

Webinar

FUGITIVE EMISSIONS

Get a grip on fugitive emission

- Thank you for joining.
- You can ask questions via the Q&A button in the zoom menu. During the webinar, all attendees are muted.

STORK

A Fluor Company

STORK PROVIDES OPERATIONS & MAINTENANCE SERVICES ACROSS MULTIPLE INDUSTRIES

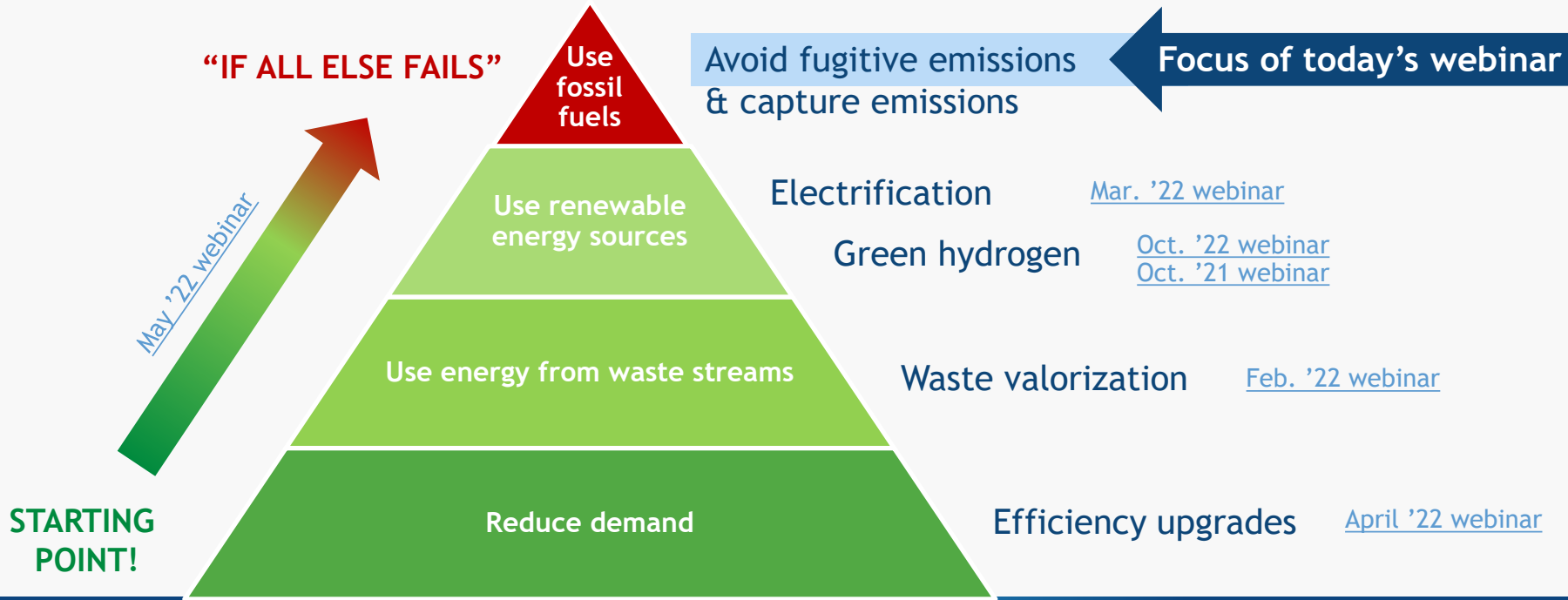


DECARBONIZE
EXISTING ASSETS

SUPPORT THE
ENERGY TRANSITION

DECARBONIZATION OPPORTUNITIES

VARIOUS SOLUTION TYPES



FUGITIVE EMISSIONS AN EMISSION THAT MATTERS



**02 Nov 2021
IEA at COP26: Launch of
Global Methane Pledge**

COP26 news: Countries pledge to cut fugitive methane emissions

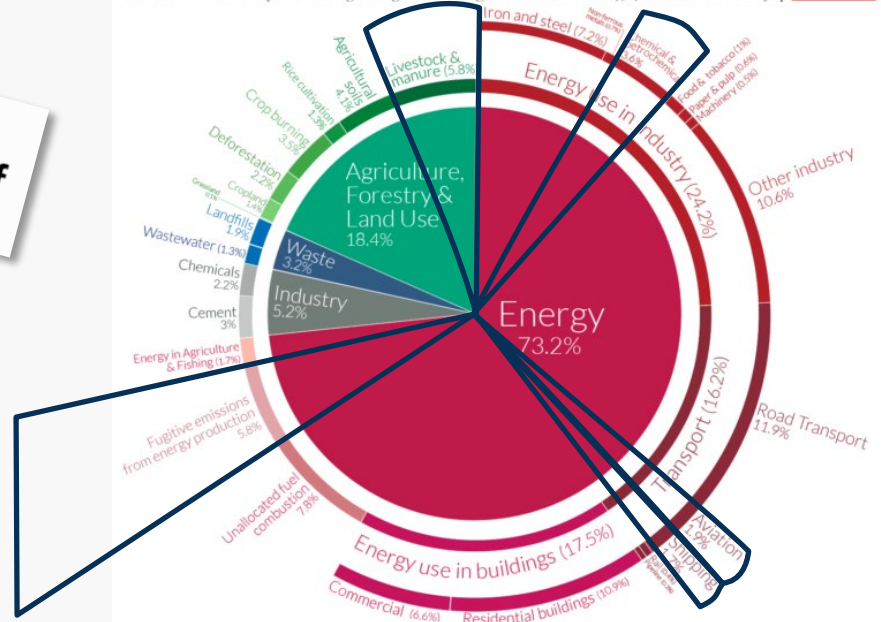


Fugitive emissions from energy production
5.8% of global greenhouse gases



Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



OurWorldinData.org – Research and data to make progress against the world's largest problems.
Source: Climate Watch, the World Resources Institute (2020).

Licensed under CC-BY by the author Hannah Ritchie (2020).

PRESENTER INTRODUCTION



Sebastiaan Niessen

Maintenance Engineer @ Stork



Joey Steenbakker

Process manager @ TP Europe

FUGITIVE EMISSIONS

WHAT ARE THEY?

Fugitive emissions are unintentional and undesirable emissions



FUGITIVE EMISSIONS CONSEQUENCES

Toxic releases
Flammable releases



Safety & health



Product loss

Through leakage
Through explosion / fire
and subsequent
unplanned downtime



Environment

Greenhouse gases
Ozone depleting



Legal

License to operate
Individual prosecution

Cost

Direct



Indirect

POLL

Which of the previous consequences keeps you awake at night?

- Safety & health
- Product loss
- Cost
- Environmental
- Legal



FUGITIVE EMISSIONS SOLUTION



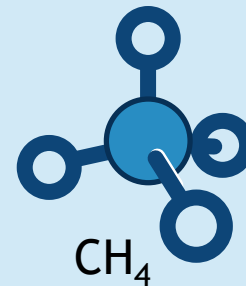
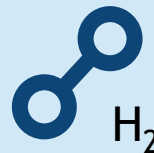
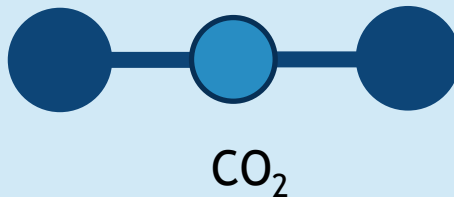
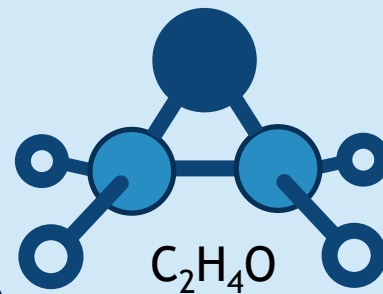
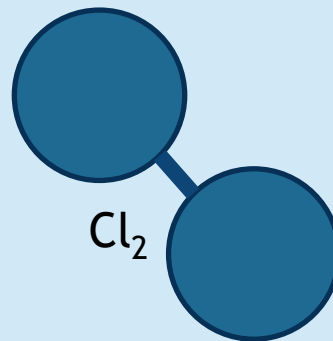
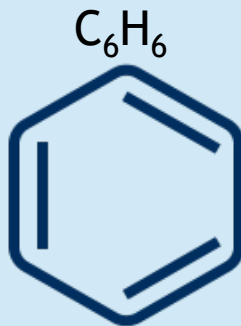
FUGITIVE EMISSIONS SOLUTION



ASSESS DEFINE WHAT, WHERE, HOW & WHEN



- List



ASSESS DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand

International regulations

- US EPA
- OGMP
- ...

Country regulations

- NEN-EN 15446
- VLAREL
- Milieu monitor 14 & 15
- Royal Commission
- ...

US EPA: U.S. Environmental Protection Agency

OGMP: Oil & Gas Methane Partnership

VLAREL: Besluit tot vaststelling van het Vlaams reglement inzake erkenningen met betrekking tot het leefmilieu

EU Regulations

- EN 15446
- Upcoming EPrEN17682 for LDAR
- EU methane proposal 2019/942
- ...

Customers' corporate regulations

- British Petroleum
- Saudi Aramco
- ADNOC
- Qatar Petroleum
- ...

ASSESS

DEFINE WHAT, WHERE, HOW & WHEN



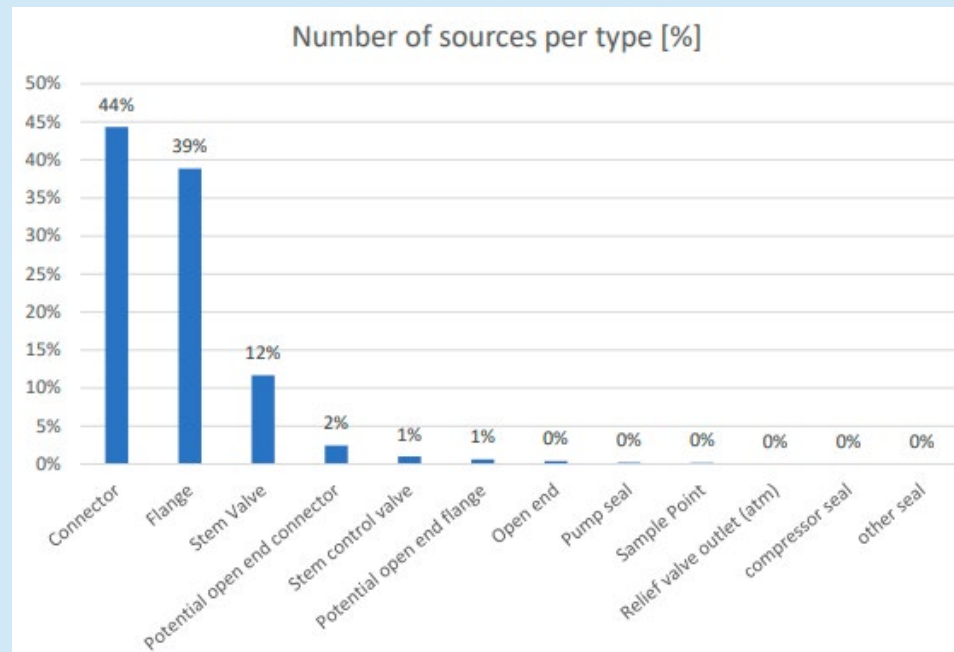
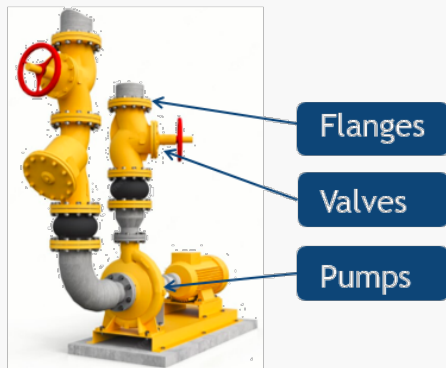
- List
- Understand
- Identify



ASSESS DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand
- Identify



ASSESS DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand
- Identify
- Document



ATLAS

EMISSION MANAGEMENT SOFTWARE

The screenshot displays the ATLAS software interface. The main window shows a detailed piping diagram with various components like pumps (6309-JA, 6309-JB), valves, and streams. The interface includes a sidebar with navigation options like Dashboard, General Data, Customer data, Overview, Streams, Drawing Overview, Compositions, Query, Reporting, Measurement, Requests, and Account. Below the diagram is a 'Color Picker' table with columns for Color, Code, Composition Code, and Name.

Color	Code	Composition Code	Name
	STR024-G	COMP024	6305-J
	STR024-L	COMP024	6305-J
	STR024-L	COMP025	to product condenser 6305-C

On the right side, there is a 'View Linked' section with a table of linked objects:

Name	Status
Model	Unlinked
Block (3/8)	Unlinked
„GPR_TotLock_PD [1072]	Unlinked

Below this is another table with columns for Number, Stream, EquipmentSubType, Location, and Link:

Number	Stream	EquipmentSubType	Location	Link
10256	STR024-G	GA	0.5m Ziv van 6316F	
10257	STR024-G	BL	0.5m Q/W 6316F, hv1,75m	
10258	STR024-G	GA	1m Q/W 6316F, hv1,5m	

ASSESS

DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand
- Identify
- Document
- Select

FID/PID (Flame / Photo Ionization Detector)

- Source measurement
- Concentration in ppm
- Detection of leaks down to 9ppm



OGI (Optical Gas Imaging)

- Large Areas screening
- Inaccessible sources
- Storage tanks, vents ..



HFS (Hi Flow Sampling)

- For quantification purposes
- Accurate emission calculation
- Site specific emission factors



ASSESS DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand
- Identify
- Document
- Select

Satellites

- Very large area scan
- Frequent scans
- Also look for pipe movement



Drones

- Large areas scan ,with close-up option
- Inaccessible areas
- Fast access after storm / mud slide / ...



Satelitycs



SeekOps



ASSESS DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand
- Identify
- Document
- Select

INGU Ball

- Inserted into long pipeline traces
- Audio recording detects leaks, pressure readings detect deposits
- Accelerometer and gyroscope help pinpoint location



ASSESS

DEFINE WHAT, WHERE, HOW & WHEN



- List
- Understand
- Identify
- Document
- Select
- Plan



FUGITIVE EMISSIONS SOLUTION

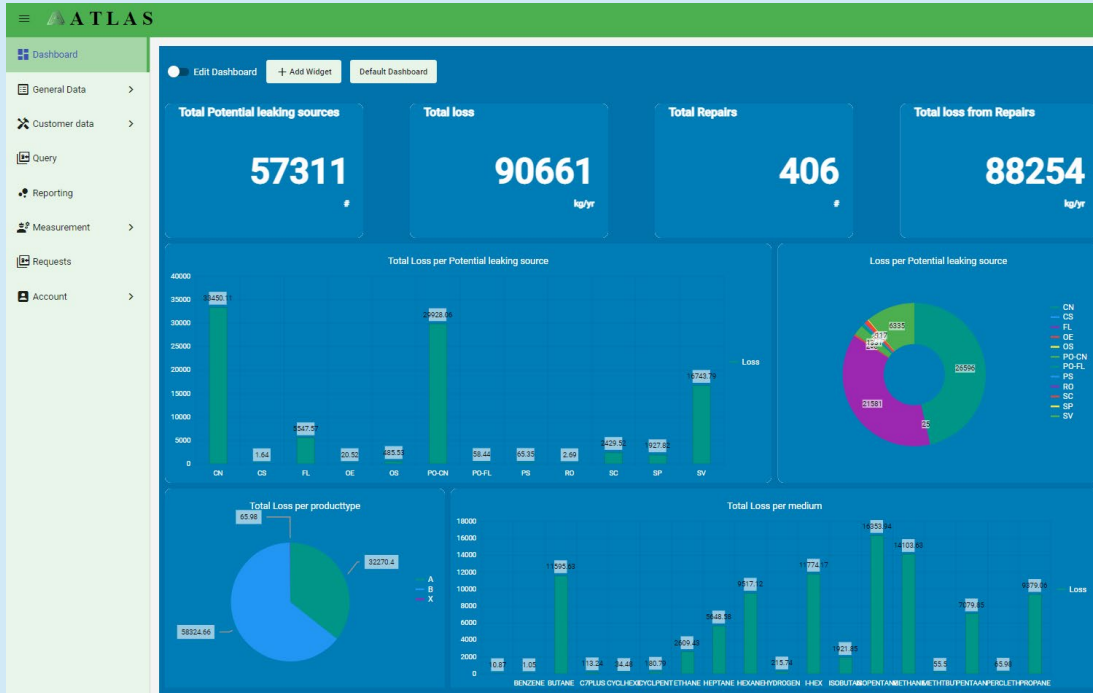


INSPECT PERFORM ACTUAL INSPECTIONS



- As planned
- After trigger events
(e.g. start-up of a facility after a turnaround)

ASSESS + INSPECT SOFTWARE SUPPORT



- List
- Understand
- Identify
- Document
- Select
- Plan
- Record findings

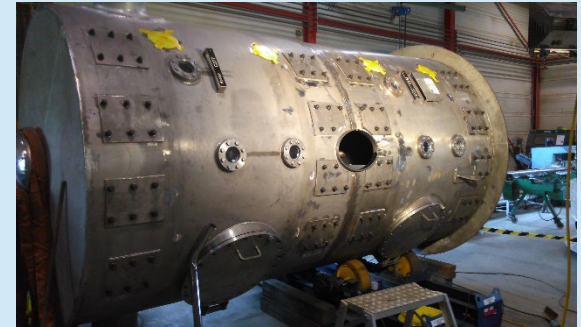
FUGITIVE EMISSIONS SOLUTION



REMEDIATE IF REQUIRED



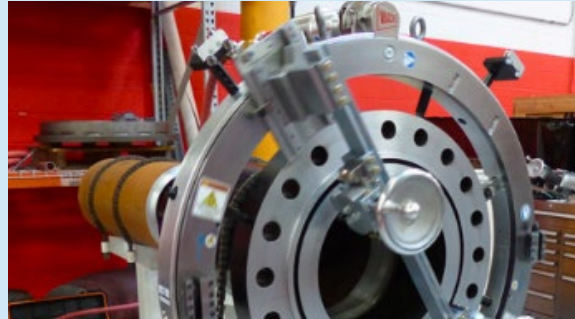
- Flanges



REMEDIATE IF REQUIRED



- Flanges



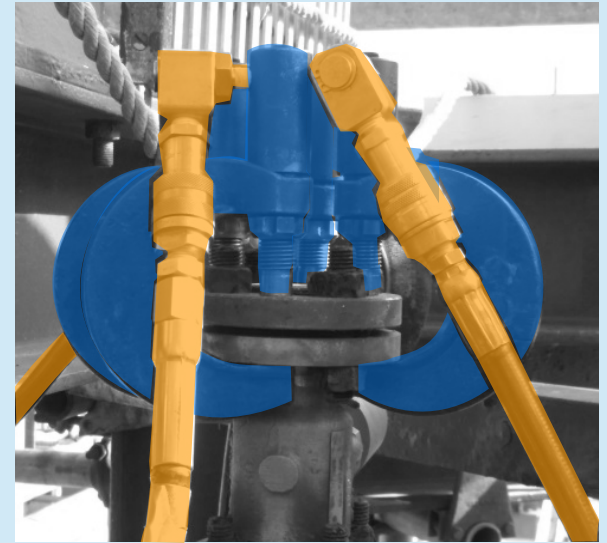
REMEDiate IF REQUIRED



- Flanges



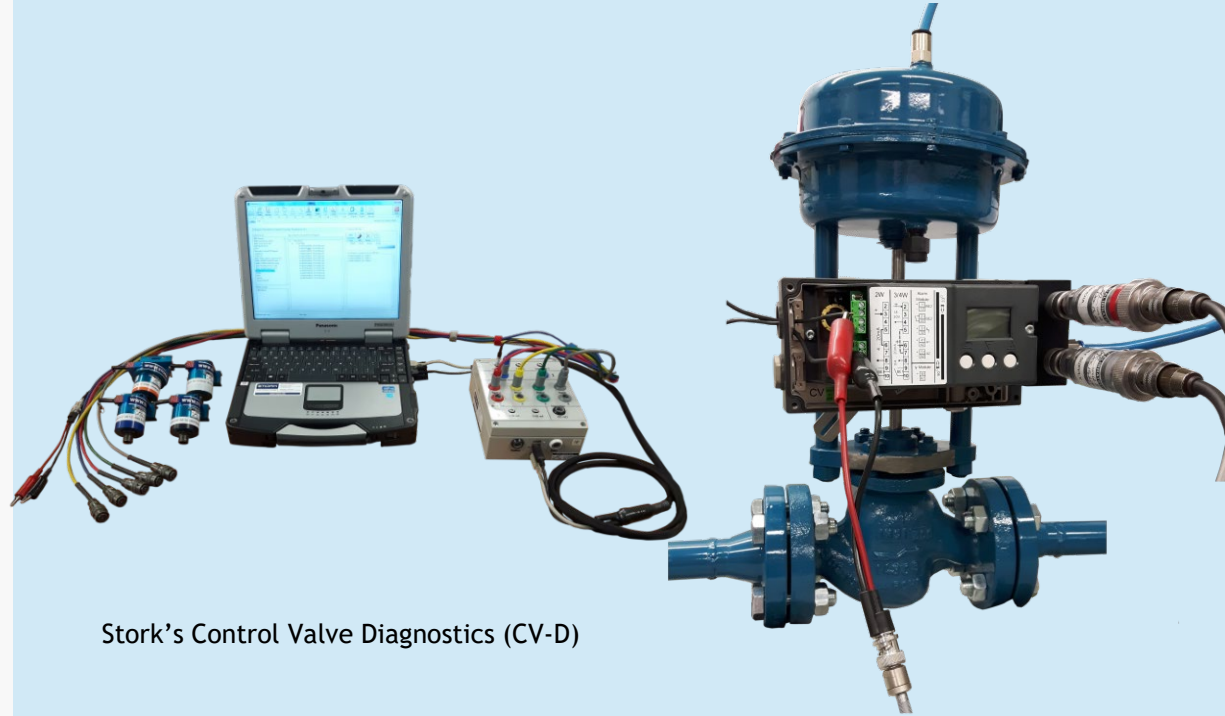
Corroded bolts



Renew bolts without having to shutdown, purge, etc the line, by using Stork's Hot Bolt Clamp

REMEDiate IF REQUIRED

- Flanges
- Valves

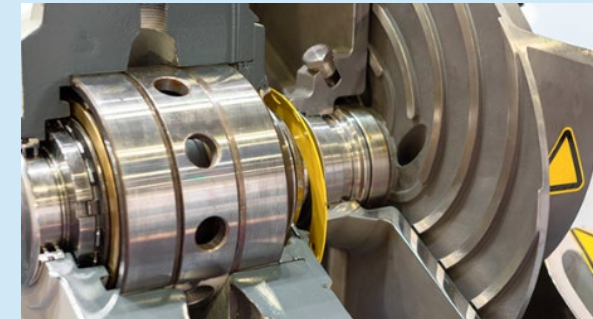
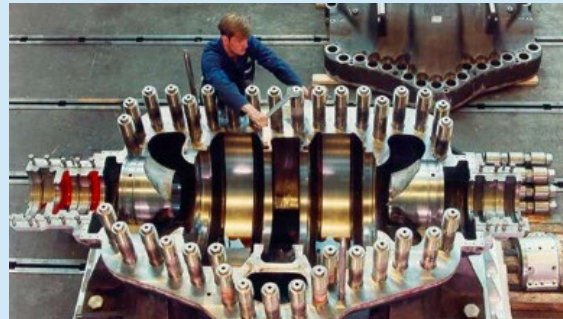


Stork's Control Valve Diagnostics (CV-D)

REMEDiate IF REQUIRED



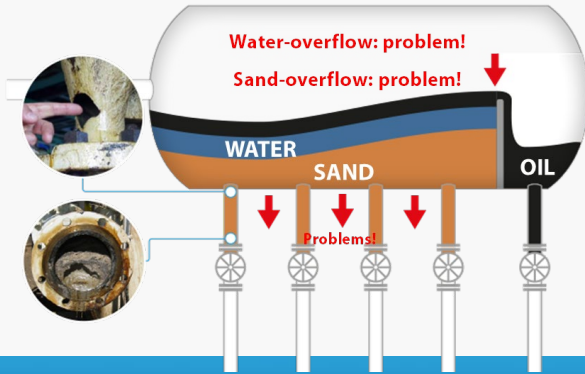
- Flanges
- Valves
- Rotating equip.



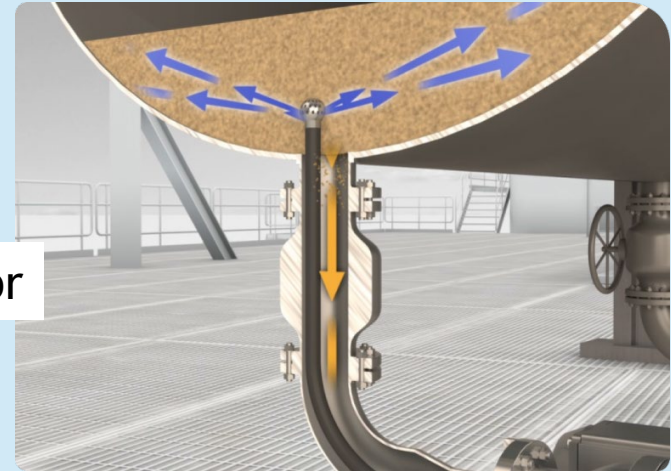
REMEDIATE IF REQUIRED



- Flanges
- Valves
- Rotating equip.
- **Vessels**



or

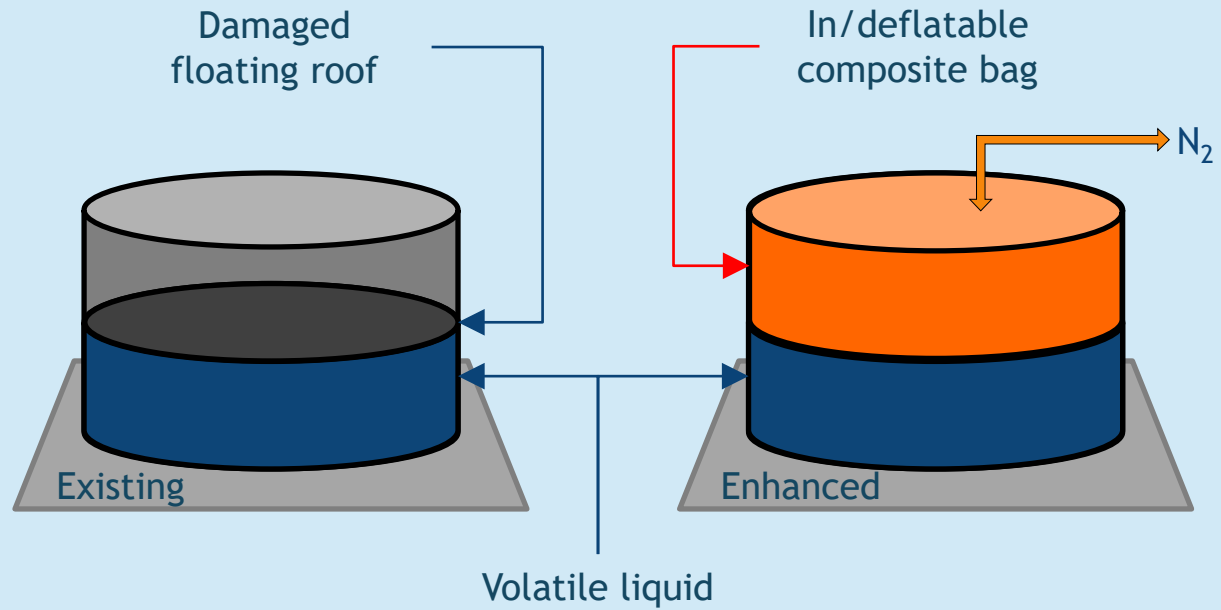


Stork's Advanced Online Desanding (AOD) solution

REMEDIATE IF REQUIRED



- Flanges
- Valves
- Rotating equip.
- Vessels
- Tanks
- ...



FUGITIVE EMISSIONS SOLUTION

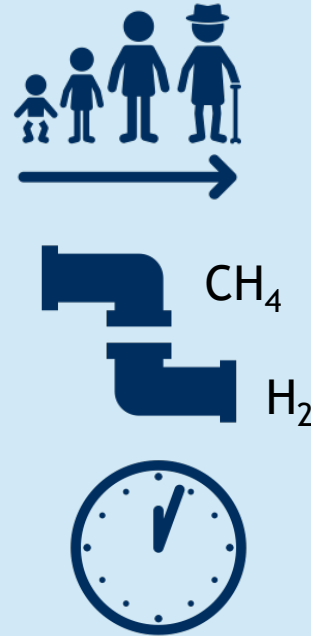


REPEAT OVER TIME MANAGE

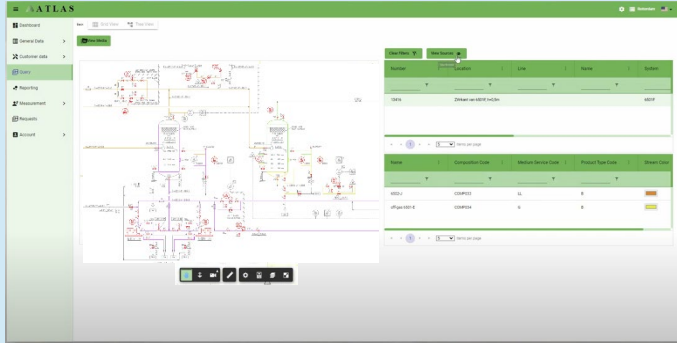


Minimizing fugitive emissions isn't a one-time action

- Facilities age
- Operating conditions change
- Facilities get modified
- New regulations
- Turnarounds are held...
- ...



REPEAT OVER TIME MANAGE



Institute a multi-year program

Maintain a history of each possible emission point

Monitor progress via dashboards

Progressively move to leak-free!

**NEED TO KEEP IMPROVING
WHAT WAS ONCE STATE OF THE ART ...**

**DOESN'T REMAIN
SO FOREVER**



POLL



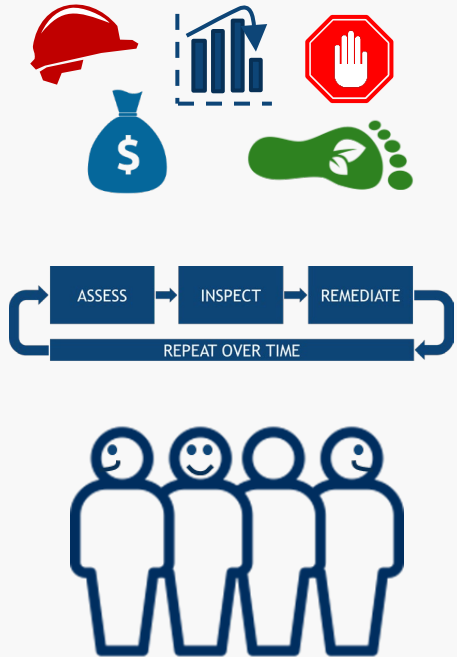
What has the most impact to control fugitive emissions?

- Good assessment
- Good inspection
- Good remediation
- Good multi-year program

RECAP



- Avoiding fugitive emissions isn't just the right thing to do, it is something that you must do.
- Multi-tier approach: assess - inspect - remediate - manage over time
- Involve parties who understand the full span so that you aren't blindsided



STORK

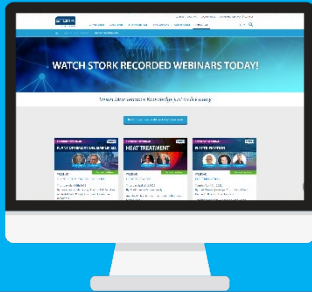
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> **QUESTIONS?**

THANK YOU FOR ATTENDING!

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