Excellence is a habit

“Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act but a habit.”

Aristotle (384-322), philosopher

Thanks, Ari, for explaining in a few words that what we try to do every day at BONO is excellence. We put the utmost efforts in doing the right things since 1958, when our Company was founded.

Our customers – thanks, folks, we wouldn’t be here without your continuing patronage – have exploited for decades some of our innovative solutions, optimizing their investments in Energy and Water Treatment processes. They came back with more business, and, because of training and habituation, we responded with more right things, repeatedly.

Read in this Cannon News some of the latest results that we have achieved for (and with) our clients in two very competitive and demanding fields: Power and Oil&Gas.

With consolidated reserves totalling 16.4 Billion barrels of oil and natural gas and 85,000 employees, Petrobras is the seventh biggest energy company in the World. Petrobras has expanded its operations, aiming to be among the top five integrated energy companies in the world by 2020, based on the key principles of profitability, social and environmental responsibility, and integrated growth.

The qualification procedure to become a Petrobras supplier is very tough: only the best have a chance to compete for their contracts, and being approved by them is the only way to apply for the bids launched by numerous EPC’s working for the Brazilian giant around the World.

Petrobras, the giant Brazilian oil company, obtained the qualification in the vendor list of Petrobras, the giant Brazilian operator in the Oil&Gas field. BONO Energia, part of a small group of companies that produce petro-chemical and polymers industries, has positively extended its range of products, aiming to be equivalent (BOE) a day. Its oil production in Brazil is higher than Brazilian demand and domestic refineries’ processing capacity. As it develops its existing reserves, makes new discoveries in the pre-salt layer and builds five new refineries, Petrobras will become a major exporter of oil and oil products in the coming years.

Only the Best Suppliers!

The qualification procedure to become a Petrobras supplier is very tough: only the best have a chance to compete for their contracts, and being approved by them is the only way to apply for the bids launched by numerous EPC’s working for the Brazilian giant around the World. BONO Energia has been working hard in the past two years in this complex qualification procedure, that has positively ended on April 2013 with the emission of the official certificate by Petrobras. BONO Energia was admitted in the vendor list for three classes of heat generators: water tube boilers, fire tube boilers and heat recovery units. The use of steam is widely diffused in the refineries, supplied at any level of pressure and temperature. This fits perfectly with the range of products made by BONO, that also bears a very hot fluids at low pressure in specific applications of the petro-chemical and polymers industries. The qualification process is now undergoing for ARTES Ingegneria – the Group’s water treatment Division very active with innovative and proven solutions for the Oil&Gas field. BONO Energia welcomes now all the requests for bidding relevant to their approved series of thermal machines and boilers!
Leading oil companies are particularly active in the offshore development nowadays. Supported by technological progress and boosted by the difficulty in accessing new conventional reserves, they have found the solution for their production growth in complex systems as oil and gas fields characterized by ambitious depths, even more than 3,000 meters. The technologies involved are advanced, challenging and expensive as a result of the high pressure requested, the long distance from the coast and sea currents in deep water. The consistently high price per barrel for oil encourages however the exploitation of those basins and the development of specific technologies.

The offshore oil production represents one third of the global oil production and this percentage is still growing. Its production involves 17,000 operating platforms and more than 400 new production facilities are constructed every year.

A WORLDWIDE COMPLEX EFFORT

West Africa stands out as one of the main actors for offshore oil production worldwide, while Europe and Far East are the biggest representatives for the offshore gas extraction. The Gulf of Guinea, South America and Russia have presented also significant investments and growth in this field. Brazil has the ambitious program to double the oil offshore production within 2020, targeting an extraction rate of 4 million of barrels per day and putting into service 70 offshore wells in 2013. In the North Sea 30 new wells will start producing next year. Furthermore new oilfields discovered in Eastern Mediterranean will be developed in next years.

The productivity in oil recovery is the major topic: “squeezing”, the oil field after peak production and optimizing the production of lower-quality oil wells is compulsory for both environmental and financial reasons.

Pointing to these concerns one of the most significant and correlated challenges facing the offshore oil & gas world quickly emerges: energy.

Upstream oil rigs and vessels are surrounded by sea water and they use huge quantities of that: there are incoming and outgoing flows of water related to extraction operations, process activities and human consumption and waste. Therefore water is considered a major player in ensuring efficiency of the system. Currently it’s no longer seen only by its operational advantage, but also by its strategic role, especially if public opinion and environment safety is concerned. It represents, therefore, a natural source that must be used sustainably in order to minimize operating costs and footprint, maximizing energy efficiency to correctly fit the growing demand.

The filters must clean the water and remove any impurities, such as shells and algae.

Filteration depends on the oil reservoir requirements, avoiding to block its pores. Sand filters with different beds and various sizes of granules are commonly used as filtration technology to remove solid impurities from the water. After the water is filtered it continues to fill the de-oxygenation tower, where oxygen is removed to avoid corrosion and bacteria’s growth that can lead to clogging of the reservoir. This is done with vacuum degassing package where oxygen is forced to flow from the liquid into the gas phase because of the low partial pressure due to vacuum conditions.

As a backup to de-oxygenation towers, an oxygen scavenging agent (sodium bisulphite and ammonium bisulphate) is often added to further reduce the presence of residual oxygen.

Produced Water Treatment

Every oilfield is characterized by the presence of water and gas that come to the surface together with the oil being extracted. The separated water, called “produced water”, accounts for the majority of the waste deriving from the production of crude oil, about eight times the amount of produced oil.

After a primary process of separation, water still contains dissolved and emulsified oil in concentrations as high as 2,000 mg/L, so it has to be further treated before it can be discharged or, sometimes, re-injected.

Sanitary water treatment

Implementing adequate depuration facilities for sanitary water is mandatory for any human community in order to reduce the spreading of water-borne diseases and to avoid the discharge of contaminated water, toxic for the marine biosphere. ARTEs Ingeniera has developed a wide experience in supplying modular treatment plants based on biological treatment.

In activated sludge processes the water to be treated is at first brought into contact with recycled activated sludge. It then passes on to an oxygenation area and then to sedimentation. The activated sludge is continuously re-aerated and recycled.

The particular characteristic of this process is the high concentration of sludge and the 2nd stage aeration, which improves the quality and the activity of the bacteria feeding on the substrate to be degraded. In these conditions an excellent depuration performance is achieved.

The BIOCLAR modular solution is also available with the Membrane Bio-Reactor (MBR) technology combining clarification, aeration and filtration into a simple and cost-effective process that reduces capital, operating costs and size.

The use of membranes ensures the complete retention of suspended solids and leads to a considerable reduction of the amount of microorganisms in the treated water.

In addition, because of the high sludge concentration, a smaller volume for the aeration tank is required. The common critical factor to all offshore water treatment systems is, of course, the lack of space on board: the technology must be very effective and very compact. And this combined result is what ARTEs Ingeniera obtains very well!

WATER FOR PRODUCTION NEEDS

Water Injection

The primary extraction of oil from a producing well is a natural process based on a pressure drop. When the underground pressure becomes insufficient to force oil, the production rate drops. Water injection is able to provide a pressure increase in the reservoir to stimulate oil production and secondary recovery. In offshore production facilities seawater is the most convenient solution, although it generally requires filtering, de-oxygenation and biociding even when the intake is placed at appropriated depth.

For offshore wells and for near-shore fields, produced water is normally discharged to the sea after treatment. Every country has set limits for the concentration of oil dispersed in the water. If the “produced water” is injected into the field or in a disposal well it is advisable to remove as much of the oil and solids in suspension in order to minimize the risk of clogging the field.

Produced water treatment package for offshore installation consists generally of three stages of separation, using a de-sanding hydrocyclone, a de-oiling hydrocyclone and a compact flotation unit (CFU).

HUMAN PRESENCE ON BOARD

From sea water to fresh water

Far away from any distribution network, the only water available is sea water. This has to be treated, removing bacteria, dissolved salts and suspended solids in compliance with World Health Organization’s guidelines.

A very effective system is the desalination by reverse osmosis (RO): final fresh product generally represents 40% of the seawater feed. Drinking water makers are installed, in most cases, into shop prefabricated containers, an easy to install and transport facility as well as an excellent protection at site. Therefore these systems can be customized according to the client’s specific conditions: salinity of the inlet water, required capacity, level of automation and type of enclosure in which the plant is installed.

2,000 tonh injection water treatment plant by ARTEs Ingeniera, with Zero Gas vacuum degassing for new design construction for a major international oil company in Indonesia.
Heat recovery, with excellence!

Heat Recovery Steam Generators (HRSG) – the name speaks for itself – are thermal machines that recover heat from flue gases generated by internal combustion engines or gas turbines. A speciality of BONO Energia, these HRSG are installed downstream engines firing renewable fuels like vegetal oils. The most appreciated advantage, according to a vast number of end users, is the functional reliability and constancy of performance in the long term, backed by prompt and reliable technical service.

BONO Energia has been a pioneer in the field of HRSG working behind internal combustion engines, diesel-like motors that generate electricity burning palm oil. An example comes from Monopoli, in Apulia - Italy, where Casa Olearia operates six 27 MW engines, fuelled with imported palm oil, to generate electricity. The resulting flue gas feed six BONO CTR machines that totally produce about 660 tons/hour of superheated, low-pressure steam. This feeds a steam turbine which produces more electricity, contributing to the global output of a closed-circuit cogeneration power plant whose capacity, in excess of 100 MW, is unique in Italy.

Not far from this plant, Biopower, based in Ottawa, Sardinia – Italy, operates successfully since 2008 two CTR machines behind two 17 MW engines, also fuelled with palm oil.

Why is BONO a preferred supplier of these generators? Because their technical solution – well-separated bundles of smooth tubes, easy to be cleaned with automated systems – provide high thermal efficiency even with huge amounts of dust and ashes deriving from that specific fuel.

The know-how in burning dirt fuel, accumulated in decades of experience with traditional recovery boilers, has been applied to this specific case with success. Talking of operation behind gas turbines, several examples – BONO counts more than 100 of these machines installed – witness the functional reliability and constancy of performance in the long time range of the HRSG units: their “mission profile” exceeds a stunning 99% score!

A good reason to select BONO is the continuity of service provided by this Group: present since 1958, it counts at least 20,000 thermal machines installed in more than 120 countries.

BONO technicians have assured for more than 50 years a reliable and fast technical and spare parts service to all their customers, no matter where they are located.

And this – in a market full of smart competitors, attracted by what looks like a “simple application” but ready to disappear promptly when things get tough – is a sure “plus” for the Milano-based Energy & Ecology specialist.

Auxiliary Boilers, lighting up the power

The “lighter” of a thermal power generation or cogeneration plant is the auxiliary boiler: it provides the steam for the start up of the plant, so reliability is the key factor that drives the client’s choice.

In the last years BONO Energia’s auxiliary boilers have been appreciated by relevant electric utility companies and EPCs contractors as well, such as EDF, Vattenfall, A2A, ENEL, Mitsubishi Heavy Industries, Ansaldo Energia, SNC Lavalin, Foster Wheeler, Technip.

More than 50 auxiliary BONO boilers are working all over the world.

One of the current jobs in this field is the supply to the consortium between the Italian Ansaldo Energia and the Canadian SNC-Lavalin that are building in Sousse (Tunisia) a single-shaft combined-cycle power plant with a capacity of around 400 MW.

This project is that of the “C” stage of the program of the extension of Sousse power station run by STEG.

BONO’s auxiliary boiler will supply 6 t/h of steam at a pressure of 15 bar at a temperature of 370°C, fired both by natural gas and light oil. The scope of the supply includes deaerator, pumps and chemical dosing systems.

The Société Tunisienne de l’Électricité et du Gaz is planning to increase the production capacity of its power plants by more than 1,200 MW by the end of 2016 to face the Tunisian electricity demand that is forecasted to increase by 5-6%/year until 2016.

The Sousse phase “D”, the construction of a 424 MW gas powered combined cycle thermoelectric power plant next to phase “C”, will be still developed by the Consortium Ansaldo Energia SNC-Lavalin.
District Heating

A2A and BONO: a successful cooperation for energy networks

A national leader in the supply of power to Italian municipal networks, the A2A Group dates back to 1970, when a fire-tube steam generator was supplied to one of the company's vendors for energy-related projects. Today, more than 40 years later, both companies have grown significantly: in addition to the above mentioned CTH units, the A2A Group is the second Italian electric operator with over 12 Gw of installed capacity. Today the A2A Group is the leader in Lombardy, where both Groups are present with the majority of their activities.

The historical relationship between BONO and A2A, that dates back to the 1970’s, when a fire-tube steam generator was supplied to one of the company's vendors for energy-related projects, has been strengthened over the years with several cooperation for energy networks. Today, in several application in this market segment, having the reliability of that boiler in several emergencies dates from the 1970’s, when a fire-tube steam generator was supplied to one of the company's vendors for energy-related projects.

When several mergers and acquisitions generated today's A2A, BONO was inserted in the Group's list of energy-related projects. Today, more than 40 years later, both companies have grown significantly: in addition to the above mentioned leading presence in the electricity field, A2A is one of the main players in the environmental sector in Italy; with approximately 3 million tons of waste treated - of which over an half is used for the production of electricity – A2A ranks among the major district heating and gas operators in Italy, with sales to end customers of 2,874 GWht in the district heating and 716 Twh in the district gas network. In 2011 the group achieved a turnover of 10.5 billion, occupies more than 11,000 employees and is listed on the Italian Stock Exchange.

Energy, serving the communities

Several examples of good cooperation between BONO and A2A can be mentioned, all of them realised in Lombardy, Northern Italy pulsating heart, where A2A owns several power plants and is leader in the field of district heating. BONO has experienced several applications in this market segment, having developed dedicated heat generation units. The most popular type of unit is a heat exchanger named CTH, a multi-tubular water tube design; these heat generators can be installed directly on the district heating networks – where network hot water circulates directly in the CTH tubes – or through heat exchangers, depending on water characteristics. Having no practical limitation on the pressure design, that can reach values higher than 40 bar, and on hot water inlet temperature, limited only for the high pressure temperature consideration, the CTH have been extensively installed in most of large Italian district heating applications.

A2A installed several CTH units in their plants of Brescia, Bergamo and Sesto San Giovanni, near Milan. The CTH can reach very high efficiency as well as very low flue gas emission levels. With a very simple design involving a reduced number of components, the CTH generators have a competitive price for a wide threshold range starting from about 10MW. For all these reasons this thermal machine has become a preferred solution for the important district heating plants operated by A2A in the above mentioned cities.

In Brescia, that represents the excellence reference point for all Italian district heating installations, BONO installed two 40 MW methane-fed CTH hot water heaters that quickly compensate the excess heat demand generating during peak hours. The CTH design grants them a reduced start up time permitting to stop the heater when the network load is on a low demand. Positioned underground, 8 meters below the floor level, these huge machines were assembled in-situ using pre-built modules transported on site with numerous logistic and space problems: the district heating plants are often positioned in the middle of the very populated areas that they must serve. Reaching these places with these outsize loads and fitting all the parts in existing old buildings isn’t exactly a piece of cake!

A similar plant was supplied to the near Bergamo plant, facing – and solving – similar assembly problems. In both these cases the heater provides hot water at about 150°C to a bank of heat exchangers, that keep the water circulating in a long district heating piping at temperatures starting from 130°C.

A different solution was required by A2A for their Sesto San Giovanni plant near Milan: here the network dimensions and its new construction design allowed the utility company to simplify the project: a significant saving was achieved by directly feeding the hot water from the heater to the circuit, without intermediate heat exchangers.

Here a 40 Mw CTH unit works flanking an existing heater, supplying the balance of heat demanded in peak hours and replacing the main unit when it fails temporarily. Designed and built for unattended operation, this heater can be supervised by the operator every 24 hours, allowing him to follow a number of other installations located nearby.

A natural gas firing CTD unit able to produce 53 Tons/hour of steam at 20 Bar and 280 °C was installed with a turn-key supply contract. This project turned out to be a very challenging task for BONO Energy specialists, that devoted a total of 16 months of work to complete the job, with full satisfaction of the client.

A major district heating system is operating in Bergamo, Italy

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The A2A power plant in Cassano D'Adda, near Milan, Italy

Stringent emission levels have always been a "must have" specification from A2A, a utility company facing tough demands from its public opinion and environmentalist groups, always keen in keeping them under a strict scrutiny for emissions and pollution.

The law-permitted limits, valid at the time of starting a new plant, are always drastically cut by the client, in order to be safe with their emissions also in the future, when those limits will be more restrictive.

BONO always complied with the imposed specifications, combining high thermal efficiency and low emissions.

These factors – and a good cost/benefits ratio – were substantially the reasons for assigning to BONO Energia the supply of four OMV oil heaters for the...
**District Heating**

Famagosta plant located in the southern part of Milano. Providing 14 MW of power each, the four units supply overheated water for the district heating system of a very populated urban area, where extra precautions are required to ensure the strictest control of emissions.

Similar problems – similar solutions: the same type of oil heaters were installed in other two urban plants of Milano, the A2A Canavese and Tecnoility/Bioceca plants, where totally four OMV units (14 MW each) supply heat (as hot water in one case and steam in the other) for the district heating network of the surrounding quarters. Another technical solution was used for the A2A Selinunte plant, in Milano, to heat a large number of buildings owned by ALER, the town’s social housing authority. In this case BONO Energia supplied an SG smoke tube boiler: that can produce hot water directly or indirectly through a steam/hot water heat exchanger. The availability of sophisticated electronic controls, developed by BONO and AUTOMATA, the Cannon Group division in charge of industrial electronics, has enriched the portfolio of products offered by BONO Energia and contributed to achieve significant results in the supply of complex technologies to the A2A Companies during these years.

Northern Italy was once a very water-rich area, but things are changing rapidly. The increasing use of land for urban and industrial uses, the extensive cultivation of thirsty crops, the progressive reduction of Alp’s glaciers and snow deposits, a more irregular supply of rain water (a direct effect of the changing climate) have significantly influenced the availability of fresh water in this densely populated area. A2A owns on the Italian Alps several artificial water basins for hydroelectric power generation, and is very sensitive to all water-related issues. Their thermal plants require daily huge quantities of the “blue gold” and they spend considerable financial and logistic resources to ensure the best exploitation of the available water.

Numerous water treatment plants have been supplied in the past twenty years by ARTES Ingegneria, the BONO Company supplying water treatment technologies, to several A2A plants in Italy. Among them, it is worth mentioning here the depuration plants supplied to the already mentioned two Brescia plants, named Lamarmora and Brescia Nord.

The first one handles the well water used to feed the boilers: a total removal of salts is achieved in this case with a 60 m³/hour plant composed by activated Carbon filter, cationic, anionic and mixed bed columns. This demineralising system provides nearly pure water: the measured electric conductivity results lower than 0.1 microSiemens/cm, practically that of distilled water! In Brescia Nord a new waste water treatment system will be installed in an existing industrial building, whose limited space has forced ARTES’ designers to draw a real “puzzle plant”.

Two main tasks will be managed in this location: the removal of suspended solids and heavy metals, and the de-oiling operations by far exceeding the limits set by current laws. A 30 m³/hour chemical/physical plant will handle the first requirement, by treating waste water recovered from various parts of the site with an initial neutralisation, followed by coagulation, flocculation and gravity settling of the hydrated metals obtained with the chemical process. The use of a lamella pack clarifier has considerably reduced the volume of the treatment basins, making more easy the installation in a rather narrow space. In open air, but still not in a very wide area, is located the de-oiling plant that will treat all waters coming from the periodical washing of tarred surfaces and of occasional spills. This plant will enable discharge all the treated water into the nearby river. The whole automation system, including the signals coming from existing, still working units, has been integrated under the control of the new plant, done by ARTES with a sophisticated hardware.

A similar plant was supplied a few years ago to the Canavese district heating plant in the eastern part of Milano, in combination with the thermal units supplied by the sister company BONO Energia. The same joint approach was used to supply the deaerator for the power plant of Cassano d’Adda, described in this article.

Synergy provides positive effects

The wide range of solutions supplied by BONO Energia and ARTES Ingegneria, the reliability of the installed equipment, a prompt technical service and a great flexibility in handling unusual requests have contributed to build a solid human relationship between the specialists of A2A and those of the BONO Companies. A mutual trust has been consolidated in all these years, leading to fast definition of technical specifications and commercial quotes, to the advantage of a short and efficient order processing time.

**High-altitude Cogeneration**

BONO Sistemi installed a cogeneration plant in La Thuile, a famous sky area in Val d’Aosta, on the Italian Alps. Fired with waste wood and forestry scrap from the local mountains, this ORC (Organic Rankine Cycle) system has an electric generation capacity of 700 KWe and produces 3.1 MWt of heat, used to feed the community district heating system.
First in Australia, a biomass-fuelled BONO thermal plant for Tartrates and Ethanol takes shape

Hectic days at ATP (Australian Tartratic Products) near Mildura, Victoria, Australia: the new biomass-fuelled thermal plant supplied by BONO is quickly taking shape. Start-up is foreseen in July, 2013: burning spent wet marc, it will produce saturated steam used to distill Ethanol and produce Tartaric Acid from the same grape’s by-products supplied by the local wineries.

Founded in 1991 by Giovanni Randi, an Italian producer of Tartaric Acid and its salts, Australian Tartratic Products (www.australian tartaric.com.au) quickly grew to establish itself as Australia’s largest manufacturer and supplier of Tartaric Acid. At its plant in Colignan, near Mildura in Victoria state, ATP also manufactures food grade Ethanol, producing and selling natural products only. ATP is part of the Randi Group (www.randi-group.com), which has a number of similar operations both in Italy and America.

A Dedicated Solution

The design solution for ATP produces 12 T/ Hour of saturated steam at 10 bar and 184 °C, used to distill Ethanol and produce Tartaric Acid: in those periods of the year when demand for process is lower, the produced steam drives an ORC (Organic Rankine Cycle) able to generate up to 400 kW of electricity, for factory internal consumption.

The system supplied by BONO Sistemi (www.bono.it) includes:
- A network of conveyors to transport the wet biomass,
- An automatic batch dosing system to feed the marcs to the combustion chamber,
- A double-stage preheater, to increase the combustion air temperature up to 220 °C,
- A moving grate combustion system, specially designed for wet solid fuel,
- Two radiant chambers (post-combustion and inversion) for the flue gas,
- A two-drum evaporator to heat up water and produce saturated steam at 184 °C,
- Three dedicated economisers, to reduce flue gas temperature and maximise heat recovery,
- A deaerator, to remove gas from recycled hot water and fresh water refills,
- Flue gas treatment cyclon and baghouse filter, to avoid emissions of particulate,
- A centralised ash recovery system, collecting them from several points of the thermal plant,
- A 25-meter high chimney for the spent fumes,
- A complete electronic control for the whole combustion process,
- Design and engineering of steam and water piping network for the whole factory.

Power from the Spirit!

A major ingredient in wine-making, the Tartaric Acid produced in the Mildura region is sold mainly to Australian wineries, with smaller quantities taken up by pharmaceutical companies and food manufacturers. Food grade spirit is also sold both to Australian wineries and internationally to be used in wine fortification and brandy production. Located near the desert, not far from splendid vineyards and fruit orchards, the facility processes considerable volumes of grape marc, grape lees, centrifuged by-products created from the wine making process, producing a completely natural product from material which would otherwise go into landfill.

The company collects nearly 50,000 T/year of these waste from the Sunnysia, Riverland, Riverina and Barossa Valley wine growing regions and processes them during the whole year also when wine-making activities end. A major cost in their industrial process is represented by the fuel required to produce the steam demanded by the distillation process. Due to their distance from gas networks, ATP is forced to buy liquid Propane in tank trucks to feed their steam-producing boilers. This cost is rising every year, and a proper solution had to be found. Taking advantage of the vast experience capitalised by the Randi Group in their Italian Villapana factory in Faenza – where a BONO Sistemi thermal plant generates electricity and steam from the same type of waste – ATP commissioned again a similar solution to the Cannon Group company specialising in biomass-fuelled energy plants.

Completely designed and built in Italy, the complex plant was shipped in October 2012 (in forty 40-feet containers and four huge pre-built elements) from the harbour of Genoa. When it arrived on site in Australia, a 10 specialists staff flew in for the assembly work.

The installation started on January 14, 2013. Now, two months later, the mechanical part of the project is completed for more than 70%, and it will be followed by the installation of refractory elements around the combustion chamber and thermal insulation material around all the heated parts. The plant takes a 30 by 20 meter area, with a max height of 25 m.

Federico Volpe, the Project Manager of BONO Sistemi who has led the installation team, says: “We have built a splendid relationship with the staff of ATP and with numerous locals: they were supporting us with invaluable help since the very beginning of our activity here. We now even spend our free time with them, visiting the beautiful natural parks of the region, organising barbecues and boat tours during the week end. They are quite a hard-working style, and we enjoy their hospitality, the wines and the special fruits of this area. It will be a pity to quit them at the end of commissioning.

Commissioning is scheduled for mid June, and official start-up will take place in July 2013: stay tuned!”

Today, 22% percent of the world’s energy consumption is represented by natural gas and the demand is growing. The IEA (International Energy Agency) foresees that the demand for natural gas will grow by the 4.9% through 2035. The major demand will come from far east markets; as a consequence the export from the countries that have big reservoirs will strongly increase, in particular LNG production. Australia by 2020, driven by the “neighborhood” demand, thanks to CSG (coal seam gas) extraction and deep water gas production, will be the first largest LNG exporter, overtaking Qatar.

First steps have already been taken to implement this plan: Australia will be the first country in the world to host a floating LNG project to develop Prelude gas field. Furthermore Australia is one of the first countries in the world to exploit CSG fields: in the Queensland Origin is gathering natural gas from coal deposits. This gas is now used for local consumption and local production of energy, but in the next future will be shipped to international market, though a liquefying facility.

MARKETS

Australia & New Zealand: a bright future for LNG

AUSTRALIA: Australia Pacific LNG project
ARTES Ingegneria supply:
- condensate treatment plant
- oily water treatment 100 m³/h capacity

AUSTRALIA: FLNG Shell project
ARTES Ingegneria supply:
- engineering, fabrication, supply and site supervision of a number of waste water treatment package.
- Sanitary water treatment plants (biological type) catering the construction camp and the LNG plant. Sludge treatment & dehydration. Overall capacity 6,500 m³.
- Treated waste water will be mostly reused within the complex.

NEW ZEALAND: Kupe Gas Project
BONO Energia supply:
Thermal Fluid Heater 32 MW capacity
Squared Box Fired Heaters
Prefabricated modules, field erected
ARTES Ingegneria supply:
- demineralization plant.
Deminerlalised Water for a Power Plant in Kuwait
ARTES Ingegneria, in partnership with Arbei Enetech, is proud to announce the order received from Kuwait’s MEW (Ministry of Electricity and Water) for the deminerlisation plant required by the Doha East power plant. Two specific end uses are foreseen for the purified water produced in this plant: boiler feed and drinking water. Desalinated water and condensate are fed to a multi-step demi plant able to produce pure water at a rate of 220 m³/hour, used to refill the large oil-fired boilers of the power plant. The whole lot of material will be mounted on skids in Italy to be assembled locally by Arbei Enetech, the local partner of ARTES Ingegneria.

Keeping Suriname’s Refinery Clean
The oil refinery built by SAIPEM in Paramaribo, Suriname, will receive by this summer a waste water treatment plant engineered and built in Italy by ARTES Ingegneria. The first part of this equipment will be used to filter process water with a compact Hydrocyclone working at a rate of 12 m³/hour. A much larger output – 162 m³/hour – will be provided by the de-oiling and solids removal plant. By using a CPI (Corrugated Plate Interceptor) the largest part of oil will be intercepted and separated using the coalescence effect. The remaining fraction of oil will be handled by a DAF (Dissolved Air Flotator) designed to extract the smallest micro-droplets of oil. Purified water will be released to the sea with specifications well within the limits imposed by local and international laws.

The sludge obtained in these two processes – mostly containing solids from the CPI treatment and oily cakes from the DAF – will be concentrated in a dedicated thickener that reduces the liquid fraction to approximately one fourth of its original volume. The remaining slurry is sent to a centrifuge where it’s treated with polyelectrolytes and concentrated up to a solid content of 20%, enough to be separated easily from the liquid fraction and to be sent to landfill. The remaining water is treated again and the cycle continues. The order will be shipped to final destination in June 2013.

Cooling water in Iraq for Baghdad
A huge treatment plant for cooling waters will be supplied to the Daoula oil refinery in Baghdad, Iraq, through the Jordan main contractor Armada.

News from Waterworld

Markets

“..."The six cooling towers used to reduce the temperature of 10,000 m³/hour of process water in the refinery require a constant flow of clean water. We get it from the Tigris river. You clean it.” This was the essence of the major project acquired by ARTES Ingegneria in Iraq for the Daoula oil refinery in Baghdad. The river water will be first treated with gas Chlorine, then it will undergo a chemical/physical process including coagulation, flocculation and final clarification in two 30-meter diameter clarifiers. A total output of 2,000 m³/hour of purified water will be fed to the cooling tower basin. Furthermore a side stream filtration plant (using stacked Hydraback double-chamber gravity filters to reduce the volume occupied by the equipment), will contribute to keep the concentration of solids in the cooling water controlled.

Drilling for Oil in Austria
An old oil field in Austria produces around twenty barrels of water per each barrel of extracted oil. OMV, the Austrian Oil Company exploiting this site, decided to reutilise this huge quantity of water by testing and pumping it back underground to increase the rate of oil extraction. ARTES Ingegneria will help, supplying a produced water treatment plant. The OMV Schoenkirchen site, located north of Wien, Austria, required a dedicated plant to treat 250,000 barrels a day of produced water, extracted together with oil from an aging oil field. The intention is to pump this water back under pressure, deep underground, to help the remaining oil to come to the surface. This well-known technique, called “water flooding” requires very clean water, in order not to block with sediments the small cavities in the deep rock that contain the droplets of viscous oil.
Another successful edition of the Agents Meeting was held in April 2013 for the international network of representatives of BONO Energia, ARTES Ingegneria and BONO Sistemi. Split between Peschiera Borromeo and Salerno the tight program of presentations saw the active participation of all the attendants.

Held on April 16-19, this edition of the Agents Meeting saw the active participation of 22 agents from 12 countries. The BONO network of Agents grows every year, reaching now distant countries as Colombia, Indonesia and Korea. Numerous new subjects were presented to the panel of attendees, including both new technical solutions and market information.

The Group Management attended the whole sessions, obtaining stimulating comments from “their people on the front line of fire” and presenting the Group strategy for the coming years, together with the tools to achieve the target results. A fruitful cross-fertilisation effect arose from the interaction between this international, multicultural group of people. The awareness that today's market dynamics have significantly changed – orders do not come anymore from the effort of a single person in a single country – gained a general acceptance among the participants.

Several important heaters and boilers were visible in the Peschiera Borromeo main factory during the visit of the agents on day two, while a visit to the Olivo Rizzo plant of ARTES Ingegneria, near Salerno, allowed the participants to witness on the last day the ongoing construction of a number of new, large orders for water treatment plants, learning more practical details and advantages of their construction.

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**Insulated pipes for District Heating and oil Industry: a Cannon speciality!**

Rigid polyurethane foams, used for the insulation and protection of pipes for more than 30 years, are now more extensively used than ever. Thanks to their outstanding performances and ease of application they are progressively replacing other insulating materials. Various technologies are used to apply foams to the pipes, according to their sizes and applications.

Cannon have developed suitable solutions for all the needs, providing high foam quality and efficient methods of application.

Rigid polyurethane foams are commonly used for the insulation of pipelines because they minimize the exchange of heat within the pipe and surrounding environment; their easy processing adds a substantial number of benefits, that can be summarised as follows:

- Their longevity allows for a long replacement cycle.
- They are effective across a wide temperature range from the extremely cold of cryogenic applications, where temperatures can be as low as -190°C, to an intense heat approaching 150°C.
- They can be manufactured either in a factory or in-situ: this production versatility suits a large number of applications.
- They are compatible with numerous pipe materials, such as steel, FR, PVC, HPDE.
- Their longevity allows for a low maintenance and a long replacement cycle.
- Formulations can be tailor made, meeting the widest range of specific customer needs.

Their energy-saving performances improve the cost efficiency of customers’ fluid distribution lines. Just as an example, we summarise in the following table a comparison between various insulating material, their density (which affects the total weight to be used in place) and their relative insulation thickness required to achieve the same heat loss from a pipe. Their superior cost effectiveness is evident:

<table>
<thead>
<tr>
<th>Insulating Materials</th>
<th>Density (kg/m³)</th>
<th>Thermal Conductivity (W/m°C)</th>
<th>Relative Insulation Thickness [%] at equal Heat Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid PU Foam</td>
<td>78</td>
<td>0.025</td>
<td>1</td>
</tr>
<tr>
<td>Mineral Wool</td>
<td>350</td>
<td>0.045</td>
<td>1.7</td>
</tr>
<tr>
<td>Expanded Glass</td>
<td>125</td>
<td>0.052</td>
<td>1.5</td>
</tr>
<tr>
<td>Mineral Cork Mix</td>
<td>850</td>
<td>0.105</td>
<td>3.9</td>
</tr>
<tr>
<td>Expanded Cork</td>
<td>450</td>
<td>0.160</td>
<td>5.9</td>
</tr>
</tbody>
</table>

If we add their high mechanical strength, excellent adhesion, flexibility and good flowability, required to properly fill the cavity around the pipe section, we understand why this reliable, efficient and long lasting material quickly gained the favour of so many contractors and end users.

The most popular areas of use, both traditional and recent, are:

- **District Heating & Cooling** systems, for transmission lines, distribution, house and building supply.
- **Oil & Gas Pipelines** On & Off-Shore, for transmission pipelines, risers, spools, oil and gas terminals.
- **Heating Services** for power stations, chemical plants and refineries.
- **Buildings & Leisure** applications, for cooling and heating circuits, air conditioning and swimming pools.
- **Marine Systems**, for instance in on-board carriers (chemicals, hot water condensates, LPG, LEG, LNG) or for cooling and air conditioning circuits.
- **Industrial Applications**: food & beverage (ice water, beer, milk, mineral water), pharmaceutical, chemicals plants and refineries, pulp & paper (lignite, water, condensates), petrochemicals (LPG, LEG, LNG), mines (lignite).

**Pipe manufacturing techniques**

According to the needs, insulated pipes’ dimensions stand in a range from 10 mm in diameter of small plumbing pipes, up to 2,000 mm diameters of the largest heating pipes. Insulation thickness vary accordingly, up to 200-250 mm for the most severe working conditions.

Each manufacturer, in accordance with his own needs, can find a Cannon suitable technology.

Piping business: small or large, few or many, talk to the local Cannon office. They can offer you some smart ideas!