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The Midrex family of companies has a new address. Midrex Technologies India Private Limited opened its doors for business in January and held its official inauguration party in late March for our newest office located in Gurgaon, India. My name is KC Woody and as the newly named Managing Director of our newest Company, I have been busy opening our new sales and marketing office to better serve our current clients and our future clients. How can we do this? There are several ways.

While I am really not adverse to travel, I can attest to the fact that making a two hour flight to Bombay or a forty-five minute drive to Delhi is much easier than making the twenty hour journey over two days from the USA. As we have seen the Indian Steel Market grow, we have seen the market for Midrex processes continue to grow. Clients have requested meetings that we can now attend in a matter of days or hours versus the weeks of planning that was required before. We also plan on building stronger relationships with our plant operators to make sure that their questions and concerns are passed back to our Technical Services Group in a timely manner.

Woody, why is Midrex coming to India now? He noted the sharp rise in natural gas prices, the decrease in natural gas allotments for existing MIDREX® plants, and was curious about our rationale. The answer really boils down to one thing; Midrex opened an office in India to better serve our current clients and our future clients. How can we do this? There are several ways.

While the market for natural gas in India has become cost prohibitive in the near term, Midrex is excited about the possibilities for new projects utilizing our coal based processes. Coke oven gas and coal gasification remain...
possible solutions for steel makers interested in expanding EAF steel production or to take advantage of the chemical energy in existing coke oven gas to produce more iron units for steelmaking.

DRI (also more commonly known as sponge iron within India) is key to the country’s increasing industry. India leads the world in sponge iron production primarily through the use of the rotary kiln process. Midrex understands that sponge iron producers utilizing this process are getting more environmental pressures than ever before and the expectation is this pressure will only increase as worldwide environmental pressures continue to grow. Midrex believes that a qualified local presence in India will allow the company to have a better understanding of what these producers need and enable us to provide a technical solution that is both environmentally acceptable and economically viable.

While local hotels may be disappointed by the decrease in revenue from Midrex, we are confident that our current and future clients will be satisfied by our increased responsiveness and better communication with a local office. We believe this will improve our relationships with our clients, strengthen our presence in the market, and introduce Midrex to a variety of new clients.

If you find yourself in the Delhi/Gurgaon area, we invite you to visit the office. I look forward to traveling around India to see existing and future Midrex clients. We hope to see you at our office soon. Our office is located off Golf Course Road in Gurgaon.
With the world economy continuing to slowly climb out of recession, MIDREX® Plants produced an estimated 44.4 million tons in 2011, 5.7% more than in 2010 and 15.8% more than in 2009. MIDREX Plants continued to account for 80% of the worldwide production of natural gas based DRI. MIDREX production is estimated based on 34.0 million tons confirmed by MIDREX Plants and 10.4 million tons estimated by the World Steel Association for DRI production by plants in Iran, all of that production from DRI facilities using the MIDREX® Direct Reduction Process. Despite slow demand and high iron ore prices, plants outside of Iran continued to establish new production records (11 annual and 7 monthly production records), and three plants came within 5% of their record annual production values. Ten MIDREX® Modules operated in excess of 8000 hours.

Iron ore raw material prices remained high in 2011 due to continued worldwide demand and restrictions in the supply. At the end of 2011 there were some downward iron ore price pressures and no shortages of pellets on the open markets, coinciding with a slowdown in DRI production in the 4th quarter. In 2011, JindalShadeed started commercial operation in Sohar, Oman, and Hormozgan Steel started up their second module in Iran. ArcelorMittal Montreal in Canada shut down Module 1 at the end of May and immediately restarted their larger Module 2 in June to increase production. MIDREX Plants have produced more than 685 million tons of DRI/HBI through the end of 2011.
ACINDAR
After the typical mid-year winter natural gas curtailments, ACINDAR’s MIDREx Plant operated with their 90-tube parallel reformer on-line for the remainder of the year, boosting production to over 140 t/h, and came within 2.5% of breaking their annual production record.

ANTARA STEEL MILLS
The first MIDREx Plant designed to make HBI produced over rated capacity in 2011, marking a recovery from depressed 2009 production levels and exceeding 2010 production levels.

ARCELORMITTAL HAMBURG
Forty years after its initial start-up in October 1971, AM Hamburg’s MIDREx Plant was well on its way to exceeding annual rated capacity in 2011, but slowed down production in the last quarter.

ARCELORMITTAL LAZARO CARDENAS
AMLC operated over its rated capacity of 1.2 million tons in 2011 despite lowering their production rate in the last quarter of the year.

ARCELORMITTAL MONTREAL
After operating Module I at maximum capacity through the end of May, Module I was shut down. Module II was restarted in June to utilize its increased capacity, after being shut down for all of 2009 and 2010.

ARCELORMITTAL POINT LISAS
All three of AMPL’s Modules operated for most of 2011, with production constrained by the high price of iron ore. Modules 1 and 2 were shut down near the end of the year because of this.

ARCELORMITTAL SOUTH AFRICA (SALDANHA WORKS)
Saldanha’s COREX® Export Gas-based DR Plant operated limited by the gas availability and averaged 67% local lump ore usage for the year.

COMSIGUA
COMSIGUA’s production of HBI increased in 2011 but remained below rated capacity due to the limited supply of locally produced pellets and lump ore.

DRIC
DRIC’s two modules located in Dammam, Saudi Arabia, continued to increase production to satisfy the demand of its adjacent steel shop. Module 1 established a new monthly production record in October, and both modules established new annual production records.

ESSAR STEEL
Five years after the startup of their fifth MIDREX Module, Essar’s sixth MIDREX Module (designed to produce cold DRI) set a new annual production record and a new monthly production record in its first full year of operation. In 2011, Essar Steel’s five Hot Discharge Modules charged 66% of their production as hot DRI to Essar Steel’s EAFs. Essar’s six modules were on track to reach the milestone of 50 million tons of DRI produced nearing the end of 2011, but reduced DRI production near the end of the year due to increased natural gas price.
**EZDK**

EZDK's three modules exceeded rated capacity, produced over 2.9 million tons of DRI, and averaged 8190 hours of operation in 2011 despite the political turmoil in Egypt at the beginning of the year. Module 2 set a new annual production record while Module 3 set a new monthly production record in December. Twenty years after the startup of their first Module, EZDK's three modules were approaching the 45 million ton mark at the end of 2011.

**FERROMINERA ORINOCO**

Ferrominera Orinoco's HBI producing facility in Puerto Ordaz, Venezuela restarted production in August at reduced capacity, restrained by oxide pellet and natural gas availability.

**HADEED**

Hadeed exceeded rated capacity for the 27th consecutive year in Modules A and B, and for the 19th consecutive year in Module C. Module E, with a name plate capacity of 1.76 million tons per year, again set a new annual production record in its fourth full year of operation (1.943 million tons in 2011, also a new record for a single MIDREX Module, and 10.4% over rated capacity), and in March established a new monthly production record of 179,870 tons. Hadeed's four MIDREX Modules have produced more than 60 million tons to date.

**JINDAL SHADEED**

Jindal Shadeed produced 1.1 million tons of saleable HBI in its first year of commercial operation that began on January 1, limited by the installed hot briquetting capacity. The plant operation was only 13 hours short of 8000 hours. This Module was designed to produce 1.5 million tons per year, mainly HDRI (Hot DRI) for use in an adjacent steel shop which is presently under construction, with HBI production as a secondary product stream. The Module is designed for the HDRI to be fed to the steel shop's electric furnace using only gravity.

**JSW ISPAT STEEL, LTD**

JSW Ispat Steel, formerly Ispat Industries, Ltd, comfortably exceeded rated capacity in 2011, and set a new monthly production record. JSWISL was within 1% of their record annual production, operated 8680 hours in the year (only 80 hours of downtime), but used more than 20% blast furnace pellets in their oxide feed mix.

**LEBEDINSKY GOK**

Lebedinsky GOK's second DR module, capable of producing 1.4 million tons of HBI, established a new annual production record almost 5% over rated capacity in its fourth full year of operation. Reaching production rates as high as 190 t/h, LGOK 2 came very close to breaking their monthly production record several times in 2011.
**LION DRI**
In its third full year of production, the Lion DRI plant located in Malaysia established a new annual production record. In 2011 the production of HDRI was more than 86% of the tons produced, with the balance being HBI. Production continued to be limited by steel shop demand.

**LISCO**
LISCO’s three modules had produced just over 300,000 tons when they were shut down in February due to the National revolution that occurred in Libya.

**NU-IRON**
In its fifth full year of operation, Nucor's MIDREX Plant in Trinidad produced below rated capacity without the use of oxygen. Average metallization of the DRI produced was 96.8%, with over 3.0% carbon.

**OEMK**
With its four modules operating on average over 8270 hours in the year, OEMK produced over 2.7 million tons in 2011. Modules 1 and 2 set new annual production records while Module 3 came within 2.5% of its annual production record. Module 1 also set a new monthly production record in January, operating on average over 108 t/h after the plant expansion in 2010. OEMK will have produced 50 million tons of DRI in early 2012.

**QATAR STEEL**
In its fourth full year of operation, Qatar Steel's dual product (CDRI and HBI) Module 2 set a new annual production record, and ended the year with production rates over 200 t/h. Most of the production for the year (82.5%) was CDRI. In 2011 Qatar Steel surpassed the 20 million tons of DRI mark from its first module which started up in August 1978. This module operated over 8200 hours this past year.

**SIDOR**
Production from all four of Sidor's MIDREX Modules improved to over 2.5 million tons in 2011, but was limited by scheduled downtime and outside causes.

**TENARISSIDERCA**
TenarisSiderca operated at reduced levels throughout most of their 35th anniversary year, limited by the demand for their DRI given the high price of iron ore. Production rate was ramped up towards the year end to stockpile DRI to cope with natural gas curtailments foreseen for their upcoming southern hemisphere winter.

**VENPRECAR**
VENPRECAR's production improved in 2011 but continued to be restricted by the limited availability of resources for HBI production in Venezuela.
INTRODUCTION
The modern direct reduction industry is less than a half century old. Direct reduced iron (DRI) and process technology for its production have been around for decades, steadily gaining popularity and establishing a solid role in the modern global steel industry. In that time the industry has grown steadily from hundreds of thousands of tons produced per year in the 1970’s to more than 73 million tons of annual production in 2011.

About 75% of that total production is from shaft furnace technologies, and today there are more than 80 shaft furnace based plants in operation. Until recently, virtually all of these plants have been based on the use of natural gas as the fuel and reductant for the process. With historically favorable economics and availability of low cost natural gas many alternative possibilities for DRI production were not explored or realized. Furthermore, most of these DRI plants were built specifically for producing metallics for consumption in EAF based steel operations with little attention given to the overall potential use of DRI products in other steelmaking processes.

Today the world is a different place.

There is a changing perspective on DRI, both in methods of production as well as usage. Natural gas-based DR technology is still the most popular form of DR production worldwide, but in many parts of the world the availability of low cost natural gas has declined significantly. The nomenclature of “DRI” once meant simple reduced iron product in the form of pellets and lump. Now DRI is the umbrella term for three separate product forms: cold DRI, hot briquetted iron (HBI) and hot DRI (HDRi).

Many steel producers today who use more conventional steelmaking techniques find themselves hungry for economical virgin metallic feed products. DRI has found usage in other sectors outside of the EAF including the use in blast furnaces as a valuable metallic supplement with productivity and ecological benefits.

The industry has expanded and so too must our view of it. This article examines the growing usage and application of alternative fuels as well as the expanded possibilities for product usage.

ORIGINS OF MODERN DRI PRODUCTION – NATURAL GAS
The operation of reducing iron in a steady state form is not new. The Bloomery process to produce sponge iron was in use in Europe and the MENA Region prior to the sixteenth century. Unfortunately it was not until the mid twentieth century that
the combination of the proper design, size and availability of processing equipment, the availability of a reducing gas and the proper knowledge base were married to yield the first commercially and environmentally successful iron direct reduction technologies.

Although the MIDREX® Direct Reduction Process was not the first process technology to successfully enter the direct reduced iron market, it was quick to find its home as the industry leader. Within a few short years, the MIDREX® Process continued to gain market share and surpassed all competition to become the number one shaft-furnace direct reduction technology in the world, a position it has held since 1979. The MIDREX® Process produced 80% of the gas based DRI in the world in 2012 as indicated by Figure 1. Midrex has steadily grown and improved upon its core DRI technology. In the upcoming months we will publish more information regarding the next generation MIDREX® SynRG™ Reformer that can produce approximately the same amount of reducing gas at 80% the size of a standard MIDREX® Reformer. This new reformer also features high temperature tubes and less NOx emissions.

As the free market will dictate, the price of any commodity is directly related to the demand and availability of the same. So, as we passed from the early 1970s to the 1990s and the availability of natural gas declined, the price spiraled upward.

Accordingly, and until very recently, the growth of DRI was then limited to areas with access to available low cost natural gas. During the last fifteen years DRI plants were built primarily in the MENA Region with a few others being built in Russia and Southeast Asia. Until recently, the feasibility of building natural-gas based plants was prohibitive in some areas like the Americas because of extreme pricing; however, shale gas reserves have lowered cost and reopened the region to the possibility of more gas-based plants. Not all regions of the world may be that fortunate, yet demand for quality DRI metallics produced via technologies like the MIDREX® Process are increasing, thus so too is the need for alternative fuels.

**BEYOND NATURAL GAS – MXCOL® AND ALTERNATE FUELS**

From the beginning Midrex investigated the possibility of several fuels for the MIDREX Process. In addition to studying the use of natural gas as the fuel for the process, Midrex also investigated the use of synthesis gas produced from coal, a fact that granted patents from that era will attest. The genesis of what we now call MXCOL® was formed, but the reality of the time was it was simply too expensive to generate the syngas to make its use feasible for producing DRI; however, times change and technologies evolve. Midrex has the broadest range of capabilities for utilizing different energy sources to produce DRI (Figure 2).

Interestingly, Siemens VAI, a long time partner of Midrex developed a hot metal production technology that also produces an off gas (synthesis gas) that can be used as a DRI process fuel. This is of course the COREX® Process. More than a decade ago, Siemens VAI and Midrex partnered to build the world’s first coal based syngas DRI plant employing the MIDREX Process to do so. It was a natural fit. The Saldanha COREX®/MIDREX® Plant (Figure 3) was commissioned in 1999 and has been in successful operation since that time. To date, it is the only commercial scale syngas based DRI plant in the world.

![Figure 1: 2011 World Gas Based DRI Production](image)
More recently two things played into reactivating interest in using a syngas as a fuel for the MIDREX® Process: A relative shortage of natural gas and/or extremely high price of natural gas in areas of growing steel demand, primarily China and India.

In order to address the renewed interest in using a syngas as a MIDREX® Plant fuel, Midrex went back to our vast knowledge base, combining that information with the considerable experience gained in the aforementioned Saldanha COREX®/MIDREX® Plant and launched a new version of the MIDREX Process: MXCOL®. MXCOL in basic terms describes the MIDREX® Process when a syngas produced by a technology other than the COREX® Process is used as the fuel for the MIDREX® Process.

As usual, it takes a bold technical and business step to build the world’s first syngas based DRI Plant utilizing a syngas produced by a dedicated coal to syngas production plant. This time, it was JSPL that took this bold move. JSPL selected the proven MIDREX® Technology for the DRI plant. This plant is currently under construction at Angul, Odisha (formerly Orissa), India. (See following page, Figure 4)

With a growing demand for iron units in some of the world’s more remote and rapidly growing locations, necessity can often

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**MIDREX® Process Energy Source Flexibility**

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Midrex Plant Reference</th>
<th>Reducing Gas Train</th>
<th>Reducing Gas H₂/CO</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corex offgas</td>
<td>Arcelor Mittal South Africa</td>
<td>CO₂ Removal + Heater</td>
<td>0.3 to 0.4</td>
<td>1999</td>
</tr>
<tr>
<td>Corex offgas</td>
<td>JSW Projects Limited</td>
<td>CO₂ Removal + Heater</td>
<td>0.5 to 0.6</td>
<td>Construction</td>
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<tr>
<td>Coal Gasifier</td>
<td>JSPL Angul I</td>
<td>CO₂ Removal + Heater</td>
<td>2.0</td>
<td>Construction</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Numerous (60 modules in operation)</td>
<td>MIDREX® Reformer</td>
<td>1.5 to 1.7</td>
<td>Since 1969</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>FMO (formerly OPCO)</td>
<td>Steam Reformer + MIDREX® Reformer</td>
<td>3.2 to 3.9</td>
<td>1990</td>
</tr>
</tbody>
</table>

**FIGURE 2 MIDREX® Process Energy Source Flexibility**

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**FIGURE 3 ArcelorMittal South Africa COREX®/MIDREX® Plant**
fuel development, or at least the growth of an idea. And so it is at present. In many locations throughout the world both integrated steel works and independent coke producers are producing millions of Giga Calories of export fuel. The fuel is most often either flared or used to produce electrical power. Each of these cases in essence constitutes a syngas generator that also happens to yield another valuable byproduct.

Of course the export fuel cannot be used “as is” coming from the coke ovens. As these gases contain a wide range of constituents that are not suitable for part of a fuel for use in shaft furnace or other DR Processes, the gas must first be conditioned to yield a proper gas.

Midrex, along with our new partner Praxair, has been researching and testing such a process to condition the gas in an extremely efficient manner that actually adds efficiency to the process cycle. Midrex and Praxair formed a strategic alliance in June of this year to demonstrate and provide a Thermal reactor Systems and facilities. This new Thermal reactor System uses partial oxidation technology to convert hydrocarbons like coke oven gases into high quality, high temperature syngases for use in the MIDREx® Process (Figure 5). This is a revolutionary technology that will change the landscape for consideration of coke oven gas as a reductant fuel.

**ALTERNATIVE USAGE OF PRODUCT**

The idea of using coke oven gas (COG) as a reductant fuel is intriguing and some may ponder at the how production of DRI/HBI at an integrated steel works could be beneficial. The answer is obviously simple, more productivity by utilizing off gases to produce additional iron units; and in addition, the DRI itself can be used within the blast furnace to further increase efficiency and reduce emissions.

The new Thermal Reactor system from Midrex and Praxair enables the COG from an integrated mill to be converted into high temperature syngas suitable for DR production. COG typically has high quantities of H₂ and CH₄. This gas is appealing for production of DRI in a MIDREX Shaft Furnace because of the hydrogen and methane content; iron made from this gas has greater value than the electricity that could be generated by burning the gas. Figure 5 shows how the Midrex and Praxair Thermal Reactor system coupled with a MIDREX Plant can be used at an integrated site.
The application of DRI as feed to blast furnaces was proven in the 1960’s. In the 1965 Proceedings of the Ironmaking Conference of the AIME (American Institute of Metallurgical Engineers) one out of three of papers is about production or use of DRI as a “pre-reduced” feed for blast furnaces. Usage of DRI in blast furnaces did not become common commercial practice until 1989. Until then there was a very limited merchant supply of DRI/HBI.

Then in 1989, AK Steel began using DRI, in the form of HBI, in their Middletown blast furnace and throughout the 1990’s increased the amount of HBI in the charge. (HBI is the preferred form of DRI for charging to blast furnaces because non-briquetted DRI tends to have lower crush strength. In addition, the large particle size of HBI allows better permeability of the blast furnace burden.)

Subsequent to AK Steel’s success most other blast furnace works in the United States also use HBI as a portion of the charge, but a great majority uses it only intermittently when they need additional hot metal. This typically occurs when one blast furnace is undergoing maintenance and thus the steel works has insufficient hot metal to meet their production demands. Another case is when the market demand is high and the steel maker simply wants to make more steel.

More recently blast furnaces in Canada, Western Europe and Japan have also begun using HBI in their blast furnaces.

DRI has been used as up to 70% of the charge in research blast furnaces but it has been used as no more than 30% of the charge in a full scale commercial unit. Still the affects of using HBI as part of the blast furnace charge not only has a significant impact on the total carbon foot print of the steel making cycle, it also has a significant financial advantage.

For each ten percent (10%) of the iron charged into the blast furnace as metallic iron:
• Productivity is increased by 8%.
• Fuel rate is decreased by 7%

HBI greatly increases the productivity of a blast furnace. See Figure 6.

The use of HBI in the Blast Furnace also results in a remarkable increase in productivity. AK Steel’s Middletown Blast Furnace is the highest productivity blast furnace in the world due in large part to the fact that they charge a significant about of metallic iron.

The modern direct reduction industry is continuing to evolve and the industry’s view on DRI and methods of production is changing. Natural-gas based DR will continue to growth and thrive, but increasingly more plants will also utilize alternative fuels. Using other sources to produce syngas from coal sources or utilizing off gases from coke ovens to make DRI will create new markets. More than 11 million tons of new MIDREX® capacity will be commissioned within the next 2 years and three million tons of that new capacity will utilize coal sources rather than natural gas to produce DRI in the MIDREX® Shaft Furnace. The product of these technologies in the form of cold DRI, HBI and HDRI will also continue to expand beyond use in the EAF. Steel producers today have a new outlook for DRI. Putting Things into Proper Perspective, the future is here, and it means growing usage and application of alternative fuels as well as the expanded possibilities for product usage.
MIDREX News & Views

Midrex launches Indian Office for the growing Indian DR market

Midrex Technologies India Private, Ltd. to provide DRI options for growing industry

“The India steel industry is growing and in order to continue that growth the country will need better metallics and better methods of production that utilize the country’s natural resources.”

Midrex has announced the opening of a new office, Midrex Technologies India Private Limited, located outside of Delhi in Gurgaon, Haryana India. The new office will be Midrex’s Indian Sales Headquarters to promote MXCOL®, MIDREX®, and COREX®/MIDREX® Plant sales and development.

“The India steel industry is growing and in order to continue that growth the country will need better metallics and better methods of production that utilize the country’s natural resources,” President & CEO of Midrex Technologies, Inc. James D. McClaskey said. “Midrex’s Shaft Furnace DR technologies such as MXCOL, which can use syngas produced through coal sources, represent new technological innovations that can bring India better iron products while utilizing the region’s indigenous coals.”

The growth of direct reduced iron (DRI) production in India shrank slightly in 2011 as rotary kiln production decreased, but demand continues to increase for more efficient DRI production through shaft furnace technology. Midrex’s innovative ironmaking technologies, such as coal-based MXCOL® are ideally suited to provide high quality iron for India’s steelmakers.

“Continued growth in emerging markets creates a need for DRI and other iron products from Midrex’s technologies,” stated Kevin C. Woody, Managing Director of Midrex Technologies India Private Limited. “Midrex India will work with the leading steelmakers in this region to bring them the benefits of Midrex’s cutting-edge technologies and expertise that has spanned the globe over the past 40 years.”

Midrex Technologies India Private Limited is located at Unit 602 A, 6th Floor, Global Foyer, Golf Course Road, Gurgaon-122002, Haryana, India and will be staffed by local Indian personnel with additional personnel from Midrex’s main office in the USA.

The opening of the office continues the expansion of Midrex’s global presence. The company now has offices or representatives in London, Venezuela, Russia, Australia, and China. For more information on Midrex Technologies, Inc. or its direct reduction technologies including MXCOL® please visit www.midrex.com.
Praxair and Midrex sign Strategic Alliance Agreement to commercialize new technology to produce DRI using alternate fuels

Midrex Technologies Inc. and Praxair, Inc. (NYSE: PX) have signed a strategic alliance agreement to develop and market a new Thermal Reactor System that will allow the production of direct reduced iron (DRI) with a variety of fuels such as coke oven gas. The Thermal Reactor System will use an innovative partial oxidation technology to convert hydrocarbon fuels into high quality, high temperature syngas suitable for DRI production.

“Midrex is the global market leader in shaft furnace DRI technology and we are very excited to be working with them”, said Pravin Mathur, director of Business Development for Praxair. Under this alliance, Midrex and Praxair will perform a demonstration of the new technology at Midrex’s extensive DRI research facilities in Charlotte, NC later this year.

“With the help of Praxair’s unique technology, we can open up new markets and offer more attractive choices for the production of DRI, especially in regions where traditional DRI fuels such as natural gas are not economically available”, said Stephen Montague, Vice President of Sales and Marketing for Midrex Technologies, Inc.

Praxair, Inc. is the largest industrial gases company in North and South America and one of the largest worldwide, with 2011 sales of $11 billion. The company produces, sells and distributes atmospheric and process gases and high-performance surface coatings. Praxair products, services and technologies are making our planet more productive by bringing efficiency and environmental benefits to a wide variety of industries, including aerospace, chemicals, food and beverage, electronics, energy, healthcare, manufacturing, metals and others. More information on Praxair is available on the Internet at www.praxair.com.