

The Gas Recovery System Barge Recovery Presentation

Presents

Infracor GmbH
2002 ChemGas 16 VCM Barge
Decontamination Operations Project
Chemiepark Marl, Marl, Germany

Gulf Coast Consulting
Strategy & Technology Consulting
Houston TX

THE GRS DECONTAMINATION BARGE OPERATIONS PROJECT



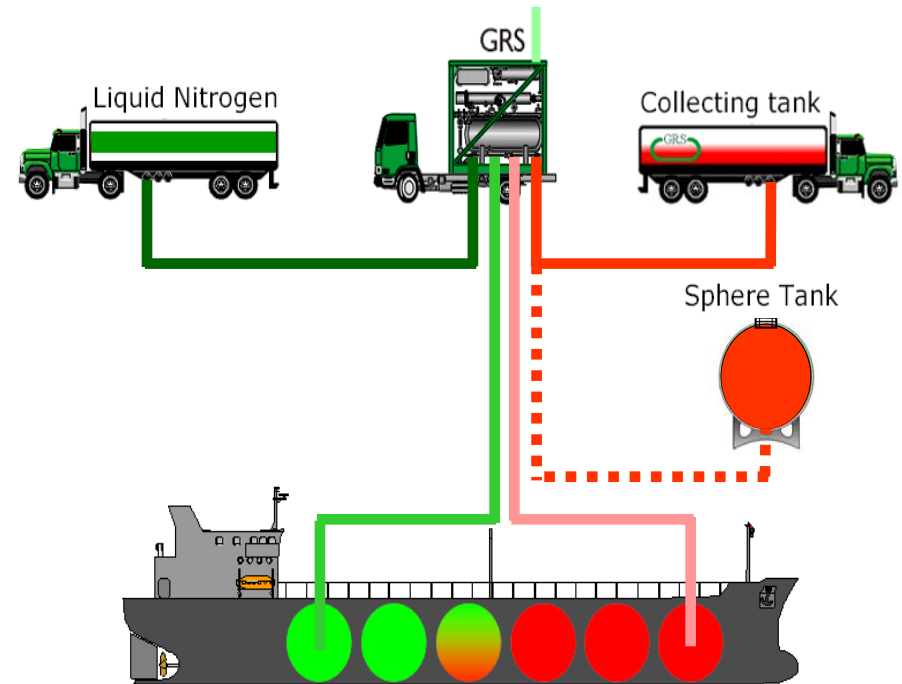
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CHEMGAS PROJECT

2002 ChemGas 16 Vinyl Chloride Barge
Decontamination Operations Project
Marl, Germany – Chemiepark Marl

Shipping Industry Gas Carriers

- Purge
- Clean
- Recover
- Reclaim
- Return



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SHIPPING APPLICATIONS

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The Gas Recovery System

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Infracor operates the **Marl Chemical Park**, the third largest integrated chemical production site in Germany. Marl is located on the River Lippe on the northern edge of the Ruhr industrial area and the southern edge of the Münsterland region. The Wesel-Datteln canal runs through the northern section of the site.



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INFRACOR CHEMISTRY SERVICES

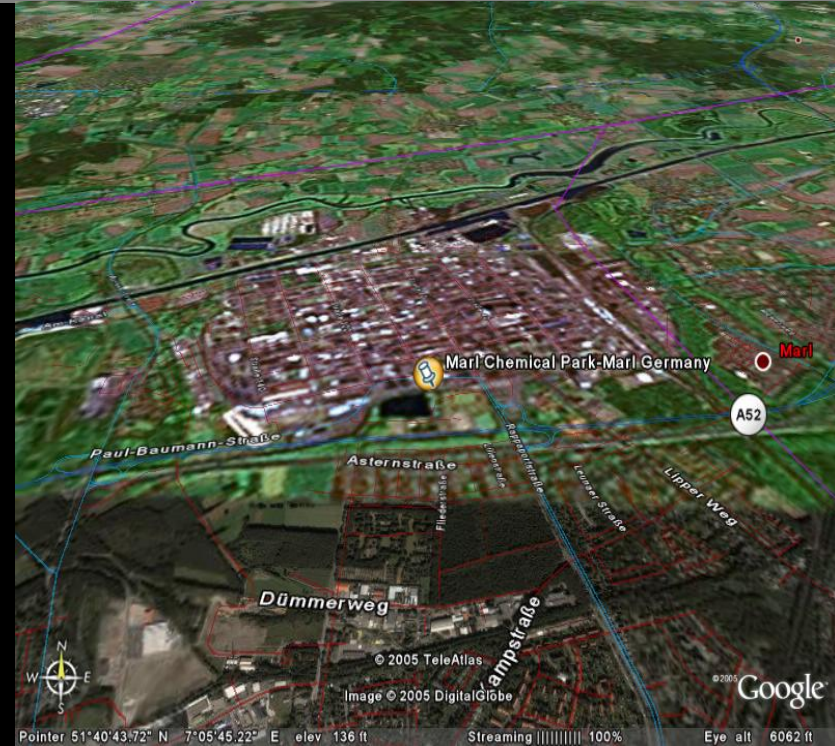
**2002 ChemGas 16 Vinyl Chloride Barge
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Marl, Germany – Chemiepark Marl**

Infracor - Marl Chemical Park

The Chemical Park is located on a 6.5 km² site. The production plants operated by the companies at the site have close links through integrated systems for the supply of energy and starting products. Most of the facilities operate around the clock.

The site comprises roughly 900 buildings and more than 100 production plants. It has 1,200 km of pipes, 30 km of which are routed over pipeline bridges.

Raw materials are delivered to the site by pipeline, road, rail and ship. Ethylene, propylene, C₄ hydrocarbons, benzene, methanol and natural gas are sourced via long-distance pipelines and on-site pipelines.



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MARL CHEMICAL PARK

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Chemgas 16 Barge Decontamination

At Chemipark Marl

- Chemgas 16, totally 2060 CBM,
(6) 343 CBM pressure tanks
- Last cargo vapors: Vinyl Chloride Monomer
- Starting condition 71.6°F and pressure of 3.89 bar
- **Planned Operational Phases**
 - Phase 1 Draining of Liquid
 - **Phase 2** **Pressure reduction**
 - Phase 3 Tank nitrogen stratification
 - Phase 4 Purging with nitrogen



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PROJECT CONDITIONS

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GRS Unit & Operator's Arrival

August 12th

7:00 P.M. Henk Wegh and Bård Norberg arrived at Chemiepark Marl for onsite inspection.

7:30 P.M. GRS unit arrived at Chemiepark Marl



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UNIT ARRIVAL

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GRS Installation Phase

August 13th

8:30 A.M. – 9:00 A.M. GRS unit lifted into position at site

9:00 A.M. – 4:00 P.M. Installation of GRS unit

- Connection of Nitrogen truck
- Connecting GRS unit to Chemgas 16
- Connection of electrical power
- Filling of propane
- Remaining propane filling postponed til next day

4:30 P.M. Checked into marl Hotel

7:00 P.M. Helge Johansen arrived Marl

Installation Phase

Time: 10 hrs: 30 min



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INSTALLATION PHASE

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Commissioning of GRS

August 14th

- 8:00 A.M. Unit arrives at site.
- Infracor connects GRS unit to terminal piping
- 8:30 A.M. – 10:30 A.M. Filling propane into GRS unit
- 10:30 A.M. – 1:30 P.M. Commissioning GRS unit

Commissioning Phase
Time: 5 hrs: 30 mins



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COMMISSIONING

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Chemgas 16 Recovery

Phase "1" – Draining Chemgas 16 Liquid

August 14th

- 1:30 P.M. Commenced draining liquid from the barge's tanks & piping system into the GRS unit
- Recovered VCM was pumped directly from the GRS unit to the Infracor VCM piping network
- 2:10 P.M. Environmental department of Infracor checked emissions of VCM from GRS ventstack to be less than 0.3 PPM
- 2:45 P.M. Liquid draining from Chemgas 16 completed
- Approximately 1000 kg of nitrogen was used in Phase 1

GRS Unit Flow Meter Reading:
Phase 1 Recovery: 1350 kg of VCM
Phase 1 Time: 1 hr: 15 mins



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PHASE 1

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Chemgas 16 Recovery Phase "3" Stratification

August 15th - Starting condition 1.456 bar

- 12:00 A.M. Started Nitrogen flow from GRS unit to the barge. Nitrogen evenly spreads to all 6 tanks

Recovery temperature -153.8°C

- 3:00 A.M. Phase "3" completed clear break through of rich nitrogen atmosphere entering the GRS unit from the barge Barge tank pressure 2.8 bar.

- Nitrogen consumption Phase "3" 7100 kg

GRS Unit Flow Meter Reading:

Phase 3 Recovery: 3680 kg of VCM

Phase 3 Time: 3 hrs: 00 mins



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PHASE 3

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Chemgas 16 Recovery Phase "4" Purging and gas freeing

August 15th - Starting condition 2.8 bar

- 3:00 A.M. Commenced Phase "4" Started flow of additional nitrogen from Infracore pipeline
- 9:00 A.M. Environmental department from Infracor checked emission from GRS unit to be less than 0.3 PPM
- 9:00 A.M. VCM tank content in Chemgas 16 measured by Dräger tubes to be less than 20 PPM
- 1:30 P.M. Less than 0.3 PPM of VCM measured in the tanks of Chemgas 16.
- Operation completed
- Nitrogen consumption in Phase "4" 7100 kg

GRS Unit Flow Meter Reading:
Phase 4 Recovery: 3670 kg of VCM
Phase 4 Time: 10 hrs: 30 mins



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PHASE 4

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GRS Dismantling Dismantling after completion

August 15th

1:30 P.M. – 7:00 P.M. Clearing GRS unit.

Dismantling all piping and electrical connection
with assistance of Chemgas 16 crew

Dismantling Phase

Time: 5 hrs: 30 mins

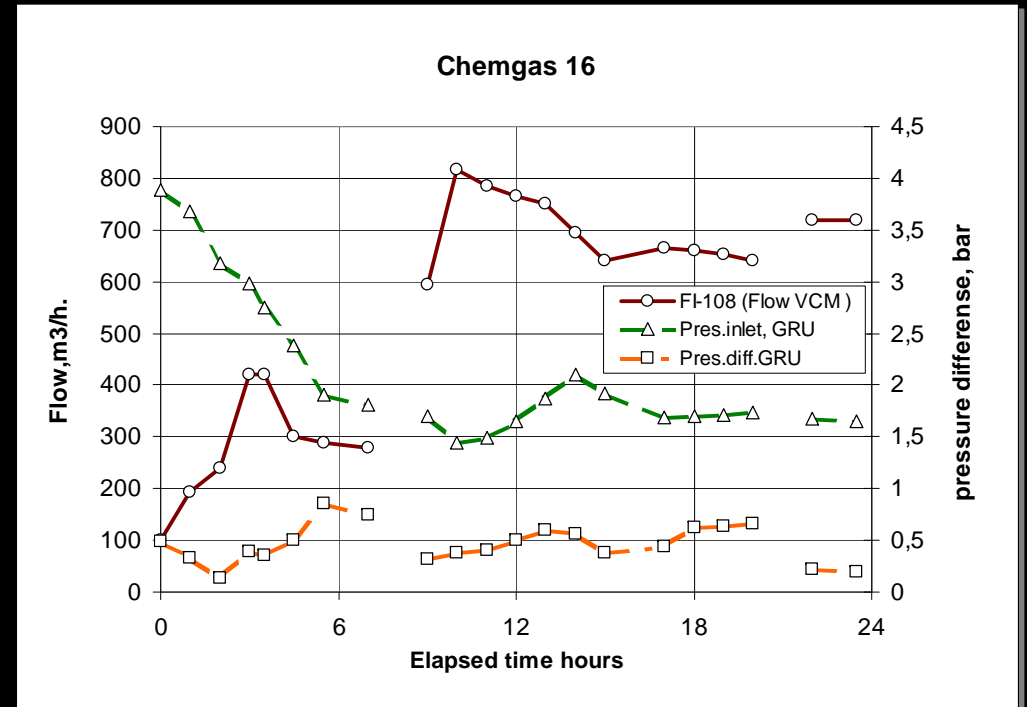


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DISMANTLING

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GRS Unit Flow & Pressures

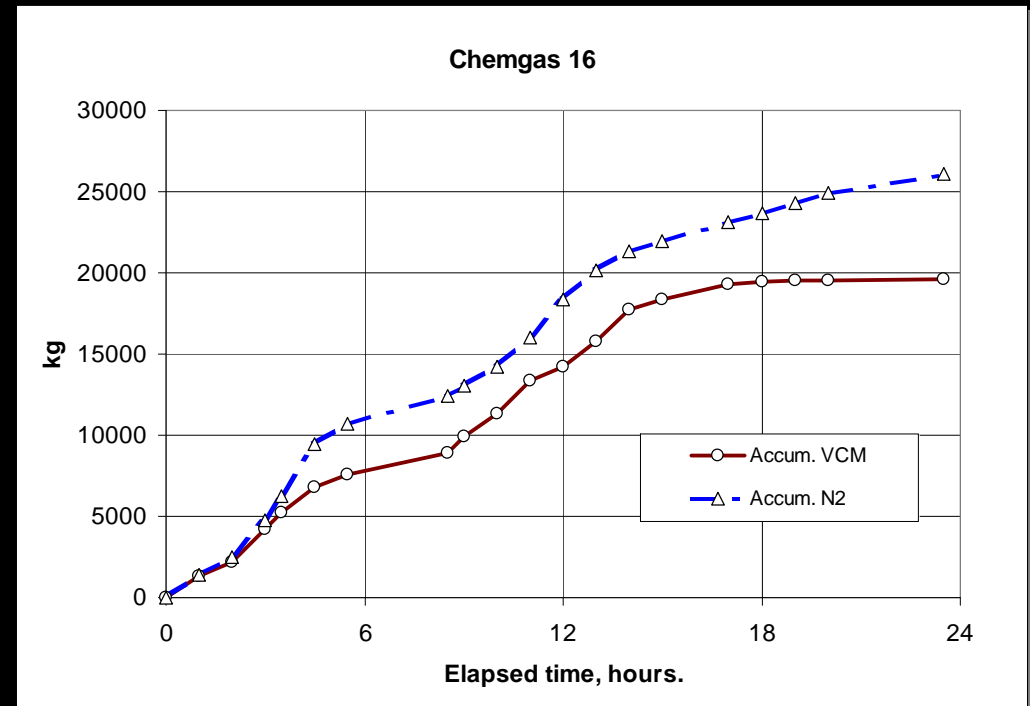


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FLOW & PRESSURE

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GRS Accumulated VCM & LIN



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VCM & LIN

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Operation Summary

Phase	Recovered	Nitrogen	Emission Ventstack
1	1350 kg	1000 kg	0 PPM
2	8700 kg	13800 kg	< 10 PPM/hr
3	3680 kg	7100 kg	<10 PPM/hr
4	3670 kg	7100 kg	<10 PPM/hr
All Phases	16140 kg	28500 kg	< 10 PPM/hr



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SUMMARY

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The Gas Recovery System



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GRS CLIENTS & PARTNERS

The GRS has achieved great results and repeat projects from major European and Australian service customers since 1998.

The GRS brings years of project partnerships with nitrogen suppliers such as AGA, BOC, Linde, and Air Products.

Vopak

Vintron

Simon Storage

Maersk Australia

Australian Vinyl Corporation

Norsk Hydro

Aga Norsk

Chemgas Shipping

Infracor Marl

Glaxo Smith Kline



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CLIENTS

These are some of the serviced worldwide clients the GRS has provided decontamination or sphere mandated inspections. We have achieved great results and created repeat customers through 2010. The next scheduled GRS project is our repeat client Australian Vinyl Corporation and their 3300 CBM sphere inspection.

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The GRS Demonstration was a Success!

On May 4, 2006, the GRS recovered for the first time ever, an Isobutane Barge for Kirby Inland Marine, LP in Channelview, Texas

Acro Technologies, Inc certified this recovery event with official results charts. [Click link to see Final Recovery Charts.](#)

AIM Laboratory provided LIVE Online Gas Chromatograph Process Reporting continuously during entire operation.



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DEMONSTRATION

In May 2006, Gulf Coast Consulting will host the first ever GRS, U.S. Demonstration at Kirby's Barge Flare Dock. The subject is a typically purged and flared 33,000Mb 1,3 Butadiene Barge with an estimated 81,000 lbs heel . A full results report will be posted at our website for viewing just after this demonstration.

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GRS CONTACTS



Gas Recovery Systems

*Exclusively Licensed to
Gulf Coast Consulting
for North & South America*

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Strategy & Technology Consulting

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CONTACTS

Contact your national authorized GRS sales/marketing representatives at Acro Technologies, Inc. or Gulf Coast Consulting for additional detailed information on the Gas Recovery System. We welcome your inquiries on the GRS by emailing us at: **GRS@gulfcoastconsulting.net**.

The Gas Recovery System Barge Presentation

Thank you for viewing.



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Houston TX