

Major Projects – Caspian Sea



These two maps show the Caspian Sea and surrounding region, followed by a close up showing the major oilfields off and onshore in Azerbaijan.

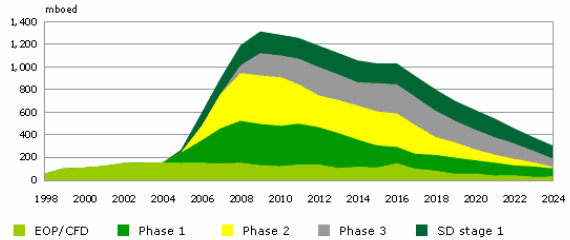
During the construction of phases two and three, Metrode have supplied huge volumes of duplex and superduplex welding consumables to major contractors: -

- Zeron 100X – TIG, MIG and SAW**
- 2507XKS – MMA**
- 2205XKS – MMA**
- Supercore 2205P – FCW**
- ER329N – TIG & SAW**
- SSB – Flux**

The Chirag field has been in production since 1997, phase 1, the central Azeri Field, is on track to start up early 2005, with oil from phase 2, The West & East Azeri Fields currently planned to come onstream in 2006/07. The third phase will concentrate on the development of the deepwater

section of the Gunashli Field and is due to come on stream in mid-2008. The full field development with reserves of 5.4 billion barrels will require seven offshore structures and over 400 wells.

ACG and SD stage 1 production



With our existing track record on this and other major offshore projects over many years Metrode is well positioned to expect significant sales over the next few years.

Dragon LNG Terminal – Milford Haven

Dragon LNG is a joint venture between Petroplus, BG Group (a part of the former British Gas) and Petronas of Malaysia. Dragon LNG will develop a terminal for the importation and storage of Liquefied Natural Gas (LNG) at its allocated land area at Waterston, Milford Haven. The Waterston site was formerly the Gulf Oil Refinery which operated from the mid 1960's until 1997, when refining operations ceased. Petroplus acquired the site in 1998, when it purchased Gulf Oil Refining Ltd. UK from Chevron. Since that time the site has operated as Petroplus Tankstorage Milford Haven Ltd., providing storage and other services relating to the oil and energy industry.

LNG will be delivered to Milford Haven from Q3 2007 by marine vessels, called LNG carriers (LNGC's) in the LNG industry. These are specially designed double hull vessels that have large insulated storage tanks to contain the LNG. Compared to normal oil and oil-product tankers LNG carriers tend to have a smaller draft and more freeboard due to the modest weight of the cargo.

The LNG carriers will be brought into the Haven like normal oil and gas tankers with adequate tug assistance, turn as necessary and berth against a dedicated LNG jetty. This dedicated LNG jetty is formed by conversion and part re-build of the former jetty no 1 of the refinery.

Once securely moored and after connecting the metal unloading arms, LNG will be pumped ashore into two storage tanks (as per initial development). These storage tanks act as buffer

to link the discontinuous arrival of LNG carriers with the continuous 24 hours and 365 days per year process of vaporisation of LNG and sending out of Natural Gas into the National Transmission System (NTS).

The storage facilities for LNG and the adjacent process plant units have been located within the existing operational site and adjoining land that Petroplus owns.

The initial development phase of the Terminal consists of two LNG storage tanks and re-gasification equipment to store 308,000 m³ of LNG and process per year some 4.5 million ton of LNG to create approximately 6 billion cu m of Natural Gas into the National Transmission System.



Artists impression of how the site will look in 2006

In our two previous newsletters we have looked at the history and development of our range of 'CF' (controlled ferrite) welding consumables specifically designed for service down to -196°C.

In December 2003 we concentrated on the **Ultramet 308LCF** and **316LCF** MMA electrodes, originally developed for the SAGE project terminal in St.Fergus. In June this year we looked at our **Supercore 308LCF** FCAW which was developed and then almost immediately specified for use on the Isle of Grain LNG terminal, again in the UK.

We are now introducing 'CF' solid wires for TIG and SAW for 308 and 316 LNG applications, ensuring that Metrode will probably be in the unique position of offering specifically manufactured (and not batch selected standard austenitic grades) consumables for every welding process.

Visit the Metrode website News section at www.metrode.com to view copies of this and previous newsletters. The technical literature section also includes copies of two recent papers we have presented on the subject of Welding Consumables for Cryogenic Applications.

Buzzard Oil Field – North Sea



EnCana (U.K.) Limited operates the Buzzard development - one of the U.K.'s most significant development projects in the past decade.

In June 2001, EnCana Corporation announced encouraging results from a discovery in Block 20/6 in the UK Central North Sea, some 100 kilometres northeast of Aberdeen. The well, drilled by EnCana Corporation's UK subsidiary, EnCana (U.K.) Limited using the semi-submersible rig Ocean Nomad (see photo), initially encountered a 400-foot gross oil column, which tested at 6,547 bbl/d and one MMcf/d of gas. A subsequent sidetrack extended the oil bearing sands 4,400 feet to the east and increased the gross oil column to 750 feet.



Ocean Nomad testing the Buzzard discovery.

Not only is it one of the largest North Sea discoveries in recent years with over a billion barrels of oil in place; it is also one of the fastest to be sanctioned for development by UK authorities. The field has been approved for development a mere 30 months after it was discovered.

Metrode Products Limited – December 2004 Newsletter



Metrode are supplying considerable volumes of **Zeron 100X** during the fabrication of the Utilities and Production Decks of the Buzzard Field.

BP have been awarded the contract to transport and process oil from EnCana (U.K.) Limited's Buzzard field through the Forties Pipeline System.

This is the biggest field to enter the Forties Pipeline System for 10 years and first oil from Buzzard is expected to start flowing through the system in late 2006, rising to a plateau rate of around 180,000-190,000 barrels per day.

The physical connection to the Forties System will be made by means of a new 18" diameter pipeline link and a sub-sea hot tap into the main sealine about 60 kms from the Scottish Coast. Production from fields using the system will not be affected during the course of the tie-in work, which is scheduled to be carried out in summer 2004.

The Forties Pipeline System is owned by BP and commences at the Forties Charlie platform with landfall at Cruden Bay, Aberdeenshire. The pipeline then continues to the processing terminal at Kinneil, adjacent to BP's Grangemouth complex in central Scotland. Crude oil is shipped from the Hound Point terminal on the Firth of Forth.

The Forties Pipeline System was constructed for the development of the Forties Field and first production occurred in 1975. In the early 1990's the Forties system was expanded to 1150 thousand barrels per day capacity with a focus on providing pipeline transportation to companies developing and operating fields throughout the North Sea.

Ineos Chlor – Genesis Project



Fifty million pounds worth of Regional Selective Assistance has been awarded to chlorine manufacturer Ineos Chlor to help modernise its Runcorn facility on Merseyside. The plant produces 80% of the UK supply of chlorine, a chemical which cannot be imported in bulk. The

modernisation includes; the installation of modern membrane cell technology for the production of chlorine and caustic soda from brine; building a new, more efficient, steam-generating plant; and the installation of modern computer control systems.

Ineos Fluor – Tiger Project



Tiger is the name given for the Project to manufacture the new power station & Ethylene Plant at the Ineos Fluor site at Runcorn.

Local fabricators and the local Metrode Distributor are ensuring a huge range of Metrode consumables are being used on both these projects.

The Best just got better!

The latest issue of the Metrode Technical Handbook has just been published.



It is the same A5 size and basic layout as in recent years but with one or two new features: -

- Conversion tables
- Page numbers throughout including the 3 indexes
- Thumbnail colour coded blocks to separate each product group visible on the foredge of the book.

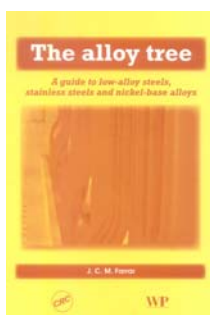
With 324 pages, 260 products and 591 consumables specifications referenced our Technical Handbook continues to be the best in the business. Copies are available on request from your sales contact.

**Stainless Steel World America
2004 Conference & Expo**

This year, no less than 43 companies exhibited at the Expo, up to 800 visitors found their way to the Expo floor and over 200 delegates attended the Conference between 20th-22nd. Graham Holloway attended the conference and presented a paper on Stainless Steel Welding Consumables for cryogenic applications. This paper is available on our website and is located in the News Section.

**The Alloy Tree – A guide to low-alloy steels,
stainless steels and nickel-base alloys**

There are certain key alloys, stainless steels, nickel alloys and low alloy steels that are of paramount importance to the power generation, petrochemical and oil and gas industries. In one fully comprehensive guide, *The alloy tree* addresses the significance of such alloys and their role in these fundamental industries.



The book was written by Chris Farrar, former Technical Director of Metrode and begins with a short introduction and a master flow diagram, the "alloy tree", which shows the interrelationship between the main alloy groups. This is followed by ten chapters, each describing how stainless

steels, nickel alloys and some low alloy steels have evolved from plain carbon steel. Adopting a narrative style, each chapter explains the background, development, key properties and applications of the alloy type. Abbreviations, specifications, product forms, alloying costs and types of corrosion are covered in the extensive appendices and a full bibliography and sources of further information conclude the book. *The alloy tree* will be an important reference for Metallurgists and Materials Engineers and for those mechanical and chemical engineers who have an interest in the alloys used in their industries.

The book is available from: -

Woodhead Publishing Ltd
Abington Hall
Abington
Cambridge
CB1 6AH
UK

Code Number – ISBN 1 85573 766 3

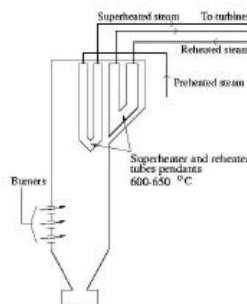
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Drax Power – Eshete 1250



**Austenitic stainless steels in steam power
generating plants**



The part of a steam power plant we are interested in can be (that's simplistic) seen as a huge kettle. In the superheater tubes, high pressure 'water' circulates and is heated to temperature around 650°C before being sent

to the turbines. There is interest in constantly increasing the service temperature, as this improves the efficiency of the plant.

The material used for superheater tubes must have excellent corrosion and **creep resistance**. *Creep* is a time dependent deformation under a stress which is below the yield stress of the material (that is the stress above which a material undergoes 'instantaneous' plastic deformation).

There are several creep mechanisms, which become predominant under different temperature and stresses. For example, at low stresses and relatively high temperatures, creep deformation will be essentially due to the movements of vacancies (holes in the atomic arrangement) from the region under tension to those under compression, where they have a lower energy.

At higher stresses, *dislocations* can move, but the stress to which they are submitted is not large enough for them to pass the obstacles. To pass

Metrode Products Limited – December 2004 Newsletter



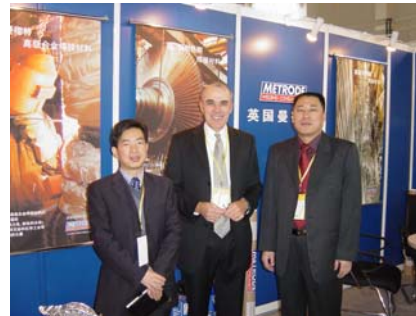
the obstacle, they must climb (and this process again involves diffusion of vacancies).

Creep resistance is therefore enhanced if there is a fine dispersion of particles in the matrix, that is many obstacle for the dislocations. A way to achieve this which has been exploited for many years is to add to the steel elements like Ti or Nb, which combines with the carbon or nitrogen present in the steel to form a very fine dispersion of particles in the grains. But all precipitates are not beneficial to creep properties, either because they form coarse precipitates on the grain boundaries, or because they remove solute elements from the matrix (elements in solution also contribute to the strength)... It is therefore important to be able to predict which phases one can expect to form for a given composition of steel.

Drax Power Limited owns and operates Drax Power Station, the largest, cleanest and most efficient coal-fired power station in the UK. The output capacity of their six generators is 4,000 megawatts, and currently provide enough power to meet 7% of the UK's electricity needs.

The superheater tubes at Drax are made from a special creep resistant austenitic stainless steel called Eshete 1250 and Metrode has recently completed an order for nearly 3 tonnes of matching TIG Wire.

a very successful show for Metrode, as well as our friends and colleagues in the industry, and we are looking forward to a further good year in 2005"



Beijing Essen 2004



After 17 years development, Beijing Essen Welding & Cutting Fair has become the 2nd largest professional welding show in the world with over 13,000 sqm of exhibition space and over 400 exhibitors from 14 countries and regions.

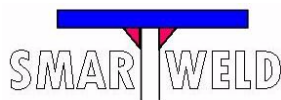
The Metrode stand at the exhibition proved very popular with many visitors from existing and new customers, from China and its neighboring countries. Alex Morton, Metrode's Managing Director, who attended the exhibition together with our whole team for the China Market commented; "this Beijing-Essen Fair was definitely



12th to 17th of September 2005!

The SCHWEISSEN & SCHNEIDEN in Essen - more than just a fair, rather a legend. Why? For over 50 years the market, the know-how and the users from all over the world have been coming to the Olympics of welding engineering every four years. Once again Metrode will be exhibiting and we will have more news in our next newsletter in June 2005.

Smartweld Project - Closing Views



In our July 2002 newsletter we introduced the Smartweld Project which brought together Eastern European developments in welding technology and Western European expertise in scientific evaluation, manufacturing quality, and power plant management. The three year project was coordinated by Metrode and is now complete.

The primary objective of the SmartWeld project was to develop welding consumables and procedures suitable for the welding of creep resisting steels without the need for post weld heat treatment (PWHT). There is an ongoing need throughout Europe to upgrade obsolete and inefficient fossil (and nuclear) power stations to increase service life, improve thermal efficiency and reduce emissions, particularly CO₂, SO₂ and oxides of nitrogen. All of this requires replacement of obsolete or time-expired equipment and pipework on site. The ability to carry out this work without the need to carry out PWHT on site (or possibly in the workshop) would result in major time and cost savings.

P91 New Applications

Whilst P91 has been extensively used within the power generation, it's use in the hydro-carbon industries is relatively new. Western Australian based fabricator Specialised Welding (WA) has recently completed and delivered three radiant section reformer coils to the Altona Refinery (ExxonMobil) in Victoria.

The coils were fabricated from 125nb ASTM A355 grade P91 pipe, 350 & 450nb ASTM A355 grade P22 headers with ASTM A312 grade 310 support legs and 253MA hanger brackets. These materials required the qualification of welding procedures that met the very restrictive ExxonMobil requirement of 260BHN (max) for butt welds.

All materials were subject to positive material identification at all stages of fabrication. All production welds were registered by QA, all of which being subject to: -

- Strictly controlled welding preheat and interpass temperature
- Post weld heat treatment
- 100% positive material identification (PMI)

- 100% radiography and magnetic particle testing (RT/MT)
- Hardness survey
- Full document control of welding operation.

Specialised Welding further enhanced their already excellent reputation by: -

- On time delivery of a 'fast tracked' project
- Another 1st in the Australian Welding Technology
- Welding P91 CrMo to below 260BHN
- Dissimilar welding of P91 to P22

Welding consumables for the project were supplied via Metrode's exclusive Distributor in Australia; Specialised Welding Products.



The Reformer Coils during fabrication

9CrMoVN TIG
AWS ER90S-B9
Chromet 9MVN MMA
AWS E9015-B9



End of Year

Another year has gone by and we would like to thank all our customers for their business during 2004. We would also like to wish everybody seasons greetings and a very happy and prosperous 2005.

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