

DIRECT FROM MIDREX

4TH QUARTER 2008

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Commentary

Happy Silver Anniversary

From 1974 until 1983, Midrex Technologies (then Midrex Corporation) was owned by Korf Industries. During the steel industry downturn in the early 1980s, Korf declared bankruptcy and was required to sell Midrex. Kobe Steel, Ltd (KSL) had a keen interest in the company because of its involvement in the QASCO (now Qatar Steel) MIDREX® Project. KSL's role included turnkey construction of the plant, meltshop and rolling mill; a management services contract; and twenty percent ownership in the company. The plant has had an outstanding record since start-up.

After intensive due diligence, KSL announced the purchase of Midrex on August 25, 1983. Mr. Taisuke Mori, Executive Vice Chairman of KSL, described KSL's interest: "The technical excellence of the MIDREX® Direct Reduction Process is testimony to the research and development and engineering capabilities of Midrex people... Kobe Steel will become an active partner with Midrex in developing some new projects by providing turnkey project capabilities and alternative financing programs." From our perspective, and I believe from KSL's also, the last 25 years have been a very rewarding partnership. KSL has always taken a long-term, strategic view of business and has supported us through some very difficult times. KSL and Midrex have worked together quite well over these last 25 years, most recently with the Qatar Steel and Shadeed Projects. In addition to the MIDREX Process business, we are now working together to commercialize rotary hearth furnace technology, including FASTMET® and ITmk3®. Little did we know when we began our relationship 25 years ago that we would diversify into coal-based technologies. These processes have great promise and the first US plant is now under construction in Minnesota.

One of KSL's medium-term goals is to increase sales of "Only One" products, i.e., offerings that are unique. Both the MIDREX Process and ITmk3 fit this description and KSL appreciates Midrex's innovative spirit. With the severe financial downturn now being experienced world-wide, which was due in part to short-term thinking, we can take



*Jim McClaskey
President & CEO*

a lesson from the long-term perspective typically taken by Japanese companies. That approach has certainly benefitted Midrex over the years. It will take some time, but we will get through this difficult period and the steel industry will grow once again to meet the world's needs for infrastructure and consumer and industrial products. DRI, HBI and ITmk3 Nuggets are important inputs for the world's steelmakers and we remain dedicated to continue to develop and commercialize new technologies and products that provide even further enhancements of our technologies for the benefit of our customers. I have been personally involved with KSL professionals since the beginning and I have enjoyed our collaboration over the years. Midrex looks forward to a bright future with KSL and we thank them for their strong support during the last quarter century. Arigato gozaimasu!

MISSION STATEMENT

Midrex Technologies, Inc. will be a leader in design and integration of solids and gas processes. We will meet or exceed performance expectations, execute projects on time, enhance existing product lines, and provide value-added design, procurement, logistics and field services to our clients. We will develop new business opportunities that will challenge our employees and maintain the economic vitality of our company. Our employees are the key to our success, and we are committed to encouraging them to grow professionally and personally.

For the latest information, visit www.midrex.com

MIDREX® TECHNOLOGY

FOR THE MENA REGION



By Todd Ames
Plant Sales Manager

INTRODUCTION

The growth of the worldwide direct reduction industry in the last five years has been remarkable, with total production increasing from 45 million tons (Mt) to 67 Mt. The transition has been from traditional cold discharge to hot briquetted iron plants, to the new flexibility of hot discharge and combination plants. Steelmakers around the world have seen the value associated with using DRI as a clean, reliable, high purity metallic feedstock for electric arc furnaces. (EAF)

Now we are all faced by a new and quite serious challenge. The recent international economic downturn has dramatically lowered steel prices and steel mill profitability. Every day we read press releases about major steel producers cutting production due to lack of demand for steel products. Steel has joined the downward spiral of other commodities such as food, energy and clothing.

It is a matter of time until our international financial imbalances are corrected and steel market stability is reached.

Unfortunately, pricing speculation in a low volume environment is a recipe for volatility! It appears price bottoms have been reached. Some steel making raw material and finished goods prices have increased slightly. ArcelorMittal has suggested that the first quarter 2009 European hot-rolled coil pricing basis will be € 500/ton, close to the average operating cost of integrated mills. It is likely that the 2009 benchmark iron ore and pellet prices will decrease substantially from 2008 levels. Based on the views of industry experts, a substantial overall recovery will not occur until late 2009 or early 2010.

THE NEED FOR DRI AND ADVANTAGES OF MENA

In all of this turmoil, let us be mindful of a few basic fundamentals of EAF steelmaking. First, reliability, quality and cost of scrap supply will continue to be a key concern for steelmakers, particularly the low residual scrap required for higher grade steel products. Second, economic growth in the developing countries will continue to drive steel demand. Third, specific areas of the world will have a distinct advantage in an upturn.

Abundant and low-cost natural gas (~\$1/MMBtu)
Low-cost electricity
Good access to seaborne trade of iron ore
Lack of large-scale scrap generation
Availability of project financing
Scrap price volatility

Table I - Factors Favoring DRI Production in MENA



Qatar Steel Module 1



Tuwairqi Steel Mills



Shadeed



Steelmakers with low cost natural gas and electricity combined with competitively priced iron oxide pellets will be hard to match.

Nowhere else in the world are these factors more prevalent than in the Middle East/ North Africa (MENA) region. Utilizing the area's natural energy resources to find solutions to metallic shortages through direct reduction facilities has allowed for increased EAF steelmaking. The demand for MENA steel has resulted from the strong growth and improved infrastructure throughout the region. The Arabian Gulf has been the area of most demand, but we expect North Africa to become increasingly important and countries with good potential include Egypt, Libya, and Algeria. Table I lists factors favoring DRI production in MENA.

This year marks the 30th anniversary of the first MIDREX® Plant started up in the Middle East area, Module I at Qatar Steel Co. The MENA region has become a powerful entity in the global steel industry and with new projects announced and others being commissioned, the future for this region is certainly bright.

There is now over 15 million tons per year (Mtpy) of new MIDREX® Direct Reduction Process capacity recently started up or under construction worldwide. Two thirds of this capacity, nearly nine million tons, is located in the MENA region, as shown in Table II. This is only contracted capacity and Midrex expects to contract more modules in the near future.

PLANT	Country	Start-Up	Capacity (tpy)	Product
Al-Tuwairqi Dammam	Saudi Arabia	2007	1,000,000	Cold DRI
Hadeed Mod E	Saudi Arabia	2007	1,760,000	Hot & Cold DRI
Qatar Steel Module 2	Qatar	2007	1,500,000	Cold DRI & HBI
Shadeed	Oman	2009	1,500,000	HOTLINK® & HBI
Tuwairqi Steel Mills	Pakistan	2009	1,280,000	Hot & Cold DRI
ESISCO	Egypt	2010	1,760,000	HOTLINK®
TOTAL			8,800,000	

Table II - New MENA MIDREX Projects

GET IT WHILE IT'S HOT

The most striking feature of these plants is the predominance of hot discharge designs. This includes plants for the production of hot briquetted iron for merchant sale and hot DRI (HDRI) for charging to an adjacent EAF.

Midrex offers three options for hot discharge/transport/EAF charging: HOTLINK®, a hot transport conveyor, and hot transport containers. Clients are selecting these options because of the significant benefits of HDRI use, including increased steelmaking capacity and reduced energy consumption. The three designs have been incorporated in plants starting up from 2007-2010. The energy and productivity benefits this provides are outstanding, and clients the world over have realized the benefits of linking a MIDREX Plant with a near-by EAF. Based on 2007-2008 costs and profits, hot charging of DRI to the EAF results in a profit increase of \$24-48 million per year. The MENA region is the only area in the world to have such a broad spectrum of hot charging implemented or scheduled to be implemented.

Figure 1 shows the MIDREX Shaft Furnace at the Hadeed Module E, along with the hot transport conveyor and meltshop building. The complex started up in 2007 and the results of using hot (500° C) and moderate carbon (2.5%) DRI in the meltshop have been very good.

In addition to the hot discharge feature, there must be an option for discharging cold product for times when the meltshop is down. This can be cold DRI (CDRI) or HBI. The HBI option also provides the plant the ability to sell merchant HBI if it cannot use all the DRI produced. Figure 2 shows Qatar Steel Module II, that also started up in 2007 and has the hot briquetting option.



Figure 1 - Hadeed E MIDREX Module



Figure 2 - Qatar Steel II MIDREX Module

WHY CHOOSE MIDREX?

When choosing a direct reduction technology for pairing with an EAF meltshop to make long or flat products, there are many factors to consider. What are the advantages of the MIDREX Process?

- Flexibility with regard to iron ore, capacity and product characteristics
- Superior furnace flow characteristics
- Ongoing commitment to process and equipment development
- MIDREX Plants typically exceed design capacity: 130 percent capacity utilization in 2007
Over the last four years, Qatar Steel I has produced at 210 percent of design capacity and the three modules at EZDK (Egypt) have produced at 120-135 percent of capacity
- Reliability, low risk
- Proven high productivity design: Hadeed Module E is rated at 1.76 Mtpy and produced above that rate from May-October 2008

- Midrex training that develops skilled and motivated operators: the 11 MIDREX Plants started up since 2006 represent over 500 plant operations and maintenance personnel trained by Midrex experts.
- Client commitment: many repeat clients, established long-term relationships, and the yearly Midrex Operations Seminar

CONCLUSIONS

Although the world steel industry is facing a difficult period because of reduced demand, recovery will come, driven by growth in the developing world and the need for steel to support that growth. DRI has a bright future in MENA because of the region's expansion and tightness in the metallics market (scrap, pig iron, DRI/HBI). MENA is ideally positioned to produce DRI and HBI because of the abundance of natural gas, low cost electricity and the access to quality iron oxide. MIDREX Technology provides an efficient and reliable solution that has been widely adopted. MENA is becoming a powerful entity in the global steel industry and with new projects announced and others being commissioned, the future for this region is certainly bright.

MARKET ANALYSIS



By Robert Hunter
Midrex Technologies

Such incredible changes over a very short time.

Within only a few months, the world has gone from steel, scrap and commodities prices in general, that were the highest ever seen, by far, to declines of three-to-one, five-to-one and even more. This past summer, finished steel was selling for prices on the order of \$1200/t, and in some locations even above \$1500/t. Now, prices range from around \$450/t up to \$700/t. At the peak of the market, in late July, prime grades of steel scrap and other low residual iron units (pig iron and DRI/HBI) were demanding from \$800/t up to \$1000/t. For instance, #1 busheling was selling for \$890/GT in Chicago and Pittsburgh. By late October the price had fallen to \$125/GT in Chicago and \$135/GT in Pittsburgh. (See Figure I)

WHAT HAPPENED?

ACTUALLY TWO THINGS HAPPENED.

The first was part of a cyclical worldwide commodities boom and bust. This happens every few decades, whenever a broad surge of economic growth occurs and worldwide demand exceeds supply. The most recent peak had been in the mid-1970's. This latest peak had been quite prolonged, beginning in early-2004 and continuing through the spring of 2008. It brought the prices of steel and scrap to astronomical levels. But, when corrected for inflation (as noted in prior articles in DFM), the price level of this peak was similar to earlier peaks, in 1974, 1956, and in 1919.

By this past summer, the boom had run its course and commodities everywhere were overpriced. Crude oil exceeded \$147 per barrel, copper was \$9,000 per ton, yellow corn was \$8 per bushel and cotton was over 90 cents per pound. As the boom turned to bust, prices began declining rapidly, similar to the decline of the steel and iron markets.

The second force affecting the markets was the freezing of

credit around the world. Stemming from poorly collateralized loans in the United States and from overleveraged banking across much of the western world, the financial crisis brought commerce everywhere to a near halt in a remarkably short time. A good measure of how swiftly and how absolutely business went from "full speed ahead" to "halt" can be seen in the daily price of dry bulk vessels, especially the largest ones, the Capesize vessels. In mid-summer typical Capesize vessels were chartering for nearly \$250,000 per day. A few weeks ago, Cargill was able to charter a vessel of over 180,000 tons for only \$1,000 per day. Obviously, the fleet is idle and owners are willing to let their ships if someone will merely offer to cover their operating costs. The coincidence of this credit crisis on top of the commodities boom has driven prices to lows not seen in many years.

WHERE TO NOW?

So, what happens next? The most important, and necessary, development is to solve the credit crisis. Governments are taking gargantuan steps toward accomplishing this and trillions of dollars are being spent to underpin the economy. The governments need to continue doing so, until we can be assured that the banking system, and the economy, can and will, operate. A measure of banks' willingness to loan is the amount of mark-up they place on those loans. One index that tracks this quite well is the "Ted Spread", (See Figure 2) the difference between the market rate for US Treasuries (essentially, the banks' borrowing cost) and the London Interbank Rate (their loaning rate to one another). The higher the spread, the more careful the banks are, the less willing they are to loan. As in figure 2, it can be seen that worries rose suddenly more than a year ago as the spread increased from around 15 to 35 basis points up to a range of 100 to 200 basis points.

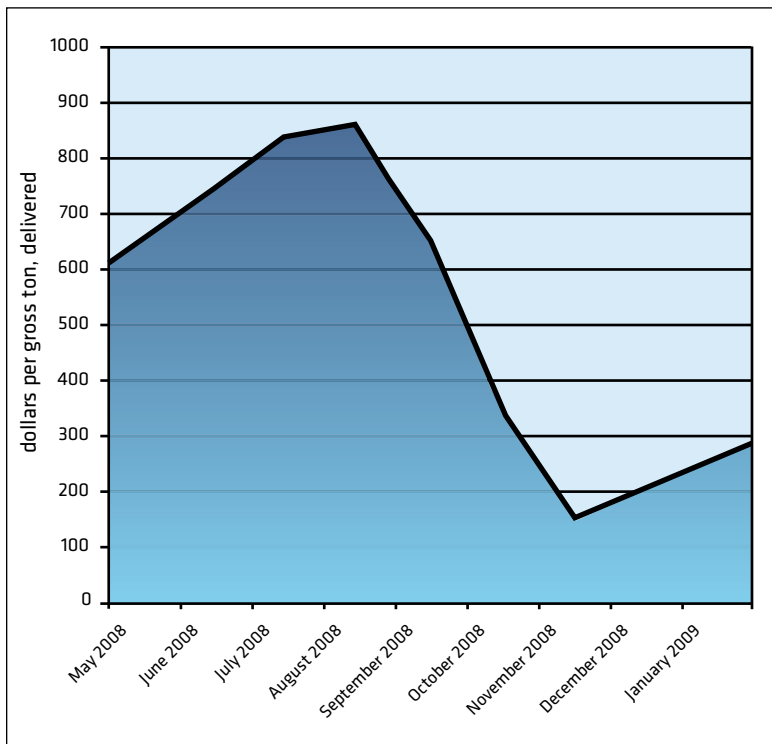


Figure 1 - #1 busheling composite

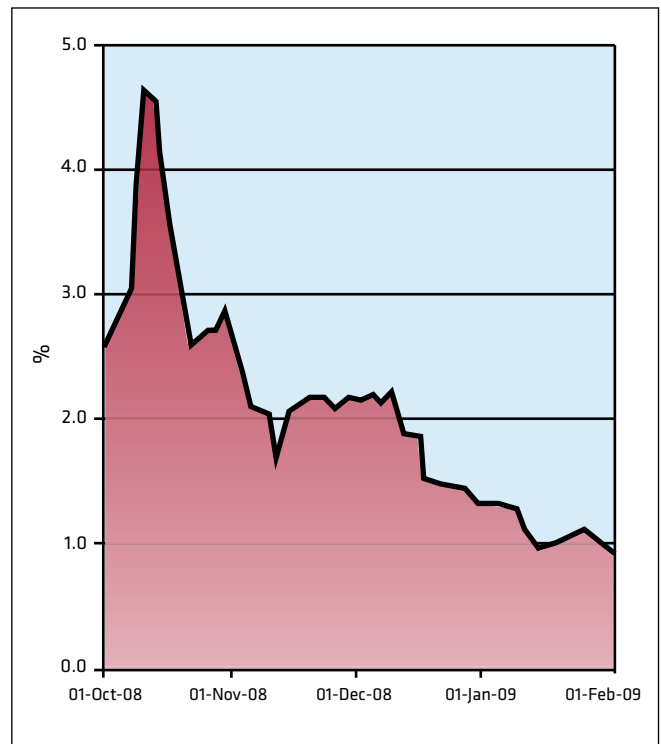


Figure 2 - Ted Spread

Then in late September and early October, the credit crisis occurred as this spread increased to 464 basis points. Credit simply froze. Recently, the spread has further declined to around 100 basis points; low enough that the economy can function, but still so high that growth will be very slow. This drop in the Ted Spread is a “light at the end of the tunnel”; a sign that the situation is beginning to return to normal.

The other factor, the commodities boom and bust works on a far longer time scale, decades. It is a fundamental force so strong that not even the credit crisis will stop it. As Gordon Brown, Prime Minister of the United Kingdom, stated, despite the credit crisis, “by 2020, world GDP will still be twice what it is today.” It is generally expected that future growth will resemble recent growth, concentrated in the developing nations.

THE IMMEDIATE FUTURE ...

Within the next few months, we should see a rapid increase in economic activity. Scrap prices and steel prices will move accordingly. This is essentially a technical response to the downturn ‘bouncing’ off the bottom. To some extent, it is likely to be a false dawn. That is, it will most likely rise too quickly, and therefore need to fall back a bit, before the real recovery resumes. A genuine return to normalcy is not expected until sometime in the latter part of 2009.

AND, A FEW YEARS FROM NOW

(Even though it is impossible to forecast the future, often we are required to try.)

Within two or three years, it is very likely that growth will have accelerated enough that pricing will be again somewhat higher than normal, much as we saw from 2004 through 2006. The futures market for crude oil can be used as a predictor of future growth and future prices. Typically one ton of standard, cut scrap steel, such as #1 HMS costs about four times the price of a barrel of oil. So, with the NYMEX Crude Oil Futures contract for December, 2010 (two years from the time this is being written, in mid-December, 2008) at about \$62.50, we might expect number one heavy melting scrap to be up around \$250/t. Similarly, following typical correlations, prime scrap grades would be about \$325/t, and pig iron might be somewhere just below \$400/t. Compared to the prices of mid-summer 2008, these seem very low, but compared to the pricing of all other history they are very high. And, one should keep in mind, the pricing of raw materials used to produce goods, such as pig iron, and the prices of products manufactured from these goods will move correspondingly.

As growth returns, we will again see that the steel industry must move ahead with that growth. Steel growth outside of China will be primarily EAF's and with China having a base of steel to recycle, we will see more and more EAF's built within the country. And, yes, again, we will see the requirement for iron metallics become a key issue for success in the steel industry.

SUCCESS

Since 1969, more than 70 shaft furnace and rotary hearth furnace modules have been built across five continents.

Argentina
Canada
Egypt
Germany
India
Libya
Malaysia
Mexico
Nigeria
Oman
Pakistan
Qatar
Russia
Saudi Arabia
South Africa
United States
Trinidad & Tobago
Venezuela



Midrex would like to thank the steel industry for making us the world leader in direct reduction.

Christopher M. Ravenscroft: Editor

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