

REDUCE VOC EXPOSURE Off-Loading Rack at Bulk Plant

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Outline

- Volatile Organic Compounds Controls at Bulk Plant
- Off-loading Facility Overview
- Assessment
- VOC Sources
- VOC Reduction
- Reassessment



VOC Controls

Off-loading
Facility
Overview

Assessment

VOC Sources

VOC Reduction

Reassessment
Results

VOC's Controls at Bulk Plant



Storage Tanks



**Loading / Off-loading
Operations**

VOC Controls

Off-loading Facility Overview

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VOC Reduction

Reassessment Results

VOC's Controls at Bulk Plant



VOC Controls

Off-loading Facility Overview

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VOC Reduction

Reassessment Results

VOC Emissions Controls at Floating Roof Tank



IR Image / Floating Roof Tank



Primary & Secondary Seal

VOC Controls

VOC Emissions Controls at Floating Roof Tank

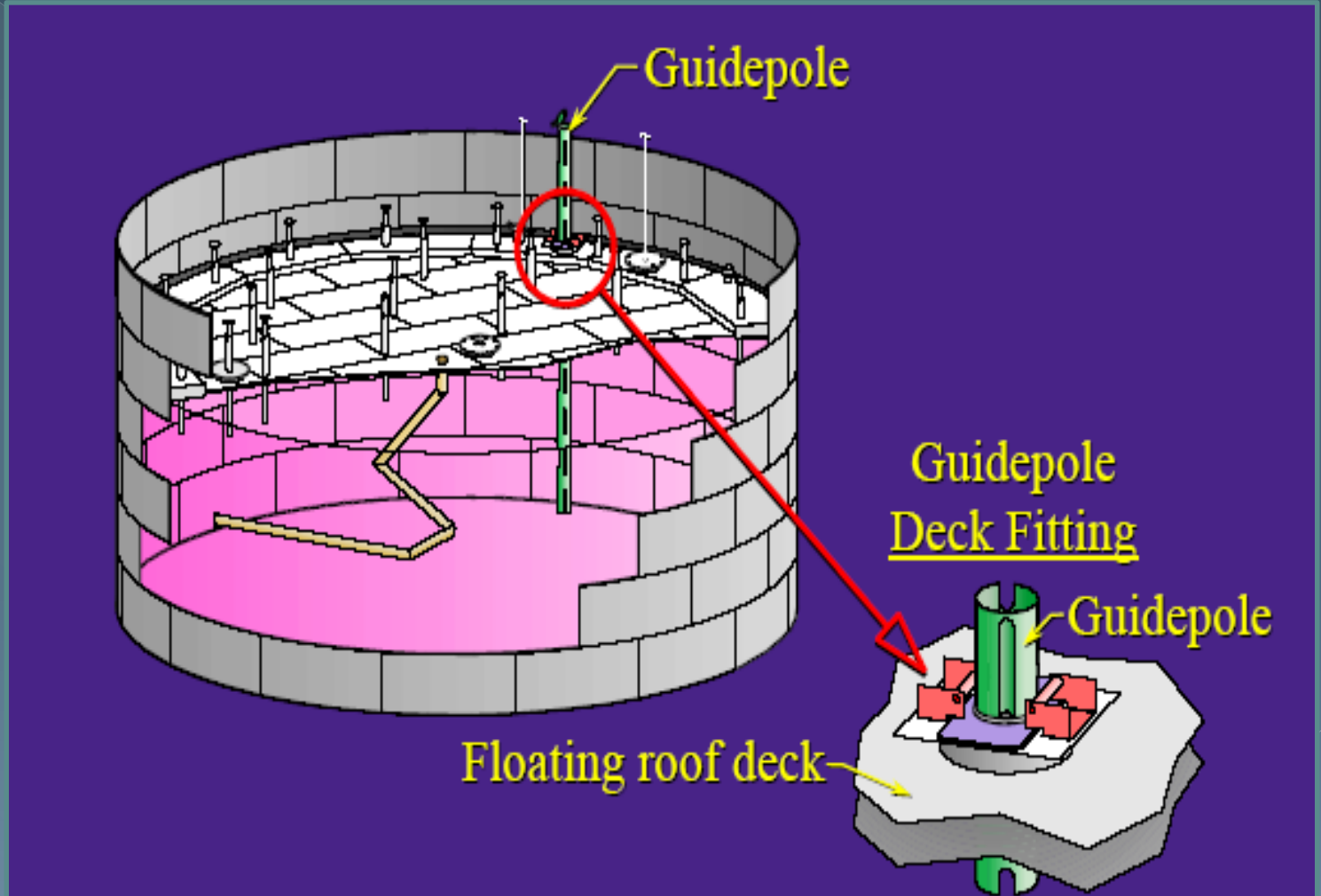
Off-loading
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VOC Sources

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VOC Controls

Off-loading Facility Overview

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VOC Sources

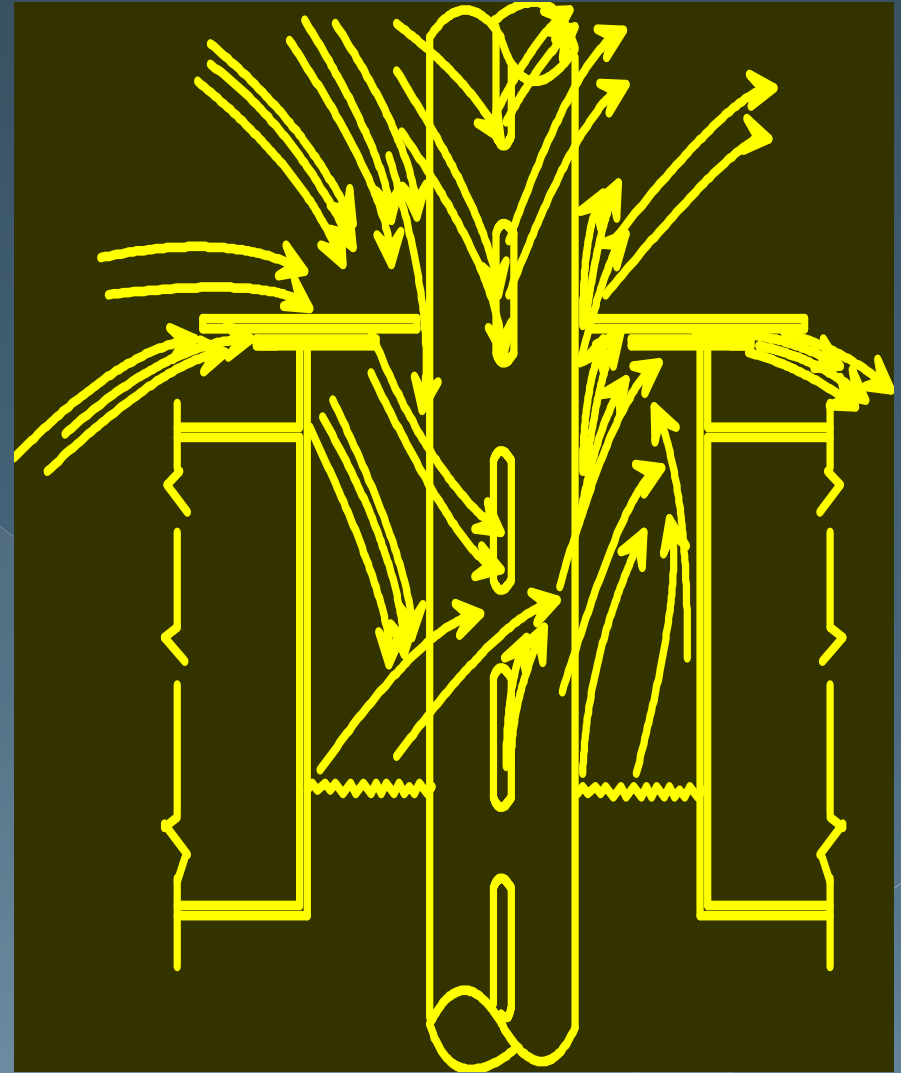
VOC Reduction

Reassessment Results

VOC Emissions Controls at Floating Roof Tank



Guide Pole Slots



Wind

VOC Controls

Off-loading Facility Overview

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VOC Reduction

Reassessment Results

VOC Emissions Controls at Floating Roof Tank



Slotted Guide Pole



Guide Pole Fittings

VOC Controls

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VOC Emissions Controls at Loading Operations

- The vents release the VOC's from the truck to the atmosphere
- Utilize Vapor Recovery System
- Recovers about 96% of the VOC emissions



Fig. 7 Dual-coil refrigerated vapour recovery unit

VOC Controls

Off-loading Facility Overview

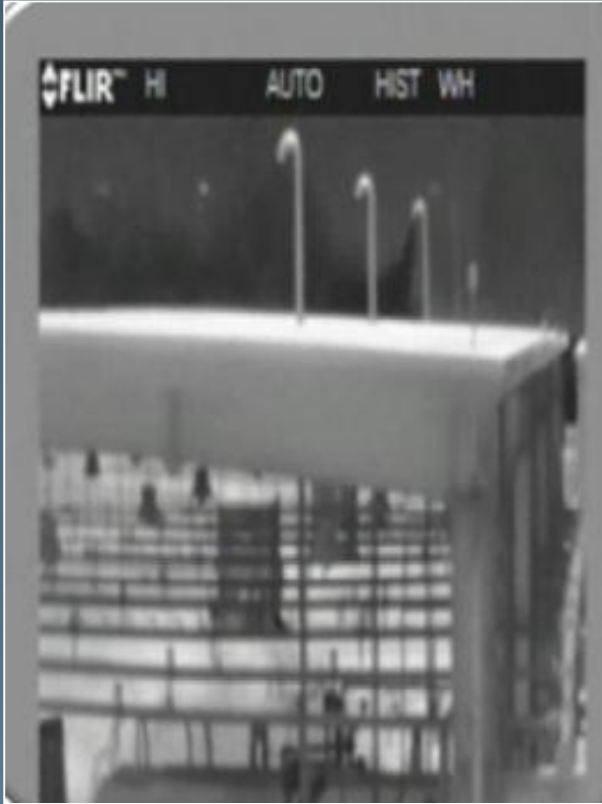
Assessment

VOC Sources

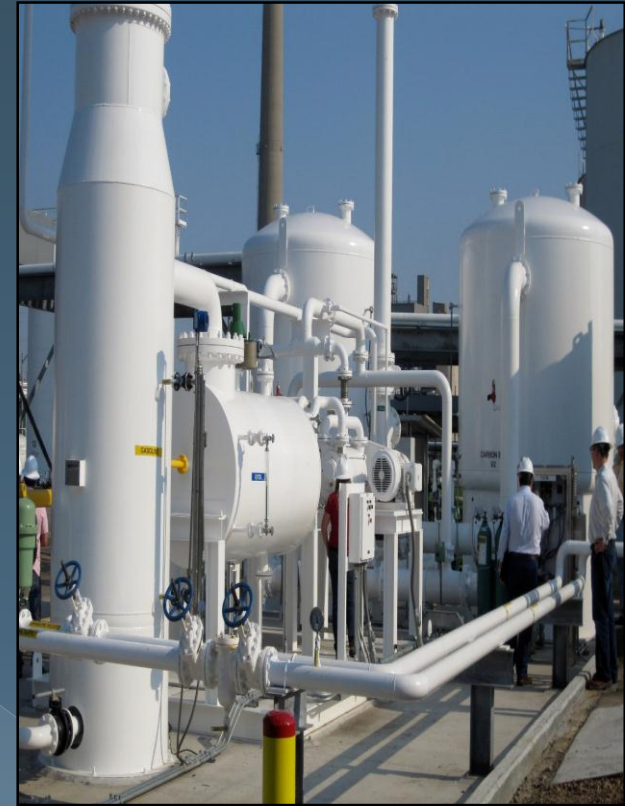
VOC Reduction

Reassessment Results

VOC Emissions Controls at Loading Operations



IR Image / Loading Operation Vents



Vapor Recovery Unit

Off-loading Facility Overview

VOC Controls

**Off-loading
Facility
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Results

- Truck unload the product by gravity to unloading sumps
- 120 Gasoline & 35 MTBE trucks / Day
- 5 Off-loading bays, each bay has 2 bottom offloading couplers
- Vent lines release the air from the sump directly to the atmosphere



Assessment at Off-loading Facility

VOC Controls

Off-loading
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Assessment at Off-loading Facility

VOC Controls

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VOC Reduction

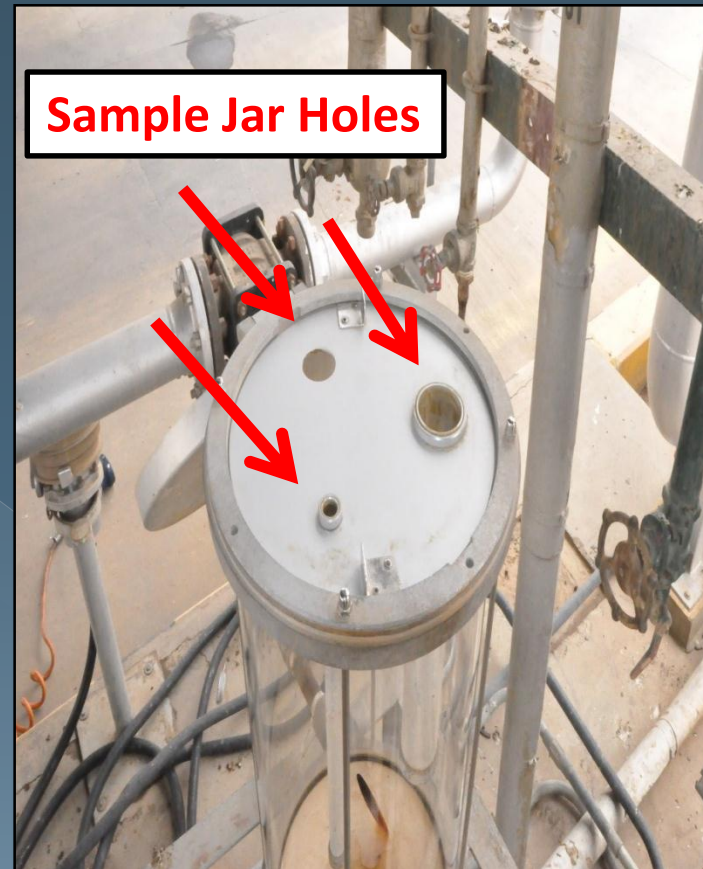
Reassessment
Results

Field operators were exposed to high concentration of VOC emissions



VOC Exposure Sources at Off-loading Facility

1. Open sample jar holes caused VOC emission



VOC Controls

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**VOC
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VOC Reduction

Reassessment
Results

VOC Exposure Sources at Off-loading Facility

VOC Controls

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**VOC
Sources**

VOC Reduction

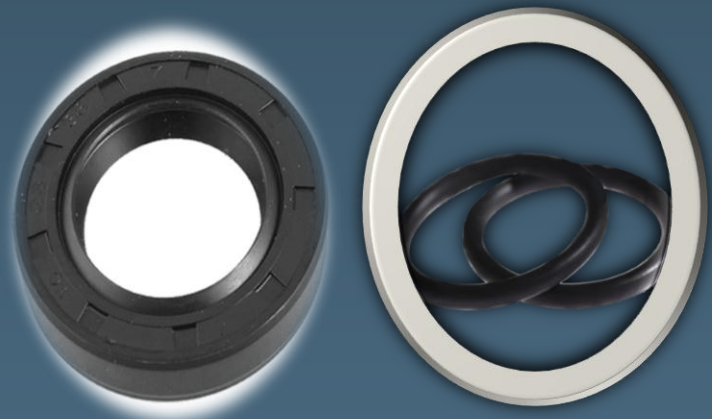
Reassessment
Results

2. Short vapor lines caused low VOC dispersion



VOC Exposure Sources at Off-loading Facility

3. MTBE couplers frequent failures caused drips & leaks



Total 4 Couplers Failures / Month	Coupler Average Failures
24 Times	5 Days

VOC Controls

Off-loading Facility Overview

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VOC Sources

VOC Reduction

Reassessment Results

VOC Exposure Sources at Off-loading Facility

VOC Controls

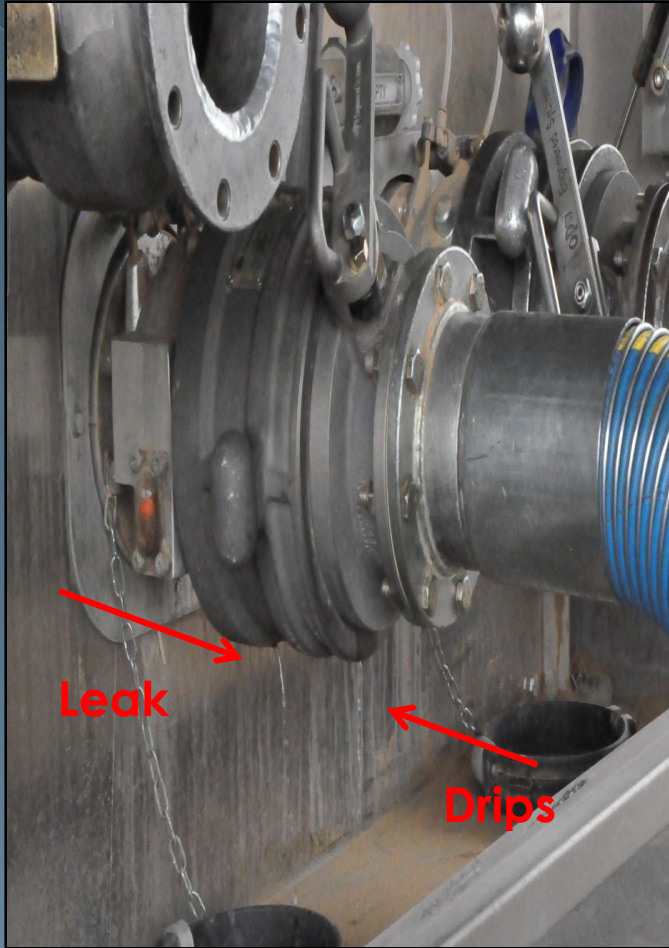
Off-loading
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**VOC
Sources**

VOC Reduction

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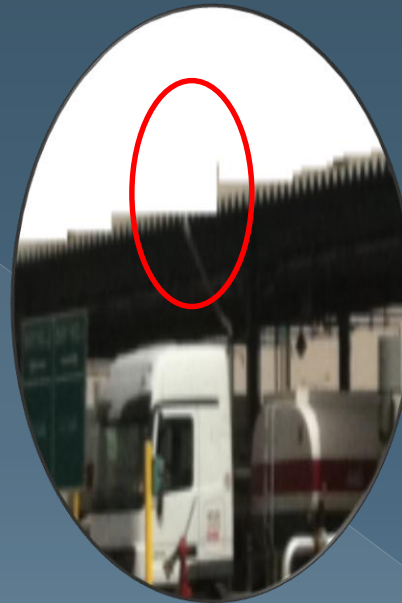


VOC Exposure Sources at Off-loading Facility

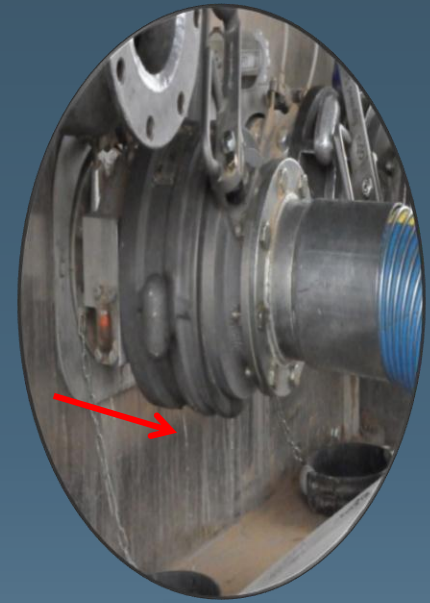
Three potential emission sources were identified



1. Sample Jar Holes



2. Rack Vent Heights



3. Coupler Sealing

VOC Controls

Off-loading Facility Overview

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VOC Exposure Reduction

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**VOC
Reduction**

Reassessment
Results

- Release sample jars product immediately and ensure sample jar cover is closed
- Enhance preventive maintenance program
- Request operators not to use broken coupler
- Awareness Program:
 - HAZCOM Refresher Training
 - Posted large sign of CHB



VOC Exposure Reduction

VOC Controls

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**VOC
Reduction**

Reassessment
Results

✓ Improved sample jar operation to work similar as tight sampler



VOC Exposure Reduction

VOC Controls

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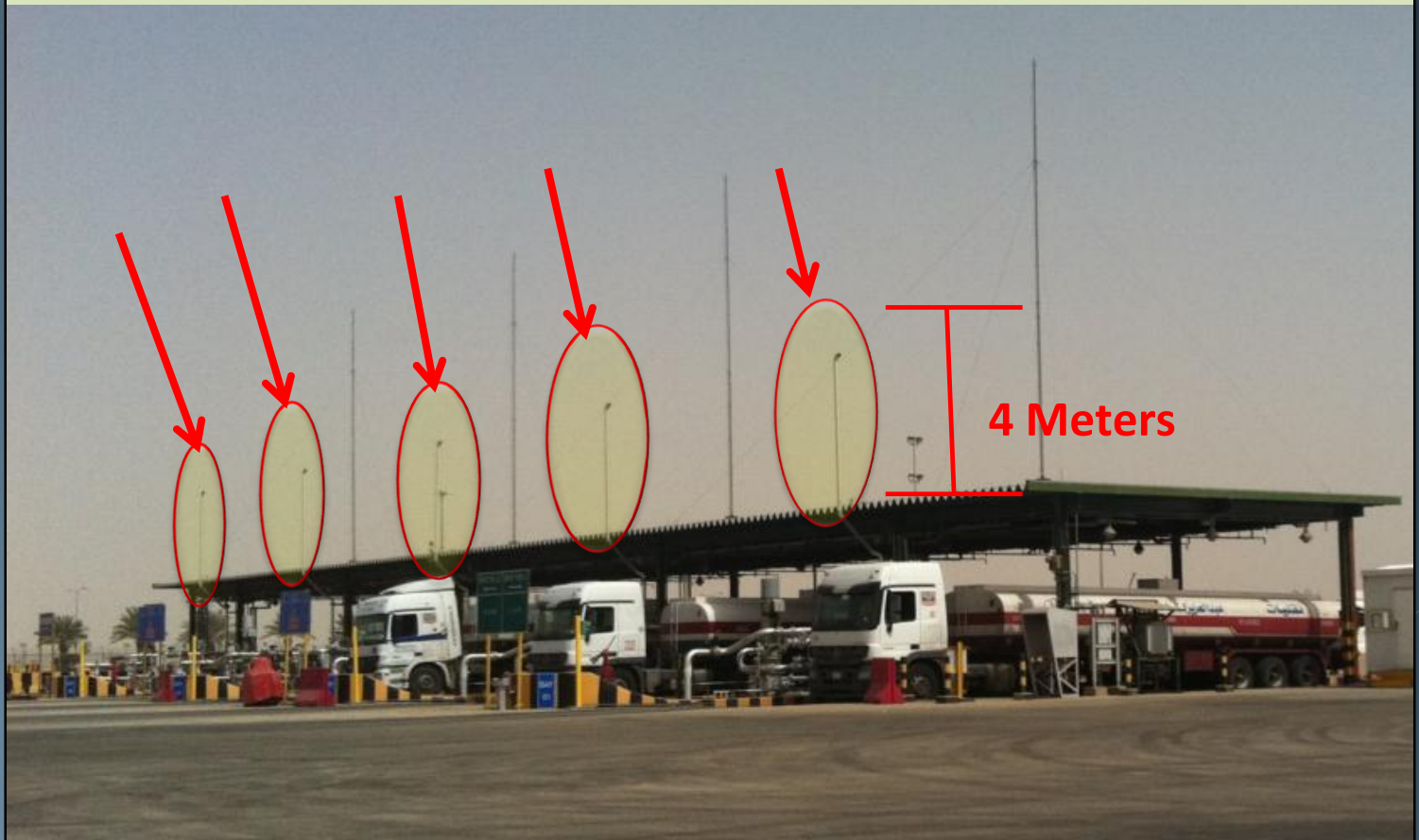
Assessment

VOC Sources

**VOC
Reduction**

Reassessment
Results

- ✓ Extended the vents height by four meters above the unloading roof



VOC Exposure Reduction

VOC Controls

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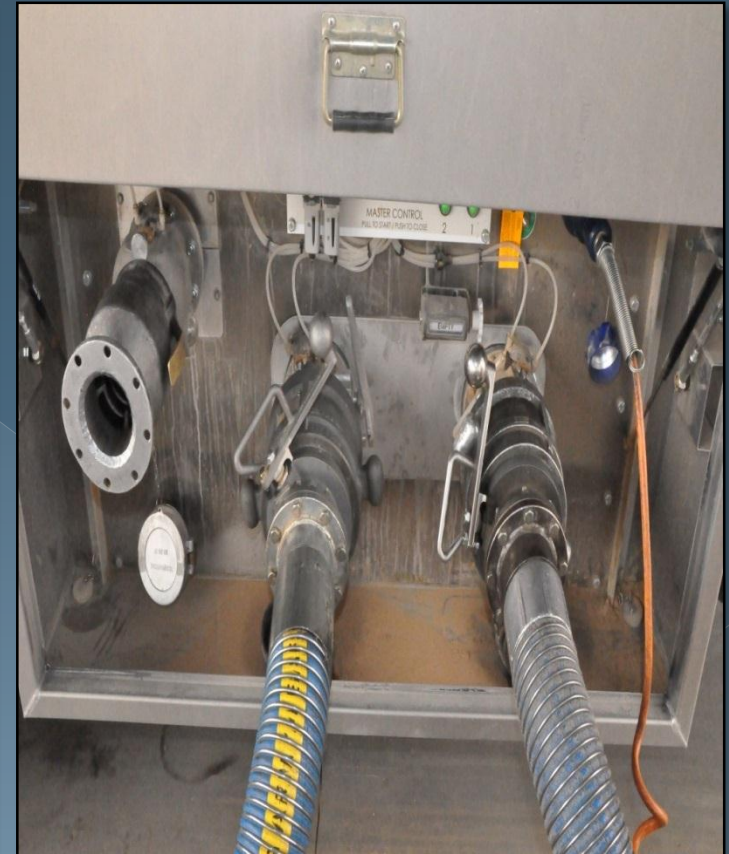
Assessment

VOC Sources

**VOC
Reduction**

Reassessment
Results

- ✓ Improved the MTBE coupler sealing durability by replacing Teflon & Viton types with Fluorocarbon type



VOC Exposure Reduction

VOC Controls

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**VOC
Reduction**

Reassessment
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✓ Coupler sealing failure improved from 5 to about 63 days

Coupler Failures	
Teflon & Viton	Fluorocarbon
5 days	63 days

Reassessment Results

VOC Controls

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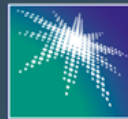
Assessment

VOC Sources

VOC Reduction

**Reassessment
Results**

- Reassessment was conducted after completing all required actions and modifications
- Lab analysis results indicated that there is no potential of exposure to VOC emission
- Lab results are within the Permissible Exposure Limit (PEL) for benzene and MTBE
- The Benzene and MTBE exposure reduction is about 96%



Thanks

