

Giuli: a world-class supplier of stainless, duplex & nickel alloy grades for the energy industry

Stainless Steel World last visited Zhejiang Jiuli Hi-Tech Metals Co., Ltd. in May 2011. This time we are back to talk to Mr. Denny LEE, Deputy General Manager; Mr. XiaoFeng ZHU, Vice General Manager of Sales Dept.; and Robin WANG, International Dept. Manager, about Jiuli's service to the global energy industry – ranging from conventional energies such as oil & gas and refineries right through to 'clean' energies like nuclear and wind power, solar power, and especially LNG. We look at their capabilities, in these industries and the sound strategy choices that have been used to move Jiuli in this business direction.

By Juan HUANG and John Butterfield

Changing Chinese energy needs and specifications

"The fact that Jiuli is increasingly moving into energy markets is sound business strategy," Mr. XiaoFeng ZHU, Jiuli's Vice General Manager of the Sales Dept. tells us.

"I have been in the stainless steel industry for upwards of thirteen years and have never seen a downward swing in this application field. As an example, in 2012, the sales of small cars alone in China exceeded twelve million, which naturally

only increases the demand for gasoline and diesel oil. However, the drive for more energy necessarily brings additional pollution with it. For instance China is heavily dependent on coal-fired power stations with still many pollutant

Natural gas exploitation

Mr. ZHU: "We have supplied products for a Middle East project owned by Petroleum Development Oman (PDO). The natural gas along the Gulf of Oman has a high salinity. As a result, duplex was chosen for the pipelines. We successfully delivered 281 kilometers of duplex line pipe to API standards for the project. This is just one way in which we are serving the energy industry."

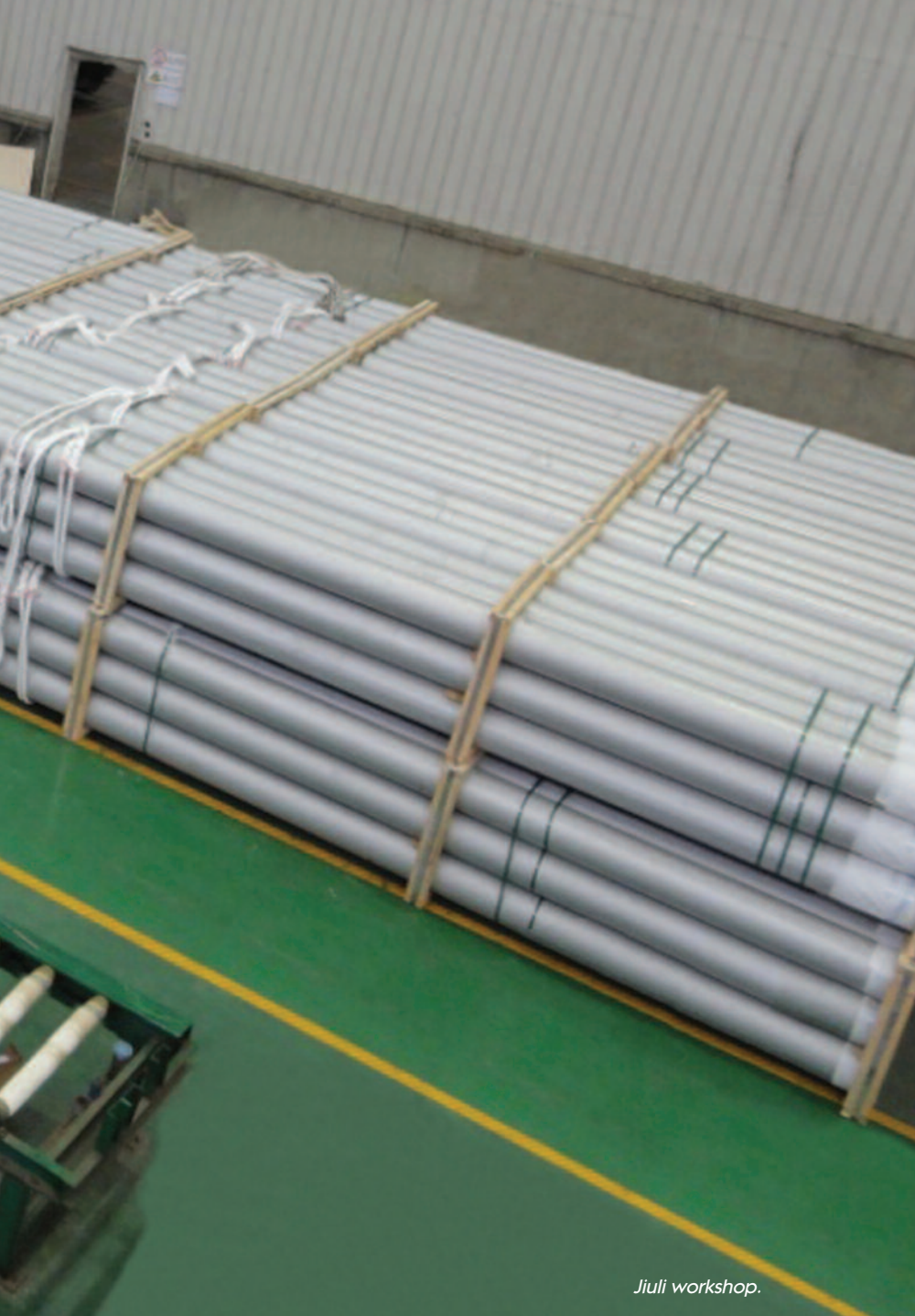
In the domestic market, Sinopec's and CNPC's gas exploitation faces similar problems. By exploiting ever deeper natural gas wells, the challenges imposed from corrosion increases due to the higher pressures and temperatures encountered, not to mention the increasing severity of corrosion due to the salinity, H₂S and sulfur. So quite understandably the material requirements for the oil and gas exploitation industry are now higher than before. In the past, 13Cr was used. Today it is mainly alloy G3 and 028 and other nickel-based alloys like 825 that are used. Jiuli supplies these materials to Sinopec and other domestic companies. Robin WANG: "In addition, we have recently supplied some nickel alloy 825 line pipes to a large-scale natural gas facility in Turkmenistan."

Petrochemical industry

Sinopec and CNPC used to use carbon steel in the petrochemical industry. However, since crude oil imported from the Middle East has a higher salinity and sulfur content, they have upgraded to Stainless Steel, Duplex and Super Duplex, Nickel Alloy 825, and even 625. With our improved production capability, we are now able to supply normal-sized furnace tubes and piping in these materials. They are also being widely used for heat exchangers and air coolers in refineries.

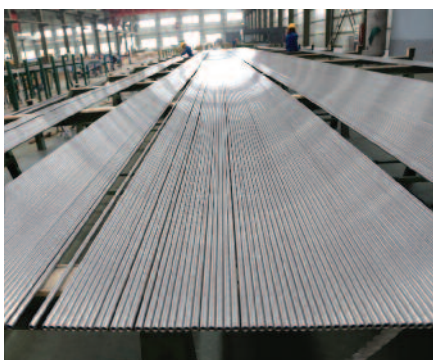
Offshore exploitation

Nowadays, there are more and more offshore natural gas exploitation projects. Offshore exploitation conditions are more complicated and hazardous, having to take into account seawater, chloride corrosion, and corrosion from the natural gas itself, thus, higher grades of materials like 22Cr, 25Cr, 28Cr, 825, and G3 are required. We manufacture tubes and pipes in all these grades.



Jiuli workshop.

emissions. Moreover, this January, twenty-five days of the thirty-one were hazy in Beijing, one of the main reasons being automobile exhaust fumes. To reduce the pollution to the environment



Seamless heat exchanger tubes in 24 m lengths for a chemical project in Ningxia, China.

from coal-fired power plants and automobiles, there is an increasing public demand for 'clean' energy. To date solar energy and wind power do not seem to play a significant role in solving China's energy needs. However, LNG does seem to have a very bright future as does natural gas."

In addition, as more easily exploitable reserves of light crude oil are exhausted in China, there is a need to extract oil and natural gas from more inaccessible reserves in deeper and more corrosive environments. Providing the stainless steel & nickel alloy grades to meet the demands and specifications of companies working in these fields is increasingly becoming a core activity of Jiuli.

Jiuli has, moreover, plans to develop clad pipes, and is currently developing steel-tubed umbilical cable from Duplex 2205 with other partners. They have already supplied heavy-walled pipes in Super Duplex 2507 to the riser pipe system of an offshore project owned by Shell.



API 5L CRA welded line pipe LC80-2507 ready for delivery for Shell offshore project.

“We have recently supplied stainless steel pipes to two of Petrobras’ FPSOs through the contractor, SBM,” says Robin WANG. “The products have been installed into the prefabricated units. In addition, in 2011 we delivered Super Duplex and N08825 pipes to the platform of ONGC. Additionally, Abu Dhabi based company AMDA-OPCO has approved us as a supplier and has placed an order for Nickel Alloy 625 tubes.”



N06625 instrumentation seamless tubing for a AMDA-OPCO offshore platform in Abu Dhabi.

Jiuli also intends to meet end-user HSE standards for fire fighting systems on offshore platforms and floating production vessels, which may require Duplex 2205, 2507 or 6Mo, and other high-performance alloys.

Clean energy

“Jiuli’s R&D work is also closely tied in with the need to produce clean energy, following developmental trends,” Denny LEE tells us. “We are actively involved in the new thermal power technology and aim to help make the industry cleaner. For example, we have successfully developed

a boiler tube known as S30432 and S31042 for use in ultra-supercritical power generation units and these have been successfully and intensively used in the Datang Power Plant for over three years.”

In the nuclear power industry, Jiuli is supplying not only peripheral piping products, but also core components like steam generator tubes. They have achieved volume production with this product and are currently supplying them to a fabricator in China. Additionally, they also supply bulk volumes of titanium tubes to nuclear power plants and they have many experience supplying stainless steels tubes for solar and wind power industries. To the latter industry, they have supplied nickel-based alloys and austenitic stainless steel tubing for the polysilicon hydro-chlorization system increasing the efficiency of electricity power and saving costs.

LNG

In 2012 Jiuli received an order of more than 1000 tons of 304L heavy-walled welded pipes (size: OD 1067 mm, 12 meters long) from CNPC’s Tangshan LNG Terminal, which has been appointed by the Chinese Government to supply LNG to Beijing by December 2013. These pipes, used as a loading arm, play a key role in the terminal. Delivery of the order will be completed before May 2013. Production time was only three months and Jiuli’s timely delivery will have a positive effect on the terminal’s ability to deliver LNG on time.

Jiuli has also supplied similar pipes to other LNG terminals such as in Ningbo, Shanghai and Guangdong. Until recently these establishments relied on imported products, which are more expensive and normally required longer delivery. These companies’ specifications were not easily met. However, Jiuli managed to exceeded international standards both in terms of product size and flexibility in delivery. For example, the CNOOC Ningbo LNG Terminal ordered a small number of these pipes very urgently out of working hours. Jiuli delivered them onsite within 48 hours and received an ‘Excellent Supplier’ award.

“We’ve also been serving overseas LNG projects” says Robin WANG. “For one of the world’s largest LNG projects – the

Gorgon Project in Australia – we supplied both seamless and welded pipes, and fittings. Our customer is very satisfied. Similarly, we are supplying piping products to ExxonMobil’s LNG project in Papua New Guinea, and instrumentation tubes to Barzan LNG Project in Qatar owned by ExxonMobil and RasGas.”

“In addition to supplying LNG terminals,” says Denny LEE, “we recently received an order for pipes for four LNG ships from the Hudong Shipbuilding Company. This shows that we have the capability to supply the grades needed for the whole industry supply chain. In the future, we intend to expand our supply to LNG ships and stainless steel pipes for Chinese city gas pipeline networks.”

Another highlight has been supplying to the world’s first FLNG owned by Shell. The requirements on these products were more critical than that to LNG ships and Jiuli believes that the experience they have gained will help them with future projects.

Full range of products

“It is worth emphasizing”, says Mr. ZHU “that on the world stage, there are not many companies like Jiuli who are able to supply a full range of piping products from large to small O.D, from thin to thick wall, from commercial stainless steel to duplex, nickel alloy and titanium. The reasons why we can do this are because of our heavy investments in production and testing facilities, and R&D. We want to be at the forefront of industrial developments and we do this largely through the Jiuli R&D Center .



A comprehensive range of pipe fittings.

Jiuli Pipe Fitting Co., Ltd., as a subsidiary of Jiuli Hi-Tech Metals, can offer an extensive range of pipes fittings in Stainless, Duplex/Super Duplex and Nickel Alloy Grades and has been approved by Sinopec, CNPC, Saipem, Fluor, BASF, etc.



Jiuli produces large OD (up to 711 mm) seamless pipes with heavy walls (up to 65 mm).

Expanding duplex products

Jiuli has taken up a leading position in the manufacture of duplex. It reserves its largest capacity for duplex pipes and, compared to even two years ago, they claim that their understanding of duplex and their quality has increased substantially. Denny LEE: "Welding it used to be difficult for us but the experience we have gained by supplying more than 10,000 tons of duplex pipes in recent years has solved this challenge. We have gained approval for our duplex products from many multinational oil companies. For example, ExxonMobil approved our stainless steel tubes/pipes several years ago but at that time did not have the intention to purchase duplex products from China. However, over the years we have built up trust together through the projects we have worked on, and they have started to use Jiuli's duplex tube for their heat exchangers."



API 5L CRA welded line pipe LC65-2205 supplied by Jiuli at a PDO project site in Oman.

About precision instrumental tubing

Precision instrumental tubing is an important business and investment project for Jiuli. They have a specialized plant for their production and they supply to domestic System Integrators and foreign customers.

Closing the gap with western competition

In recent years, Jiuli has been approved by more and more end users, giving its products access to the world's marketplace. Last year, for the first time, their exports exceeded 30% of their sales. Nevertheless, their priority still remains the domestic market.

Mr. ZHU: "We do not want to dump or disrupt foreign markets. Our target is to build Jiuli into a world-class enterprise. There is still a gap for us to close behind some world-class companies, especially in fundamental research, but we are catching up fast. The investment direction determined by the management team has proven to be the correct one, and in accordance with market trends. These technical developments also go arm in arm with our determination to not only ensure that employees receive good training and career possibilities but that they are well motivated and get satisfaction from what they do. The human resource factor is very important for us."

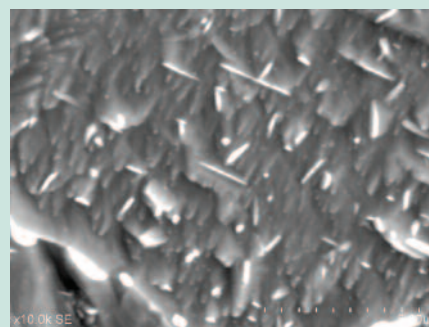
Conclusions

Today Jiuli's products are roughly made up of 60-70% austenitics, 20-30% duplex

and super duplex and nickel alloys, titanium, and other special materials make up 10%. They concentrate on high-end products, whilst still offering commodity products and services. During the past ten years, their sales have increased tenfold, which clearly shows that they serve their clients very well. Denny LEE: "Over the past years we have continuously improved ourselves and these findings have been supported by overseas visitors. We have not only improved our facilities and output, but also our philosophy, awareness and services. In 2011, Shell chose us as a long-term supplier of tubes/pipes. It was not just our manufacturing that attracted them, but also the consistency in our quality and HSE and our ability to service them well no matter the size of the order. This comes across in our mentality of being a world-class supplier. By working with world-class end users, we have, moreover, benefitted not only in sales growth, but also in management improvement. When having to work to the world's most critical standards, you naturally to improve yourselves in many fields at the same time. For ourselves, we are very proud of our accomplishments but will always want to do better."

Jiuli R&D Center

The Jiuli R&D Center was established in May 2011. Its main activities are: application research into the sustainability of products under tough working conditions like high temperatures and pressures by using test simulations; material innovation by which new materials are developed and tested for new application fields; and a center for new product development. Because of these factors it is able to provide clients with very sound advice in their material choices. It is therefore not surprising that Jiuli has invested heavily in the facilities and it further has state-of-the-art electron microscopy and failure analysis equipment, for example. The Center forms the hub for all production, technical and quality control issues and currently employs 120 staff of whom one in six has a Ph.D. or Masters degree. This total will rise to 150 shortly.



Analyzing precipitated phase of N08028 at 10000X magnification under Scanning Electron Microscope in the Jiuli Lab.