# Pipeline Integrity and Risk-Based Inspection Leadership

**GExperts Learning Academy | PC-X03 | PC | 12-18 weeks**

## Course overview

12-18 weeks PC programme focused on Pipeline Integrity and Risk-Based Inspection Leadership, using energy-sector cases and applied decisions.

Designed for: Experienced professionals

## Learning outcomes

- Explain core principles and terminology for Pipeline Integrity and Risk-Based Inspection Leadership.
- Interpret an applied case using evidence and stated assumptions.
- Identify risks, safeguards, role boundaries and escalation points.
- Prepare a clear recommendation for a multidisciplinary audience.

## Course guide

Work through each module objective, lesson and teaching note, complete the applied activity and assessment, then use the separate Academy practice page for practice questions and answer feedback.

Separate practice questions:
https://www.globalexpertsconsultoria.com/training/academy/courses/questions/?course=PC-X03

## Academic and certification status

Draft learning resource for study and review. It does not confer accreditation, external certification, a regulated qualification, professional licence, safety-critical competence or site authorisation. Confirm approvals, current laws, standards, approved procedures and awarding-body requirements before delivery.

# Module 1: Pipeline integrity

## Learning objectives

- Explain pipeline integrity, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Pipeline integrity
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Pipeline integrity links design, materials, operation, corrosion control, inspection, damage assessment and repair. Threats include corrosion, fatigue, third-party damage and geohazards. Explain how service and environment influence the threat register.

Decision logic. Use condition evidence and engineering assessment to prioritise action. A pressure rating does not address all degradation or installation damage. All operating limits, repair decisions and fitness-for-service conclusions require competent approval.

Worked example. A route section crosses unstable seabed even though corrosion readings are low.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Create a pipeline threat register including non-corrosion threats.

Model answer guide. Include route movement, spans, fatigue, material condition and monitoring limitations.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Create a pipeline threat register including non-corrosion threats.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 2: Corrosion mechanisms and damage management

## Learning objectives

- Explain corrosion mechanisms and damage management, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Corrosion mechanisms and damage management
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Corrosion depends on materials, fluids, temperature, environment and operating history. Internal corrosion, external marine corrosion and localised attack can require different controls. Explain general thinning versus pitting and why average thickness may hide local damage.

Decision logic. Identify credible damage mechanisms before selecting inspection or mitigation. Coatings, inhibitors, material selection and cathodic protection have different applications. Competent engineers establish acceptance criteria; classroom measurements never approve equipment for continued service.

Worked example. A plate's average thickness appears acceptable but a local pit is much deeper.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Review a fictional damage map and propose a specialist inspection scope.

Model answer guide. Address local severity, mechanism, inspection coverage and operating conditions rather than average thickness alone.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Review a fictional damage map and propose a specialist inspection scope.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 3: Risk based inspection

## Learning objectives

- Explain risk based inspection, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Risk based inspection
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. RBI combines likelihood and consequence of failure to prioritise inspection and other actions. It relies on credible damage mechanisms, operating data and consequence modelling. High risk does not automatically mean only more inspection is needed.

Decision logic. Document assumptions and uncertainty and validate findings with competent teams. Mitigation may require operational change, repair or replacement. The course illustrates RBI logic without reproducing a proprietary standard or approving inspection intervals.

Worked example. A low-likelihood failure has severe consequences and therefore remains a priority for assurance.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Rank three fictional assets and explain the influence of consequence and uncertainty.

Model answer guide. Credit transparent reasoning and alternative controls; reject ranking only by historical failure count.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Rank three fictional assets and explain the influence of consequence and uncertainty.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 4: Inspection planning and technologies

## Learning objectives

- Explain inspection planning and technologies, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Inspection planning and technologies
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Inspection seeks evidence of condition and degradation using methods fit for the expected damage. Coverage, access, resolution and operator competence affect confidence. Distinguish visual survey, thickness measurement and detailed examination.

Decision logic. Start with the question being answered, then select method and locations. A clean report from limited coverage does not prove the whole asset is defect-free. Record limitations, traceability, findings and required engineering disposition.

Worked example. An external visual survey cannot establish internal wall thickness beneath insulation.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Design an inspection brief with objective, coverage, method and reporting limits.

Model answer guide. Match technique to mechanism and state what cannot be concluded.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Design an inspection brief with objective, coverage, method and reporting limits.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 5: Pipeline Integrity and Risk-Based Inspection Leadership: Work Pla

## Learning objectives

- Explain pipeline integrity and risk-based inspection leadership: work planning, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Pipeline Integrity and Risk-Based Inspection Leadership: Work Planning
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Pipeline Integrity and Risk-Based Inspection Leadership: Work Planning describes a practical part of Pipeline Integrity and Risk-Based Inspection Leadership. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for pipeline integrity and risk-based inspection leadership: work planning. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans pipeline integrity and risk-based inspection leadership: work planning while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for pipeline integrity and risk-based inspection leadership: work planning: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Prepare a decision brief for pipeline integrity and risk-based inspection leadership: work planning: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 6: Pipeline Integrity and Risk-Based Inspection Leadership: Data and

## Learning objectives

- Explain pipeline integrity and risk-based inspection leadership: data and performance, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Pipeline Integrity and Risk-Based Inspection Leadership: Data and Performance
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Pipeline Integrity and Risk-Based Inspection Leadership: Data and Performance describes a practical part of Pipeline Integrity and Risk-Based Inspection Leadership. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for pipeline integrity and risk-based inspection leadership: data and performance. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans pipeline integrity and risk-based inspection leadership: data and performance while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for pipeline integrity and risk-based inspection leadership: data and performance: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Prepare a decision brief for pipeline integrity and risk-based inspection leadership: data and performance: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 7: Pipeline Integrity and Risk-Based Inspection Leadership: Applied C

## Learning objectives

- Explain pipeline integrity and risk-based inspection leadership: applied case, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Pipeline Integrity and Risk-Based Inspection Leadership: Applied Case
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Pipeline Integrity and Risk-Based Inspection Leadership: Applied Case describes a practical part of Pipeline Integrity and Risk-Based Inspection Leadership. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for pipeline integrity and risk-based inspection leadership: applied case. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans pipeline integrity and risk-based inspection leadership: applied case while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for pipeline integrity and risk-based inspection leadership: applied case: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Prepare a decision brief for pipeline integrity and risk-based inspection leadership: applied case: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 8: Risk assessment and uncertainty management

## Learning objectives

- Explain risk assessment and uncertainty management, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Risk assessment and uncertainty management
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Define the activity and potential harm, identify hazards, evaluate existing controls, then decide further controls and ownership. A risk matrix supports prioritisation but does not prove a risk is tolerable. Include affected people and changing conditions.

Decision logic. Test whether controls are present and effective. Residual risk should be reassessed after control implementation, not merely after a promise. Escalate high-consequence uncertainty for competent review. Project risk also includes schedule, cost and opportunity effects.

Worked example. A permit lists a barrier that has not yet been installed. The claimed residual risk is premature.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Complete a risk register with cause, event, consequence, control, owner and verification.

Model answer guide. Keep hazard and consequence distinct and require evidence before taking control credit.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Complete a risk register with cause, event, consequence, control, owner and verification.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 9: Petroleum policy and institutional governance

## Learning objectives

- Explain petroleum policy and institutional governance, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Petroleum policy and institutional governance
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Policy sets objectives, institutions assign authority, and governance creates accountability for decisions and resources. Explain government, regulator and state enterprise roles conceptually without asserting an unverified current Namibian structure.

Decision logic. Separate commercial participation from regulatory judgement and manage conflicts transparently. Define decision rights, disclosure, assurance and challenge. A strong governance design includes implementation capacity and an audit trail, not just an organisation chart.

Worked example. A fictional institution both promotes investment and evaluates its own project compliance, creating a conflict to manage.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Draft a responsibility matrix and conflict-management controls.

Model answer guide. Identify segregated decisions, independent review, declarations and public accountability where applicable.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Draft a responsibility matrix and conflict-management controls.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Module 10: Pipeline Integrity and Risk-Based Inspection Leadership: Compet

## Learning objectives

- Explain pipeline integrity and risk-based inspection leadership: competence review, interpret a case, select appropriate controls and justify a documented decision.

## Lessons

1. Purpose and key terms of Pipeline Integrity and Risk-Based Inspection Leadership: Competence Review
2. Systems and operating context
3. Evidence, assumptions and decision gates
4. Hazards, safeguards and escalation
5. Applied case: Pipeline Integrity and Risk-Based Inspection Leadership

## Detailed teaching notes

Teaching notes

Core explanation. Pipeline Integrity and Risk-Based Inspection Leadership: Competence Review describes a practical part of Pipeline Integrity and Risk-Based Inspection Leadership. Learners connect the principles to asset performance, people, operational risk, project value and local context.

Decision logic. Review the objective, evidence, limits, interfaces and applicable controls for pipeline integrity and risk-based inspection leadership: competence review. Decisions require current information, role-appropriate authority, competent review and documented assumptions.

Worked example. Use an applied Namibia-relevant case in which a team plans pipeline integrity and risk-based inspection leadership: competence review while balancing safety, integrity, schedule, cost, environmental protection and local capability.

Facilitator prompts. Ask learners to distinguish verified facts from assumptions, identify who has decision authority, name stop-work triggers and state what evidence could change their recommendation. Compare technical, HSE, commercial and community perspectives.

Activity. Prepare a decision brief for pipeline integrity and risk-based inspection leadership: competence review: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

Model answer guide. A sound response defines scope; uses current, traceable evidence; applies approved requirements and controls; records assumptions; assigns competent owners; checks interfaces; and communicates a measurable decision with an escalation path.

Assessment evidence. Score accuracy (30%), use of evidence (20%), safeguards (20%), analysis (20%) and communication (10%).

## Applied activity

Prepare a decision brief for pipeline integrity and risk-based inspection leadership: competence review: scope, evidence, assumptions, hazards, safeguards, owner, decision gate and escalation trigger.

## Assessment

Formative: 10-question practice quiz with answer feedback

Summative: Applied decision brief or practical case assessed against the rubric; proposed pass mark 70%, subject to academic approval.

## Practice

Use the separate Academy practice questions and answer key page for this module.

# Facilitator close-out and resources

## Facilitator close-out

Record attendance, assessment evidence, learner support needs, incidents and improvement actions according to approved provider processes. Do not sign learners off for regulated or safety-critical work without the authorised assessment and certification route.

## Resources and references

- Supplied GExperts/IUM reference materials; verify reuse rights and currentness.
- Current applicable Namibian legislation, standards and approved site procedures supplied by the provider.
- Case worksheet and instructor slides must be produced and reviewed before course release.