

Process Safety Risk Management

Patrick Smalley – Tutis Energy
UKOPA Members' Meeting



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Hello, I'm
Patrick Smalley
Compliance & Competence
Tutis Energy



About Tutis Energy





Challenge:

Difficulty distinguishing between **operational risk and investment / delivery risk (Opex & Capex)**.

Impact:

Risk management effort is not aligned to the **highest-priority projects** – leading to delivery of programmes that don't effectively reduce operational risk, despite a high volume of known issues.



Key Issues:

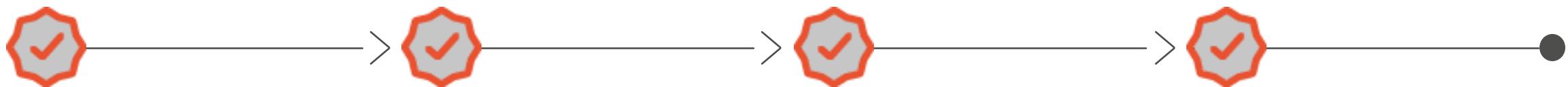
- Assets operating outside **original design limits**
- Assets with **known defects**
- Lack of **consistency** in assessment and scoring across asset types and locations leading to spend allocation challenge
- Defects without consistent risk assessment across sites
- Difficulty prioritising investments
- Gap between defect identification and resolution
- Need for transparency and regulator confidence



What's the Solution?

ORAM

The ORAM Process Map



Risk Identified

Risks scored and
categorised:
High, Medium, Low

Mitigations identified
and tracked

Outputs feed into
central dashboards

ORAM Defined

- ❖ Operational Risk Assessment and Mitigations (ORAM)
- ❖ Allows investment to be spent in the right areas across the business
- ❖ Feeds into Strategic Asset Management Plan (SAMP)



ORAM Review Meetings

Purpose

- Assess operational asset issues raised by operations.
- Evaluate risks to site performance, process safety, and system operation.
- Identify and agree mitigations until issues are resolved.

Membership / Attendees

- **Operations** – raise issues and provide site detail.
- **Asset Health** – advise on prioritisation and investment impact.
- **Asset Engineering / SMEs** – recommend and approve mitigations.
- **Assurance** – check process compliance and consistency.
- **Chair** – ensures meeting runs effectively and decisions are documented.

Scope

- Applies to compressor stations and terminals.
- Focuses only on operational asset issues.
- Ensures risks are managed consistently across the network.

Outputs

- Updated ORAM register.
- Risk scores agreed and validated.
- Mitigations assigned with clear accountabilities.
- Actions documented for follow-up.

Objectives

- Review current register of asset issues.
- Assess risk likelihood and consequence.
- Assign risk ratings (High, Medium, Low).
- Agree mitigations and confirm responsibility for actions.
- Monitor, update, and report progress.
- Ensure decisions and actions are recorded for assurance.

Frequency

- Convened when new or significant issues arise.
- Reviewed periodically (typically annually, or more frequently if required).

Key Personnel Inputs

Asset Health Manager
prioritisation & investment

Asset Engineering Manager
mitigations & SMEs

Area Operations Managers ORAM
application & mitigations

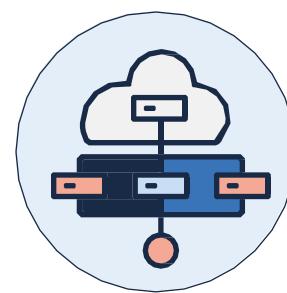
Assurance Manager
oversight and audit



ORAM in Action



Generates Site
Risk Registers



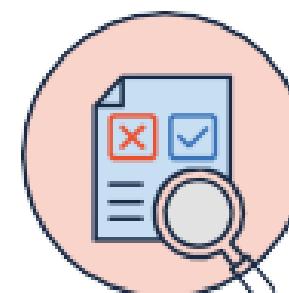
Produces Visual
Dashboards



Produce Action
Lists and
Traceability



Feeds into
Investment
Strategy

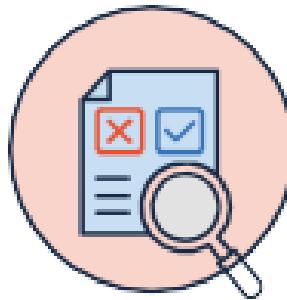


Provides Assurance
and Operational
Clarity

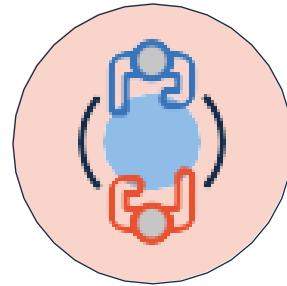
Benefits of ORAM



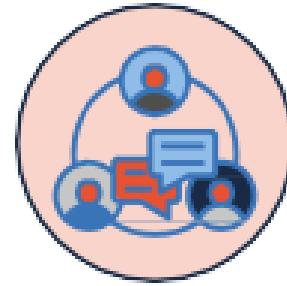
Consistency across sites
/ networks



Transparent, auditable
decision-making



Supports Budget &
Investment allocation



Build regulator
confidence

Lessons Learned

✓ Cross-disciplinary engagement is essential

✓ ORAM provides a common language for risk

✓ Ensures money spent focused on highest risks



How

PERICULUM RISK MANAGEMENT

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ADMIN

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Risk Information

Modified: Tue, 07 Oct 2025 10:22:20 GMT

Primary asset: Pipe

Secondary asset: Below Ground Pipe and Coating

Category: Corrosion

Sub category: New item

Hazard: Leakage from high-pressure gas pipelines leading to uncontrolled release, potential fire, and operational disruption in terminal area.

Defect Code: Record updated following guidance from terminal safety team.

Comments: Record updated following guidance from terminal safety team.

Owner(s): JAMES WILLIAMS, OLIVIA TAYLOR

Project Information

Is Project Started? Yes

Project Code: PC-53AF

Project Cost: 150000

Estimated Completion Date: 25 October, 2025

Scoring

Estimated Event Cost: 3,000,000	Control Opinion: Medium	Finance: 4	SoS: 5	Safety: 4
Environment: 2	Frequency: 4			

Control Measures

ID	DESCRIPTION	EDIT	DELETE
0	Regular pipeline inspections and integrity checks	EDIT	DELETE
1	Leak detection sensors installed and monitored	EDIT	DELETE
2	Emergency shutdown procedures tested regularly	EDIT	DELETE
3	Staff trained in hazard recognition and response	EDIT	DELETE
4	Preventive maintenance schedules strictly followed	EDIT	DELETE

Comments

Record updated following guidance from terminal safety team.

Actions: 1 - 4 of 4

ID	LAST UPDATED	DU DATE	ASSIGNED TO	DESCRIPTION	COMMENTS
0167-0000	06/01/2024	15/02/2024	Albert Hughes	Insulation degradation on cryogenic transfer lines between tanks 3 and 5	Frances Walker Reduced damaged insulation sections and installed improved moisture barriers with vapour detection
0167-0004	27/08/2024	19/09/2024	Sophie Green	Heat exchanger fouling causing reduced thermal efficiency in processing unit 4	Albert Roberts Performed chemical cleaning to remove deposits and implemented improved feedstock filtration
0167-0001	15/07/2024	17/08/2024	Elizabeth Patel	Emergency shutdown valve response time exceeding regulatory requirements	Frederick Wright Overhauled valve actuator system, replaced solenoid and verified proper operation through multiple test cycles

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0167-0001	15/07/2024	17/08/2024	Elizabeth Patel	Emergency shutdown valve response time exceeding regulatory requirements	Frederick Wright Overhauled valve actuator system, replaced solenoid and verified proper operation through multiple test cycles

Risk History

CREATED DATE	FINANCE	SO5	SAFETY	ENVIRONMENT	FREQUENCY	RISK SCORE	CONTROL, OPINION	COMMENTS
07/01/2025	4	5	4	2	4	20	LOW	Olivia Jones Data refreshed to maintain accuracy in risk scoring.
07/01/2025	4	5	4	2	4	20	LOW	Emily Taylor Updated to align with recent maintenance and monitoring findings.
24/06/2025	4	5	4	2	4	20	LOW	Thomas Evans Record modified following internal safety review.
20/05/2025	4	5	4	2	4	20	LOW	Thomas Taylor Record updated to support terminal risk mitigation strategy.
23/04/2025	4	5	4	2	4	20	LOW	James Jones Record updated following guidance from terminal safety team.
18/03/2025	4	5	4	2	4	20	LOW	William Taylor Record updated to support terminal risk mitigation strategy.
16/02/2024	4	5	4	2	4	20	LOW	Thomas Williams Data refreshed to support ongoing risk management initiatives.
23/01/2024	4	5	4	2	4	20	LOW	James Evans Information refreshed following latest inspection data.
25/09/2024	4	5	4	2	4	20	LOW	James Williams Data refreshed to reflect terminal hazard analysis.
27/08/2024	4	5	4	2	4	20	LOW	William Taylor Record updated to improve clarity and consistency of risk reporting.
15/07/2024	4	5	4	2	4	20	LOW	Emily Evans Information revised to include recent control measure implementations.
18/06/2024	4	5	4	2	4	20	LOW	William Taylor Record updated following guidance from terminal safety team.
30/05/2024	4	5	4	2	4	20	LOW	Olivia Williams Data refreshed to maintain consistency in risk reporting.
14/03/2024	4	5	4	2	4	20	LOW	Charlotte Evans Record updated to support terminal risk mitigation strategy.
14/03/2024	4	5	4	2	4	20	LOW	Olivia Evans Information revised to include updated maintenance recommendations.
30/01/2024	4	5	4	2	4	20	LOW	James Williams Record revised to ensure compliance with terminal safety standards.
18/12/2023	4	5	4	2	4	20	LOW	James Evans Data refreshed to support proactive safety planning.
30/11/2023	4	5	4	2	4	20	LOW	William Smith Data refreshed to maintain consistency in risk reporting.
13/09/2023	4	5	4	2	4	20	LOW	Olivia Evans Record revised to ensure compliance with terminal safety standards.
24/08/2023	4	5	4	2	4	20	LOW	Emily Evans Data refreshed to maintain consistency in risk reporting.
20/06/2023	4	5	4	2	4	20	LOW	Emily Brown Information updated to incorporate latest hazard assessment.
23/05/2023	4	5	4	2	4	20	LOW	Charlotte Brown Record updated to support terminal risk mitigation strategy.
25/04/2023	4	5	4	2	4	20	LOW	Emily Williams Record updated following review of current operational risks.
14/03/2023	4	5	4	2	4	20	LOW	Emily Evans Information revised following scheduled site inspections.
08/03/2023	4	5	4	2	4	20	HIGH	Olivia Taylor Data refreshed to reflect terminal hazard analysis.

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Dashboard for **You** **Company** All Sites **?** **Help Tour**

Gas Tech Ltd. **?** **Help Tour**

Open Risks / Without Actions **436 / 98** **Project Costs** **£2.72M** **Open Actions** **1287**

Actions due within 30 days **16** **Actions due within 7 days** **0** **Actions Overdue** **53**

Risk Projects **237** **Updates Older Than** **30 Days** **90 Days** **180 Days** **365 Days**

Risk Globes

Risk History

Company Actions **1 - 75 of 75**

ID	Due Date	Description	Comments
0038.0165	26/03/2025	Heat exchanger fouling causing reduced thermal efficiency in processing unit 4	Eleanor White Performed chemical cleaning to remove deposits and implemented improved feedstock filtration
0123.0148	17/06/2025	Gearbox oil contamination detected in boll-off gas compressor	Jack Jones Drained contaminated oil, flushed system, replaced with fresh lubricant and implemented enhanced oil analysis programme
0182.0257	17/06/2025	Cooling system efficiency reduced to 78% in liquefaction train 2	Poppy Turner Cleaned heat exchanger surfaces and restored proper coolant flow; investigating long-term solution for fouling prevention
0182.0284	17/06/2025	Pressure regulator valve showing signs of corrosion on the northwest pipeline	Albert Wright Scheduled immediate replacement of corroded components and applied protective coating with marine-grade anti-corrosive treatment
0123.0309	17/06/2025	Gearbox oil contamination detected in boll-off gas compressor	Lily Thomas Drained contaminated oil, flushed system, replaced with fresh lubricant and implemented enhanced oil analysis programme

Risk Categories

Category	Count
Civils	45
Compliance	35
Corrosion	20
Design	10
Equipment	65
Instrumentation	20
Obsolescence	5
Operation	25
Pipe	15
Safety system	30
Security	20
Service	15
Valve	10
Vibration	15

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All Sites ▼

Help Tour

ID	PRIMARY ASSET	SECONDARY ASSET	CATEGORY	SUB CATEGORY	HAZARD	PROJECT COST / STARTED	CONTROL OPINION	Score ↓	ACTIONS
0167	Pipe	Below Ground Pipe and Coating	Corrosion	New Item	Building Integrity Issue from structural deterioration affecting safety of occupied control buildings	£40K	MEDIUM	20	0
0189	Pipe	Civil assets - pipe supports and pits	Corrosion	Pipework above ground	Pipeline Rupture causing sudden massive gas release and potential fire explosion scenario	£140K	MEDIUM	20	2
0150	Site	Station process control system	Obsolescence	Process control	SCADA Security Compromise allowing remote manipulation of supervisory control and data systems	£33K	MEDIUM	20	2
0154	Site	After Coolers	Corrosion	Structural steel	Inadequate Escape Routes preventing safe evacuation during fire or gas release emergencies	£27K	MEDIUM	20	2
0213	Pipe	After Coolers	Corrosion	Ball Valve Sealant Line below ground	Emergency Response Deficiency with inadequate preparedness for major accident scenario response	£65K	NOTSET	20	1
0142	Pipe	Process valves	Valve	Isolation valves	Shift Handover Inadequacy failing to transfer critical information about ongoing operations	£68K	MEDIUM	20	0
0060	Site	Process valves	Compliance	Isolation valves	Insider Threat from employees or contractors with malicious intent and system access	£161K	MEDIUM	20	2
0127	Compressor	Electrical - including standby generators	Obsolescence	Control system	Expansion Joint Rupture causing sudden loss of containment at high pressure connections	£105K	HIGH	16	1
0176	Pipe	Filters and Scrubbers (incl. Condensate Tanks)	Corrosion	Condensate tank	Management Review Failure with inadequate oversight of safety and operational performance trends	£142K	MEDIUM	16	2
0144	Site	Miscellaneous	Compliance	New Item	Mercury Contamination in gas stream posing environmental and equipment metallurgy degradation risk	£143K	MEDIUM	16	3
0059	Pipe	Below Ground Pipe and Coating	Corrosion	Pipework > 2 inches below ground	SCADA System Malfunction preventing remote monitoring of terminal operations and equipment	£20K	MEDIUM	15	0
0156	Pipe	Pig Trap	Corrosion	Pig trap	Groundwater Pollution from underground leaks migrating to aquifer and water supply	£142K	MEDIUM	15	0
0175	Pipe	Below Ground Pipe and Coating	Pipe	Pipework ≤ 2 inches below ground	Inadequate Preservation of idle equipment allowing degradation during extended shutdown periods	£54K	MEDIUM	15	1
0170	Site	Electrical - including standby generators	Service	LV switchboards	Static Electricity Build-up creating ignition source risk in flammable atmosphere areas	£91K	HIGH	15	1
0184	Site	Below Ground Pipe and Coating	Pipe	All buried pipework	Emergency Response Deficiency with inadequate preparedness for major accident scenario response	£189K	MEDIUM	15	1
0202	Site	Pipework	Equipment	New Item	HVAC Fire Damper Failure allowing fire and smoke spread through ventilation ductwork	£155K	MEDIUM	15	3
0052	Site	Cathodic Protection	Equipment	Isolation valves	Chemical Spill of hazardous materials contaminating soil and groundwater around terminal	£82K	MEDIUM	15	1

Tutis Energy's Delivery and Current Role

Development Phase:

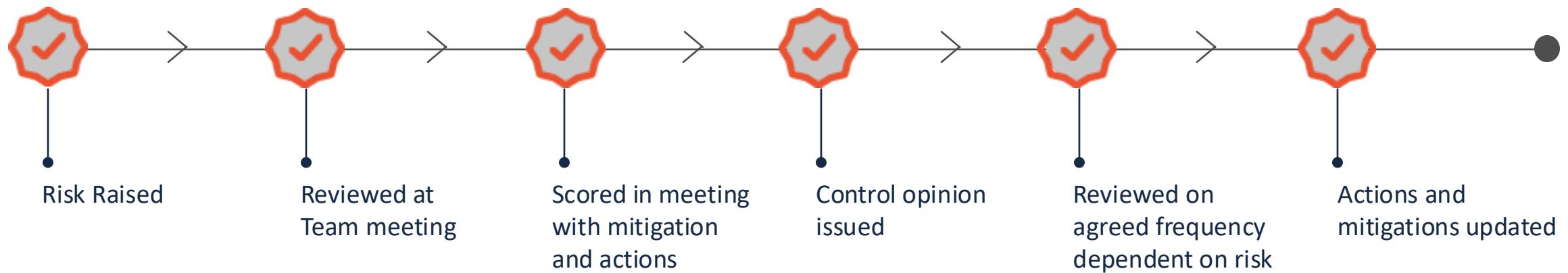
- Facilitated and chaired the initial ORAM meetings across National Gas network
- Led the drafting and development of the ORAM procedure
- Designed training packages and delivered roll-out sessions to operational teams
- Supported embedding of ORAM into daily operational and asset management processes
- Worked with National Gas to ensure alignment with Safety Case ie COMAH, PSR.

Ongoing Role Today:

- Provision of the ORAM software platform used across compressor stations and terminals
- **Annual Audit & Assurance reviews** at each location to ensure compliance and consistency
- Updates and refinements to the methodology as industry and regulatory expectations evolve



Process Diagram



ORAM embeds process safety into daily operations

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