

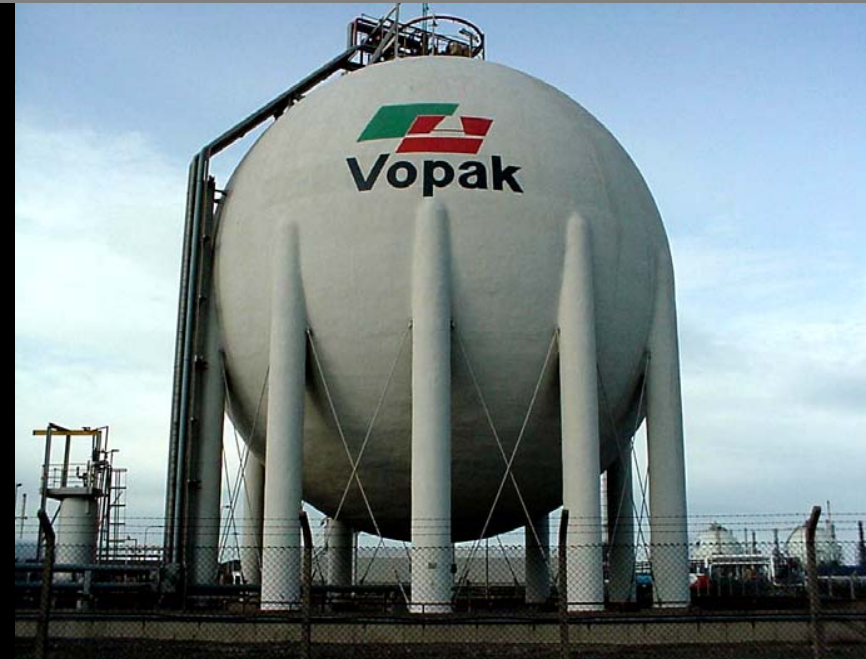
The Gas Recovery System Sphere Recovery Presentation

Presents

Vopak Royal Inc.
2001 Vopak 6650 CBM VCM Sphere
Decontamination Operations Project
Teeside, Australia

Gulf Coast Consulting
Strategy & Technology Consulting
Houston TX

THE GRS DECONTAMINATION SPHERE OPERATIONS PROJECT



VOPAK
2001
AUSTRALIA

Introduction

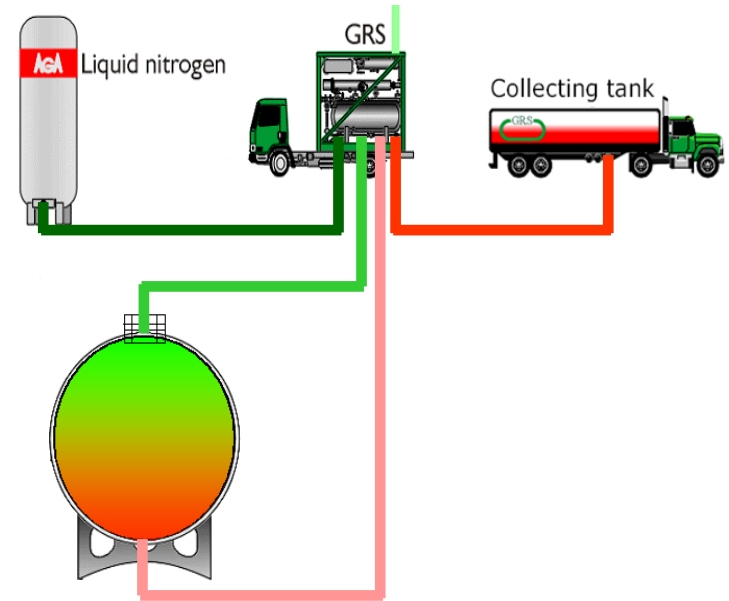
- Project Conditions
- Shipping Preparations
- Unit Connections
- Power Connections
- Controls Trailer
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VOPAK PROJECT

2001 Vopak 6650 CBM VCM Sphere
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Teeside, Australia

Petrochemical Industry Storage Sphere Operations

- Decontamination
- Degassing
- Gassing-up
- Cooling-off
- Pressure Release Recovery



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Project Conditions

· Sphere Recovery Product

- Vinyl Chloride Monomer

· VOPAK Sphere

- Approx. Volume 6647 CBM
- VCM Storage under ambient condition
- VCM atmosphere remaining 49,300 kg
- VCM pressure 2.6 bar absolute.
- Sphere is free of liquid
- Approx. 13MT Un-pumped VCM liquid in lines



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PROJECT CONDITIONS

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Preparing the GRS Unit for Shipping

· Unit Dimensions

- 10 foot standard ISO-container frame

· Unit Weight

- 5000kg (5.5 Tons)

· Mobility Options

- Trailer Transportable
- Overhead Crane Lifting Cable Hoist
- Fork Lift Shifting Accessible Skid
- Transport Vessel Onboard designed



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SHIPPING PREPARATIONS

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Preparing liquid nitrogen and collection truck connections

· Liquid Nitrogen Provider

· BOC Gases

· Heater Primer

· Propane

· Recovery Ratio

· 5500kg vapors/hour

· Estimated 1.5 parts Nitrogen to 1 part Product Recovered



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UNIT CONNECTIONS

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The Gas Recovery System

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Preparing power connection

· Low Energy Consumption

- Process System - 5 kW
- Nitrogen Heater - 60 kW

· Safety Feature

- EX Zone 2 Certified
- Intrinsically Safe

· Control System

- Siemens PLC Controls

· Electrical System

- EX Zone 2, IIB, T3 Certified



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POWER CONNECTIONS

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GRS Controls Trailer

· Equipment

- Gas Chromatograph
- Analysis Software
- System Control Panel
- Power Cables
- Connection Hoses



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CONTROLS TRAILER

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Decontamination Process

· Phases

- Phase 1 - Pre-draining of lines
- Phase 2 - Reduction of tank pressure
- Phase 3 - Stratification in tank
- Phase 4 - Gas-freeing of tank
- Phase 5 - Pressure reduction of Sphere
- Phase 6 - Draining & gas-freeing of lines
- Phase 7 - Draining & gas-freeing of GRS



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DECONTAMINATION

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Project Summary - Recovery

· GRS Decontamination Task

- Recovered from the sphere all remaining VCM to a level of less than 100 ppm of VCM in N2 atmosphere - equal to approx. 2 kg
- Drained and recovered all VCM liquid and VCM atmosphere from the piping system
- All recovered product was pumped into road tankers and transported to Hydro Polymers

· Project Duration

- 6 days



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PROJECT SUMMARY

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Project Summary - Recovery

· GRS Decontamination Results

Phase 1-From lines.....	13020 kg	7.0 hrs
Phase 2-Press. reduction...	20360 kg	8.5 hrs
Phase 3-Stratification.....	24290 kg	13.5 hrs
Phase 4-Gas-freeing.....	4580 kg	43.5 hrs
Phase 5-From lines.....	4330 kg	13.0 hrs
Accumulated GRS	66580 kg	85.5 hrs
Total weighbridge fig.	66580 kg	



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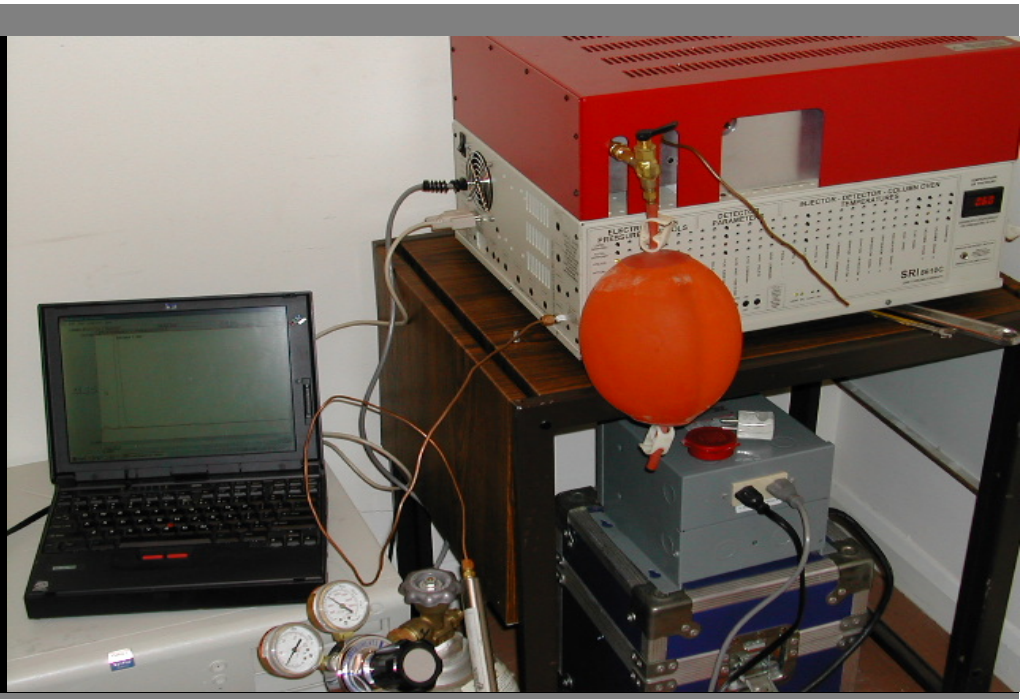
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Project Summary - Emissions

GRS Emissions Results

Phase 1 Emission	0 grams
Phase 2 Emission	200 grams
Phase 3 Emission	320 grams
Phase 4 Emission	1960 grams
Phase 5 Emission	200 grams
<u>Remaining in Sphere</u>	<u>1980 grams</u>
Total Emission	4660 grams

- All emissions were monitored by Gas Chromatograph



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Project Summary – Nitrogen vs VCM Recovered

· Nitrogen Consumption Results

- Liquid Nitrogen 81,700 kg
- Liquid nitrogen cost - 70 £ / MT

· Product Recovery Results

- VCM recovered - 66,580 kg
- VCM price – 450 £ / MT

- Product Pricing per Euro Currency



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GRS CLIENTS

The GRS has achieved great results for European & Australian service customers.

Vopak
Vintron
Simon Storage
Maersk Australia
Australian Vinyl Corporation
Norsk Hydro
Aga Norsk
Chemgas Shipping
Infracor Marl
Glaxo Smith Kline



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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- New Model
- Today's Industry
- Applications
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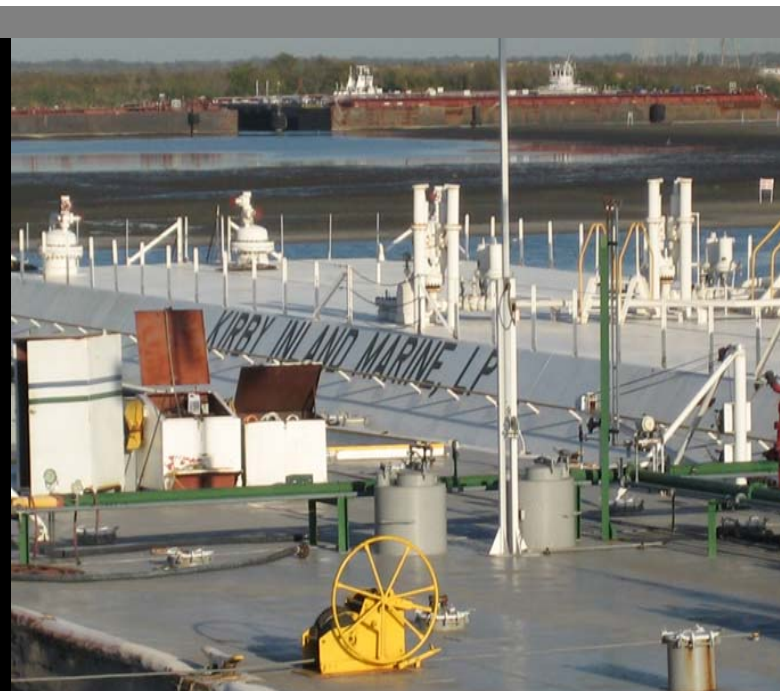


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The GRS Demonstration was a Success!
On May 4, 2006, the GRS recovered for the first time ever, an Isobutane Barge for Kirby Inland Marine, LP in Channelview, TX

This event will be certified with an official results report by Acro Technologies, Inc. and to be submitted to as final part of TCEQ's Emerging Verification Technology Program and EPA's BACT application.



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CLIENTS

This May, 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.

GRS CONTACTS



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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**.



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Thank you for viewing.

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