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**SULPHUR FORMING & HANDLING –  
MIDDLE EAST & CASPIAN**

**by**

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**All the papers and presentations prepared for the IFA  
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# **Sulphur Forming & Handling - Middle East & Caspian**

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## ***[Slide #1]***

Venue – International Fertilizer Association – Production and International Trade Conference –  
Dubai, United Arab Emirates – October 5, 2004

## ***[Slide #2 – Personal Introduction]***

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## ***[Slide #3 – Presentation Introduction]***

Sulphur Forming & Handling – Middle East & Caspian

## ***[Slide #4 – Contact Information]***

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## ***[Slide #5 – Enersul's International Projects]***

Slate

Wet Prilling

GX Granulation

Slate will soon be eliminated from the market in North America and Wet Prilling will be phased out as plant age dictates.

## ***[Slide #6 – Map of United Arab Emirates]***

Liquid sulphur production facilities in the United Arab Emirates include Habshan, Das Island, Umm Al Nar and Ruwais, however sulphur forming and loading is limited to Ruwais. Habshan and Das Island are the major producers while Ruwais and Umm Al Nar produce a negligible amount of sulphur.

## ***[Slide #7 – TAKREER, Ruwais GXMI Granulating Units # 1 - 5]***

***[Slide #8 – TAKREER, Ruwais GXM1 Granulating Units # 6 - 9]***

Location – 250 km. West of Abu Dhabi.  
Producing units – 9 Enersul GXM1 Granulators.  
Forming capacity – 8,650 tonnes per day.  
Daily production – 5,400 tonnes per day.  
Formed sulphur storage capacity – 150,000 tonnes.  
Liquid sulphur storage capacity – 37,000 tonnes.  
Loading type – ship.  
Loading rate – 1,200 tonnes per hour.  
Liquid loading – yes, ship.  
Block pouring – No.

Currently planning an expansion project that may include the following:

- Increase formed sulphur storage capacity to 260,000 tonnes.
- Increase forming capacity to 12,000 tonnes per day.
- Add a second ship loader.
- Incorporate “foam” type Dust Suppressant System for all loaded product.

***[Slide #9 – Map of Qatar]***

Sulphur forming and loading at Ras Laffan and Mesaieed.

***[Slide #10 – QAPCO, Mesaieed GX Granulating Unit]***

Location – 50 km. South of Doha.  
Producing unit – 1 Enersul GXM1 Granulator.  
Forming capacity – 900 tonnes per day.  
Daily production – 450 tonnes per day (+ 150 tpd from Q-Chem).  
Formed sulphur storage capacity – 35,000 tonnes.  
Liquid sulphur storage capacity – negligible.  
Loading type – ship.  
Loading rate – 400 tph.  
Liquid loading – No.  
Block pouring – No.

No major plans for production increase from this area of Qatar.

***[Slide #11 – Qatargas, Ras Laffan GXM1 Granulating Unit]***

Location – 90 km. North of Doha.  
Producing unit – 1 Enersul GXM1 Granulator.  
Forming capacity – 800 tonnes per day.  
Daily production – 280 tonnes per day.  
Formed sulphur storage capacity – 20,000 tonnes, shared with Rasgas.  
Liquid sulphur storage capacity – 800 tonnes.  
Loading type – ship, shared with Rasgas.  
Loading rate – 1,000 tph.  
Liquid loading – No.  
Block pouring – No.

Major expansion plans for Ras Laffan, see slide 13 for information.

***[Slide #12 – Rasgas, Ras Laffan GXM1 Granulating Unit]***

Location – 90 km. North of Doha.

Producing unit – 1 Enersul GXM1 Granulator.

Forming capacity – 900 tonnes per day.

Daily production – 350 tonnes per day.

Formed sulphur storage capacity – 28,000 tonnes, shared with Qatargas.

Liquid sulphur storage capacity – 800 tonnes.

Loading type – ship, shared with Qatargas.

Loading rate – 800 tph.

Liquid loading – No.

Block pouring – No.

Major expansion plans for Ras Laffan, see slide 13 for information.

***[Slide #13– Ras Laffan Centralized Forming & Dolphin, FEED]***

Phase 1, 2007 – 5 GXM1 Granulating Units with a forming capacity of 6,000 tonnes per day, 150,000 tonnes storage, 10,000 tonnes liquid sulphur storage, 1,200 tph ship loader.

Subsequent phases up to 2015 may include up to 18 GXM1 Granulating Units with a forming capacity of 21,600 tonnes per day, 2 – 150,000 tonne storage facilities, 2 – ship loaders, 40,000 tonnes liquid sulphur storage.

It is anticipated that this centralized forming facility will include all liquid sulphur produced in Ras Laffan which could be 12 – 15 gas to liquid facilities, including Qatargas and Rasgas.

Dolphin project expected to be 1,000 tpd of sulphur production and may be an independent forming facility at Ras Laffan. It will include 2 Enersul GXM2 Granulating Units.

***[Slide #14 – Map of Kuwait]***

Location – 20 km. South of Kuwait City.

Producing units – 3 Enersul GXM1 Granulators.

Forming capacity – 3,300 tonnes per day.

Daily production – 2,300 tonnes per day.

Formed sulphur storage capacity – 90,000 tonnes.

Liquid sulphur storage capacity – 14,000 tonnes.

Loading type – Ship.

Loading rate – 350 tph.

Liquid loading – No.

Block pouring – No.

KNPC will be completing an expansion project in 2 – 3 years that will increase their forming capacity to 4,400 tonnes per day and their ship-loading rate to 1,200 to 1,400 tonnes per hour.

***[Slide #15 – Map of Iran]***

- Crushed bulk sulphur truck/train from Khangiran to Bandar Abbas for export. There should be PNS forming (800 tpd) at this location soon. Block pouring continues.
- Production from Razi Petrochemical Complex in Bandar Emam Khomeyni consists of 2 – 800 tpd trains and Kharg Petrochemical Company has a single sulphur forming unit of the same capacity.
- South Pars Gas Development has several phases commissioned, under construction or in the planning stage. Phases 1 and 2/3 have Enersul GXM1 Granulating Units each with a forming capacity of 1,100 tpd but actual daily production is/will be in the neighborhood of 200 to 250 tpd.
- South Pars Phases 4/5 will be 1 – Enersul GXM2 with a forming capacity of 500 tpd, actual production unknown.
- South Pars Phases 9/10 is anticipated to have 1 – Enersul GXM2 Granulating Unit with a production capacity of 500 tpd, actual production is expected to be 4 – 500 tpd.
- South Pars Phases 15/16 is expected to be either 1 or 2 Enersul GXM2 Granulating Units with a forming capacity of 500 tpd each. Actual production is expected in the 500 tpd range.
- It is expected that acid gas from South Pars Phases 6-8 will be re-injected, so there will be no sulphur forming.
- Other Phases will be developed over the next few years, with similar sulphur production rates, market conditions will dictate re-injection or sulphur forming.

***[Slide #16 – Map of Saudi Arabia]***

Location – Centralized forming at Jubail Industrial City.

Producing units – 6 Devco Pelletizers.

Forming capacity – 10,500 tonnes per day.

Daily production – 7,000 tonnes per day.

Formed sulphur storage capacity – 80,000 tonnes.

Liquid sulphur storage capacity – 50,000 tonnes at Berri, 25,000 at Jubail.

Loading type – Ship.

Loading rate – 2,000 tph.

Liquid loading – No.

Block pouring – Yes at Berri Gas Plant.

***[Slide #17 – Map of Bahrain]***

Location – Mina Sitra.

Producing unit – Wet sulphur pelletizing system.

Forming capacity – 400 tpd.

Daily production – 250 tpd, 500 tonnes per day late 2006.

Formed sulphur storage capacity – 30,000 tonne open stockpile

Liquid sulphur storage capacity – 500 tonnes.

Loading type – Truck to Mina Sulman Port, then to ship via a portable truck off load / ship loading system.

Loading rate – 1,700 tonnes per day.

Liquid loading – No

Block pouring – No

***[Slide #18 – Map of Oman]***

Sulphur production almost negligible with a small amount being produced at refinery near Muscat and about 150 tpd expected from the refinery at Suhar, 300 kilometers Northwest of Muscat.

***[Slide #19 – Tengizchevroil, Kazakhstan]***

Location – Northeast Caspian Sea, Kazakhstan.  
Producing unit – 2 Enersul GXM1 Granulators.  
Forming capacity – 2,400 tonnes per day.  
Daily production – 6,000 tonnes per day.  
Formed sulphur storage capacity – 150,000 tonnes.  
Liquid sulphur storage capacity – 20,000 tonnes.  
Loading type – Train. Black Sea port for international export.  
Loading rate – 680 tonnes per hour.  
Liquid loading – Yes – Train.  
Block pouring – Yes, millions of tonnes in solid storage.

An additional 2 – Enersul GXM1 Units will be commissioned in the second quarter of 2005, which will increase forming capacity to 4,800 tpd. SGP expansion to add 2,500 tpd to liquid sulphur production.

It is expected that another Enersul GXM1 Granulating Unit will be added in Phase 3 sometime in the future.

**[Astrakhangazprom AGP, Astrakhan]**

Location – Northeast Caspian Sea, Astrakhan.  
Producing unit – Under construction – 5 Enersul GXM1 Granulators.  
Forming capacity – 6,000 tonnes per day.  
Daily production – 12,000 tonnes per day.  
Formed sulphur storage capacity – Will be 300,000 tonnes.  
Loading type – Train, Black Sea for International Export.  
Loading rate – 1,000 tonnes per hour.  
Liquid loading – Yes, train.  
Block pouring – Yes.

This facility is currently under construction and will be commissioned in the summer of 2006. It is expected that another 5 Enersul GXM1 Granulator Units will be added in Phase 2 sometime in the future.

**[AGIP-KCO, Astrakhan]**

This project is in the FEED stage and is expected to product 3,800 tpd at start up in 2008, which will most likely be formed by Enersul GXM1 Granulator Units. Final production numbers after Phase 3 could be as high as 10,000 tpd.

***[Slide #20 – Photo]***

Picture of loading in progress without the use of a “foam” type Dust Suppressant System.

***[Slide #21 – Photo]***

Picture of the same loading facility as in slide 20, only with the application of a “foam” type dust suppressant system.

***[Slide #22 – enersul.com]***

[www.enersul.com](http://www.enersul.com), Enersul web site.