency's Wave Hub project.

Wave Hub is a major offshore renewable infrastructure project that will create an electrical "socket" on the seabed in about 50m of water off the coast of Cornwall in southwest England. It will be connected to the national grid by this subsea cable. Groups of wave energy devices that float on or just below the surface will be connected to Wave Hub to assess how well they work and how much power they will generate before going into full commercial production.

There will be four berths available at Wave Hub. The project will have an initial maximum capacity of 20 MW, or the electricity to power approximately 7,000 homes. Wave Hub has been designed with the potential to scale up to 50 MW in the future. Four wave energy converters from different companies will be tested initially.

JDR's contract award calls for a 25 km, 33kV, six-phase power cable that will provide the link between Wave Hub and the onshore control room, and four additional 300m, three-phase power cables and dry mate connector sets to connect the wave energy converters to the hub. The company will also supply the Wave Hub assembly consisting of subsea terminations and a complete subsea protection structure. The equipment will be delivered in the second quarter of 2010 from JDR's new deep-water quayside facility at Hartlepool. The first wave energy converter devices are expected to be deployed in 2011.

"The Wave Hub project draws on JDR's wealth of experience in the design and manufacture of subsea cables and umbilical systems to produce a solution that will meet the demanding requirements of this new application," Phelan said.

"I think a large part of this contract award was our approach to the project," commented Adam Fellows, Product Manager, Umbilical Systems. "We don't see ourselves purely as a cable supplier, we see ourselves as a systems supplier. We were keen to supply the entire wave hub to the subsea

junction box, all of the fibre optics and connectors. We wanted to supply a fully integrated system.

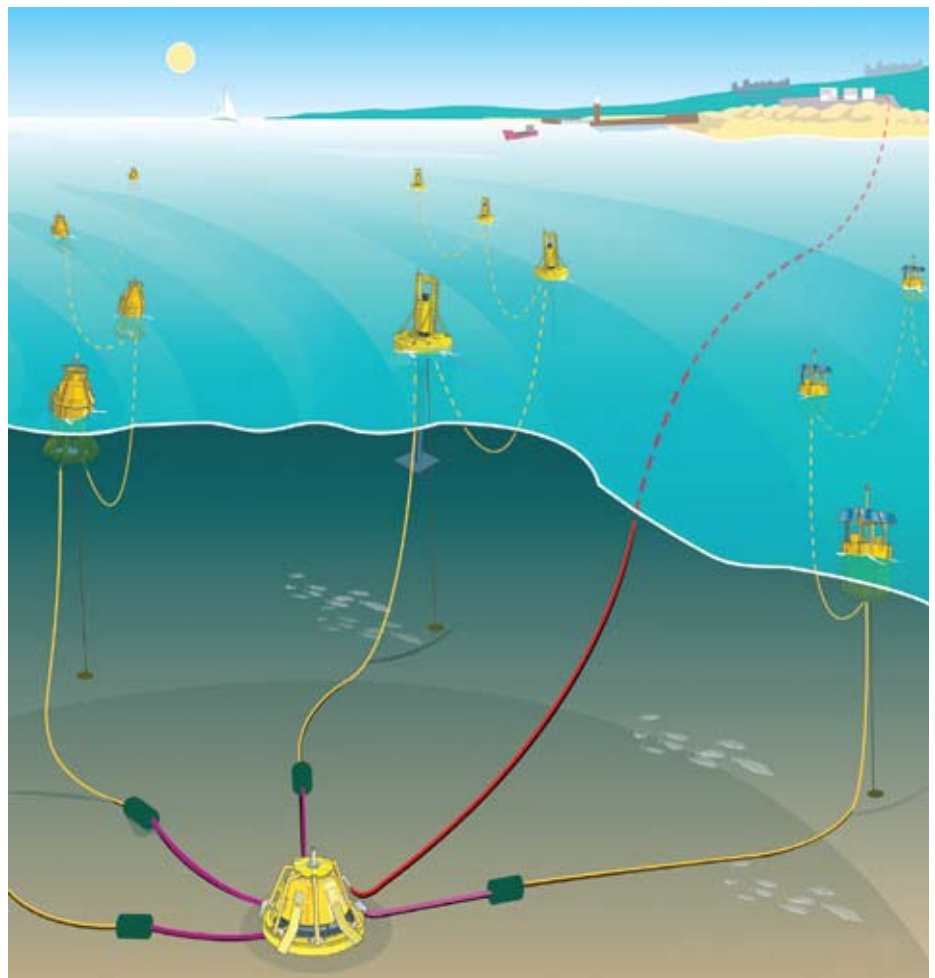
"We really stressed the package supply option to the customer. And we are doing full testing on the junction box itself before we put any of the components together," Fellows added. "We have the space, the facilities and the willingness to do that. So we are not just churning out cable onto a production carousel and onto an installation vessel, we are taking on all of this added value to provide our customer with a complete package."

Fellows also noted that the cable design for the Wave Hub is essentially for a static application although there is a dynamic element during installation when the cable leads from the hub to the various wave energy converters are lifted in place. They will then be set back down on the seafloor, where they will remain for most of the project's life.

JDR at the forefront of busy future for wave energy

One of the companies participating in Wave Hub is Ocean Power Technologies (OPT) with offices in the UK and the US. OPT will install an array of its PowerBuoys totalling up to 5 MW. JDR's Marine Cables division has worked on several of OPT's PowerBuoy projects around the world, providing dynamic power cables for its wave energy converters that use the rise and fall of the waves to move the buoy up and down. The resultant mechanical stroking is converted into electrical power by a power take-off to drive an electrical generator, which is transmitted to shore through a subsea power cable.

"We supply cables to OPT for their prototypes, demonstrator and test projects," said Han Van Veen, Marine Cables Managing Director, "and we are the exclusive provider for some of OPT's projects. This relationship



JDR will design and manufacture the subsea power cables for South West Regional Development Agency's Wave Hub project. (image courtesy of South West Regional Development Agency)

could turn out to be beneficial for both companies. OPT, for example, has test projects installed or planned for several areas. Among them are two off the coast of Oregon in the US, one in Coos Bay that could include up to 200 PowerBuoys, according to OPT, and the other off Reedsport, a commercial development with 10 PowerBuoys. The company is also testing its wave energy converters offshore Hawaii, in the Pacific Ocean, in an ongoing program with the US Navy.”

OPT also successfully tested a prototype PowerBuoy off the coast of New Jersey that will form the basis of future devices. The next generation PowerBuoy was the type installed in Hawaii and offshore Spain for OPT’s Santana project in September 2008. This project was completed in three phases. The first phase included the deployment of OPT’s PB40 (40 KW) enhanced PowerBuoy and nine PB150 (150 KW) PowerBuoys. Phase two included the Underwater Substation Pod (USP) to collect, network and transform the power, followed by the final phase, a 6km subsea cable to deliver the electrical energy to the grid.

In 2007, OPT was awarded a grant by the Scottish government for construction and installation of its PowerBuoy technology in the Orkney Isles. In 2008, OPT signed a berth agreement with the European Marine Energy Centre (EMEC) that provided for the deployment and operation of the company’s technology up to a maximum capacity of 2 MW.



JDR Marine Cables has designed and manufactured dynamic power cables for OPT’s PowerBuoy projects around the world. (photo courtesy of Ocean Power Technologies)

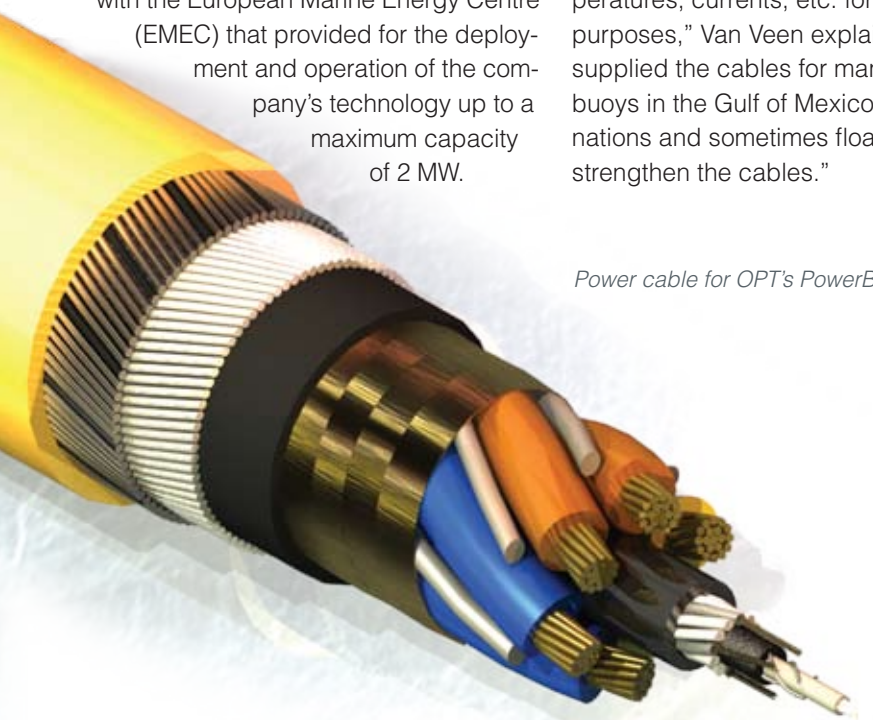
OPT is by no means the only company testing and planning wave energy projects. EMEC’s website lists dozens of such companies testing and providing numerous technologies in addition to electricity generated by buoys.

“There are about 140 wave and tidal projects around the world,” Van Veen said. “In addition to OPT’s project offshore Spain, we are working with other companies that want their projects to remain confidential at this time.”

Not all of the buoys for which Marine Cables provides equipment generate electricity from waves or tides.

“We provide the main cable and tether cable for Harris Oceannet and Mbari Moos, which has buoys all over the world with sensors to record temperatures, currents, etc. for scientific purposes,” Van Veen explained. “We supplied the cables for many such buoys in the Gulf of Mexico with terminations and sometimes floats to help strengthen the cables.”

Power cable for OPT’s PowerBuoy.



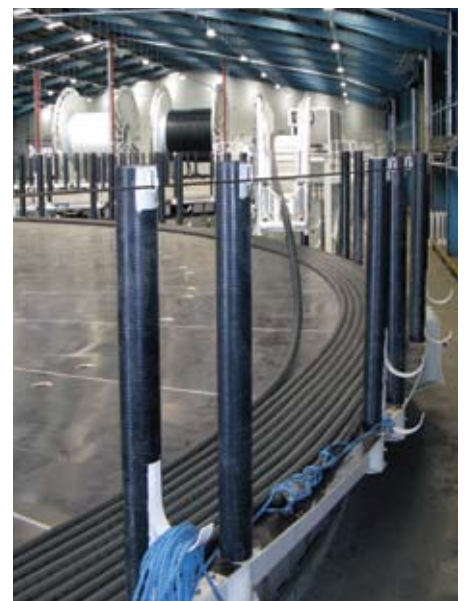
Building new manufacturing facilities, upgrading others

JDR Cable Systems is well positioned to become a major player in the offshore renewable energy market, not only because of its highly engineered and innovative products, but also because of its strategically located manufacturing facilities.

The company operates cable design, engineering and manufacturing facilities in several strategic global locations: the UK, The Netherlands and Thailand. Houston is the company’s group headquarters and also features JDR’s largest service centre in support of projects in North and South America. The company also operates service centres in Bergen, Norway, Aberdeen and Tianjin, China.

Hartlepool, England: To take advantage of the emerging renewable energy markets, JDR Umbilical Systems opened a new 10,000-sq-m, state-of-the-art facility in northeast England. It is the only site in the UK designed specifically to manufacture subsea power cables for the oil and gas sector and the burgeoning offshore renewable energy market. Its location at Hartlepool Dock allows cables to be spooled directly onto cable-laying and other installation vessels from two 2,200-tonne carousels located next to the quay.

“The new Hartlepool facility has been built in response to a significant



Spooling to 2,200 tonne carousel.



JDR's new Hartlepool manufacturing facility.

growth in demand from customers for our products and a move to expand our offering to the renewable energy sector," Umbilical Systems Managing Director Patrick Phelan said. "We believe this is the best location to serve the needs of our clients in the UK and continental Europe, as well as the east coast of the United States, West Africa and other geographies. We are further delighted to be able to make a significant contribution to the economy of northeast England," he added.

This contribution includes hiring locally to staff the facility at a time when

many companies around the world have reduced their staffing levels, sometimes significantly.

"We have a brand new facility to get up and running," said Steven Parfitt, Hartlepool's General Manager. "Most businesses are contracting in the UK, but we are bucking that trend. We are investing and growing and hiring.

"Over the next two years, we expect to employ 200 people," Parfitt continued. "We will have about 50 people by the end of this year. We also have an agreement with PD Ports that we can expand our facility up to three times

what we have now, and quite frankly, I think we will. To start up the plant and train new local hires, 25 people have been temporarily transferred from JDR's Littleport facility."

Hartlepool offers five all-tide berths along nearly 3,000 ft of dockside access with a depth of 28 ft at the berths and 16.5 ft water depth in the approach channel. Dockside facilities include three 63-tonne quay cranes with access to other cranes with 300 tonnes of lift capacity.

JDR offers lifecycle engineering and technical support to the evolving renewable market, and provides fully verified electrical and optical packages for a diverse range of applications. In addition to inter-turbine array cables for offshore wind farms, Hartlepool will produce export cables for wave and tidal energy, island link cables, subsea production umbilicals and subsea power cables.

Littleport: JDR's Littleport facility near Cambridge, UK is a 10,000-sq-m plant dedicated to supplying workover control umbilicals on fully integrated reeler packages, SSIV umbilicals, topside umbilicals and associated offshore products. Additionally, Littleport provides advanced design, engineering, project management, manufacturing, qualification testing and R&D. High pressure hoses for subsea production umbilicals manufactured at Hartlepool and at the Thailand plant in Sattahip are also produced in Littleport.

Littleport also provides full aftermarket services with dedicated support personnel, spare parts and equipment for offsite services ranging from project deployment, umbilical repairs, product modifications and general electro-hydraulic system support.

Krimpen: Marine Cables operates from a newly built 10,000-sq-m manufacturing facility at Krimpen aan de Lek near Rotterdam that was opened at the beginning of 2008. The facility provides more than double the production capacity of the previous facility. Additionally, the company has invested in both new production machinery and extensive upgrades to existing equipment. This high-quality working environment exem-



300 tonne / 9.2m diameter process reels.



Armoring line at Krimpen facility.

plifies another major investment in the company and reflects JDR’s uncompromisingly high standards.

“The company’s investment at Krimpen represents a significant commitment to the continued development of JDR Marine Cables’ unique range of products for the seismic, defence, oceanographic and renewable energy industries. Most of the tether and array cables required for the wave and tidal energy industries will be manufactured at this location due to their extensive experience in the design, engineering and production of dynamic cables for the offshore oil and gas industry,” said Pat Herbert, Group CEO.

The Krimpen facility features several innovative systems and processes that promote safe and efficient cable and umbilical design and manufacture. The company offers greater opportunities for fast-track project scheduling and considerable flexibility in product line configurations for special manufacturing requirements. Among the Krimpen plant’s capabilities are:

- Extrusion facilities for a wide range of profiles and insulation materials;
- Spacious and well equipped assembly areas with a high-level parts transportation system;
- Advanced machinery configurations to provide flexibility in manufacturing processes;
- Integrated high-specification qualification equipment and techniques;

- Hard and soft fairing applications and complete cable and umbilical termination facilities;
- Compliance testing facilities and client inspection areas; and
- Quayside location for vessel load-outs.

Sattahip, Thailand: Umbilical Systems’ Thailand facility supplies long-length subsea production umbilicals, subsea power cables and associated products for the oil and gas industry. The facility can also provide power cables and umbilicals for the renewable energy industry. The site is located at the Thai Naval Base at Sattahip, and is the only umbilical supplier in the Asia Pacific region.



Thailand subsea production umbilical loadout.

The 5,000-sq-m facility houses specialised extrusion, braiding, cabling and armouring machinery and spooling capabilities up to 300 tonnes located on a 12m deep quayside berth for direct load-out to installation vessels. A skilled workforce results in umbilical and power cable systems that are custom engineered and offered in a complete system package with installation support and repair services.

Aftermarket service and repair centres

JDR provides custom repair, re-termination and service support for its clients’ projects around the world.

“Our global aftermarket support differentiates JDR from others,” said Martin Charles, Director, Aftermarket Services. “We install, maintain, repair and test the cables with our vast network of experienced engineers that operate from a strategic infrastructure of service support facilities. Also, based on JDR’s expanded product offerings, we in service are working hard to develop an integrated approach to our service support and have developed system support for our workover reeler products, which include umbilical and reeler maintenance and repairs. In some cases, we have performed repairs and maintained cables manufactured and installed by other companies, who may not see that as part of their business model,” Charles continued. “And we offer 24x7 service and support globally.”

The JDR Aftermarket group operates across the globe while supporting customers from a number of regional and local strategic hubs. The Aftermarket group operates with a high level of synergy, which allows JDR to react quickly to regional call-offs while ensuring that additional resources and specialist equipment and tooling can be backed up to meet any demand. JDR’s global team of field service engineers are developed with a range of competencies including hydraulic, electrical, fibre optic and HV skills.

The Houston operation supports projects and clients in North and South America and other parts of the world. A

team of highly skilled and experienced project management and engineering staff provide technical and design support. Fully qualified service engineers provide immediate technical assistance for onshore and offshore commissioning, testing and repair work for umbilicals and related products, including the emerging renewable energy segment products.

Houston is the largest Service Centre and provides cost-effective assembly, integration and factory acceptance testing (FAT) of umbilicals, reelers and associated equipment. It features a 15,000-sq-ft facility for assembly, integration and testing of umbilicals, power cables and associated products. There is also a 20,000-sq-ft external yard for testing, staging and storage.



DNV certified workover control reeler system.

The UK-based Littleport Service Centre operates from the UK Umbilical Systems headquarters and manufacturing facility. A large team of field service technicians operate there and are supported by a team of office-based service support engineers who provide new project field support around the world during installation and hook-up and testing as well as service support such as re-terminations, repairs, in-field splicing, etc. The Bergen Service Centre serves the North Sea with a highly trained and experienced group of technicians who operate both within the workshop or offshore supporting all JRD products and in particular Workover Reeler systems and umbilicals.



Intervention Workover Control System (IWOCS) umbilical.

The Littleport, Houston and Bergen Service Centres offer API 17E compliant hydraulic umbilical testing, including pressure testing, NAS fluid cleanliness testing and flow rate testing, as well as API 17E compliant electric cable testing, including crosstalk, inductance, capacitance, insulation resistance, DC resistance, DC high voltage and TDR. Re-termination, splice and repair of umbilicals and electric cables are also performed.

Other service locations include Aberdeen and Tianjin, China. The Aberdeen office offers a local marketplace office-based service, while in China, JDR offers a complete service and repair support centre for the fast-growing Far East region. The well-equipped facility provides local engineering resources capable of providing a full range of flushing, testing and re-termination services.

Quality, reliability and safety are second to none

All JDR products are built to exacting industry standards. Standardised training programs have been developed and implemented across the company to ensure that every employee thinks in terms of zero defects. Because most of the company's design, engineering and manufacturing capabilities are for a highly innovative, dynamic industry, the company also conducts periodic internal audits to assure that all of its processes are in accordance with industry standards of workmanship and that its engineering and support processes are at a level to ensure that its total delivery of products to the client is of the highest standard in the industry.

The company's test facilities provide the capability to conduct compre-

hensive qualification and acceptance testing of its products to the most rigorous international standards, including ISO 13528-5 (API 17E); SAE; LRS; DNV and ABS. The Krimpen facility complies with NATO Standard APAP-110, covering all design, development manufacturing, testing and servicing activities.

All manufacturing facilities are approved to the Quality Management Systems standard; ISO 9001:(2008) by Lloyds Register of Quality Assurance. In addition, JDR has in place an integrated organizational structure with procedures that are based on the OHSAS 18001 Occupational Health & Safety Management Systems standard, and the ISO 14001 Environmental Management Systems standard. The new Hartlepool facility is currently undergoing review for certification to ISO 18001 and ISO 14001.

JDR is defined by our offshore DNA

"JDR's evolution from the oil and gas sector to renewable energy sources brings proven reliability and technology to the forefront of every major renewable energy project. Since our formation, we have chosen to build depth rather than breadth in our products, thus, we are uniquely qualified to meet the growing demand for reliable subsea power cables for the growing renewable energy market.

"JDR has the design and manufacturing expertise to minimise risk, the experience to ensure reliability and the dedicated facilities and personnel to deliver our products on time in accordance with best industry practices."

Pat Herbert, Group Chief Executive Officer, JDR Cable Systems (Holdings) Ltd. ■



PROVIDING THE VITAL CONNECTION



JDR is a leading worldwide manufacturer of custom-designed subsea power cables, umbilical systems and towed marine cables for a broad range of applications in the oil and gas sector and the growing offshore renewable energy industry.

For more details, please visit our website at www.jdrcables.com