What makes a good requirement?

James Carr
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What makes a good requirement?

What's so hard about developing good requirements?

Where requirement management tools can help

Which communication challenges will follow you everywhere

Why writing styles must change with digital requirements

How to support requirement authors and reviewers

qvscribe

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JIP33 JOINT INDUSTRY PROGRAMME Standardizing procurement specifications

An IOGP programme International Association of Oil & Gas Producers

What's so hard about developing good requirements?

Objective

Unambiguity
Verifiability
Singularity

Subjective

Communicating Context
Aligning Terminology
Ensuring Consistency

What's so hard about developing good requirements?

Objective	
Unambiguity	Only one possible interpretation.
Verifiability	Can be proven by inspection, demonstration, test, or analysis.
Singularity	A self-contained statement including exactly one requirement.

Why teams are adopting Requirement Management Tools

Management Tool Benefits

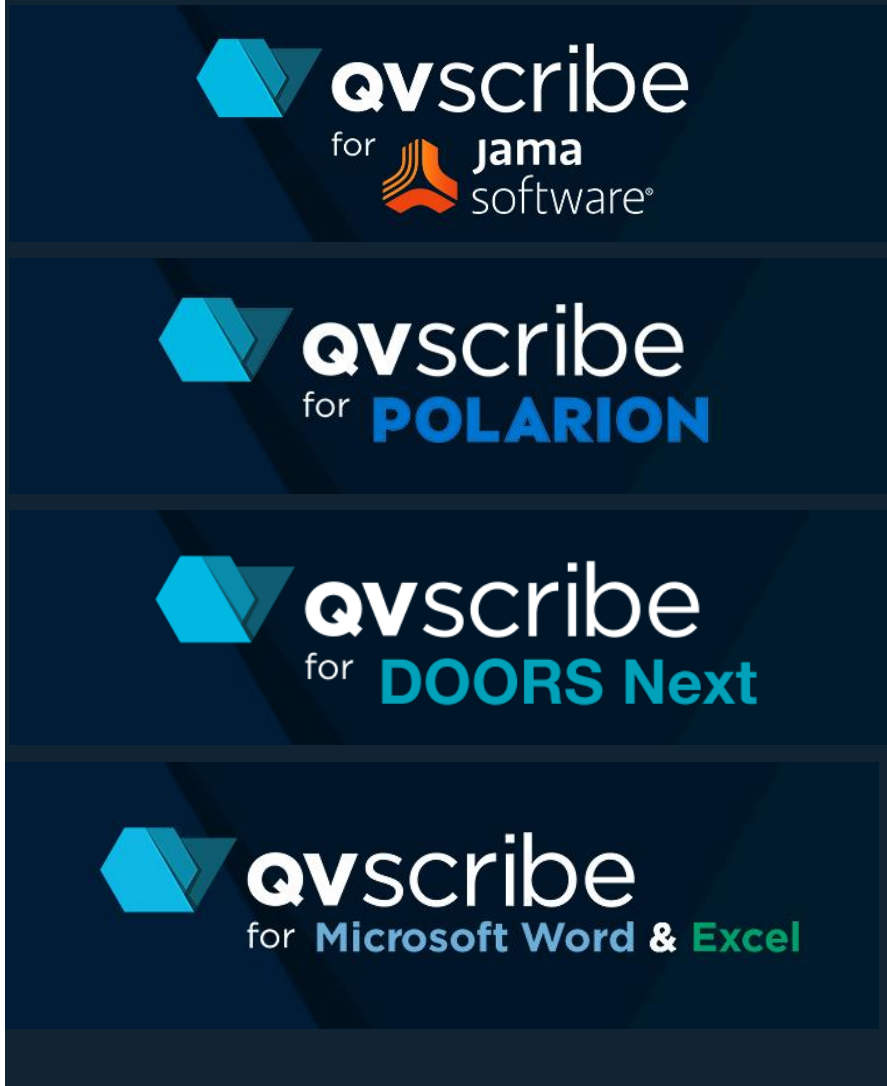
Availability of Information

Flexible Workflows

Traceability

Reusability

Easier Version Control



Which Communication Challenges Will Follow You Everywhere

No matter where your requirements are written or managed, there will always be a blank space where someone needs to describe what is required. It is in this space where ambiguity and assumption will create confusion and rework.

Which Communication Challenges Will Follow You Everywhere

Management Tool Benefits

Availability of Information

Flexible Workflows

Traceability

Reusability

Easier Version Control

New Challenges

Data Transfer

Designing New Workflows

Training Employees

User Adoption

Changes to writing styles

Why writing styles must change with digital requirements

Unambiguity
Verifiability
Singularity

Pipeline Specification

5. Railroad Crossings

5.4 Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval and work on the railroad right of way shall be subject to their inspection. The Contractor shall bear all costs incurred.

Why writing styles must change with digital requirements

Unambiguity
Verifiability
Singularity

Pipeline Specification

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5. Railroad Crossings

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Why writing styles must change with digital requirements

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Verifiability
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~~5. Railroad Crossings~~

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Why writing styles must change with digital requirements

Unambiguity
Verifiability
Singularity

5.4.1 Where The Work Area is within 50m of a Railroad, The Contractor shall submit proposed pipeline plans to The Chief Railroad Engineer for approval.

5.4.2 Where The Work Area is on a Railroad Right of Way, The Chief Railroad Engineer shall perform an inspection of The Work.

5.4.3 The Contractor shall bear the cost of Railroad Crossing inspections.

How to Support Requirement Authors and Reviewers

Objective

Unambiguity
Verifiability
Singularity

Requires Direction

Subjective

Communicating Context
Aligning Terminology
Ensuring Consistency

Requires Insight

Quality Score Summary

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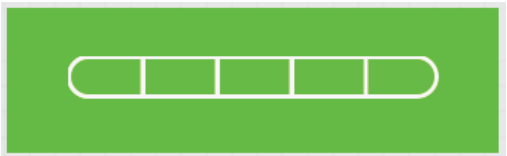
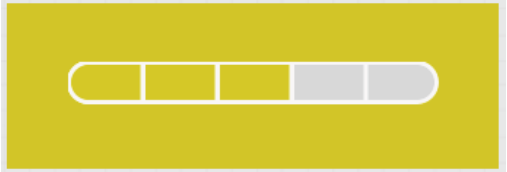
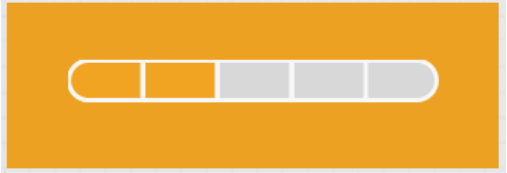
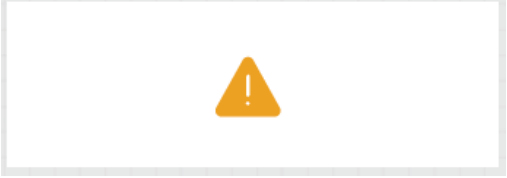
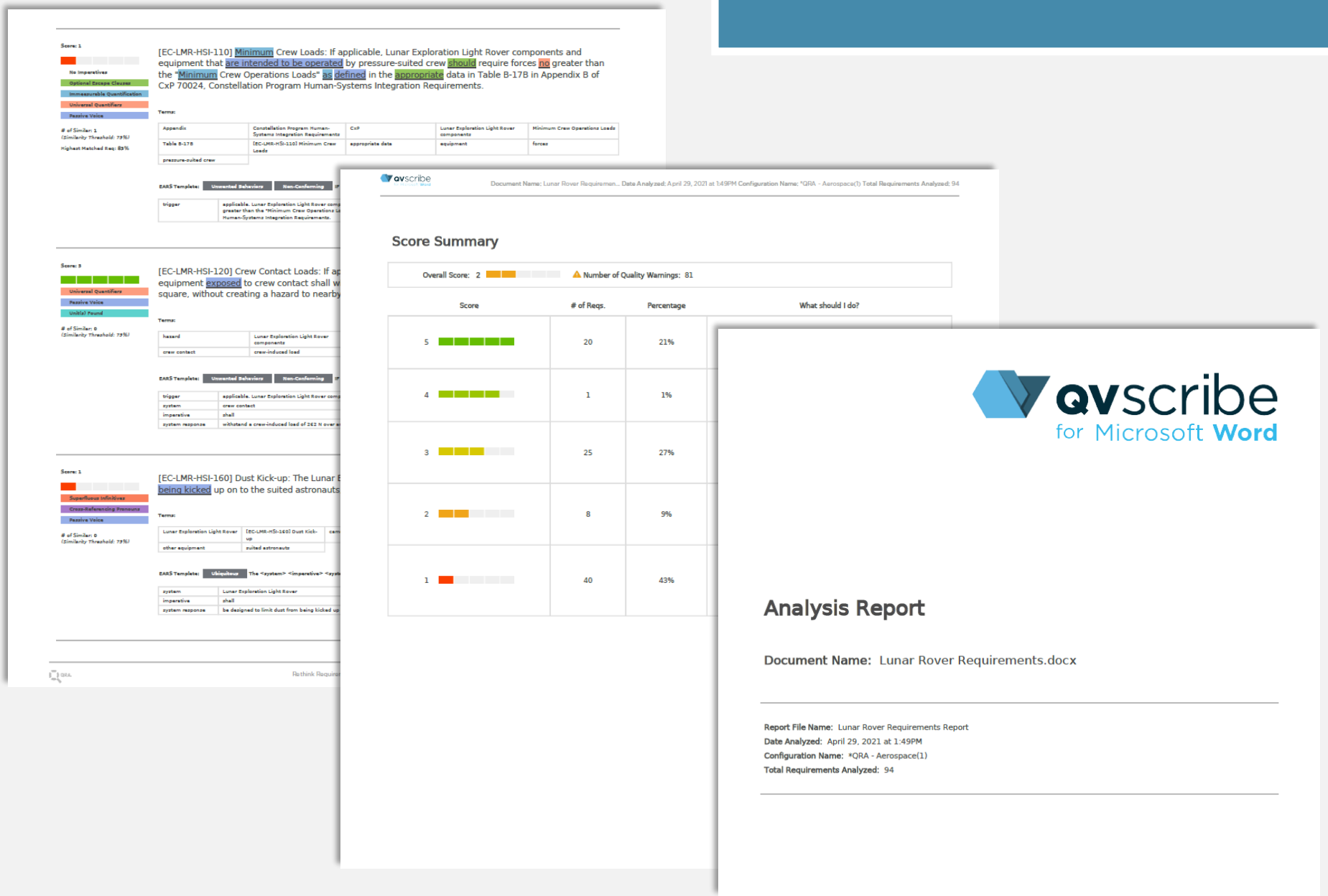
Quality Score	Reason for this Score	Risk and Action
	**No problems found** with this requirement that impact the Quality Score.	**Very Low Risk** Includes exactly one imperative and uses clear, unambiguous terminology to express the requirement.
	Minor problems with this requirement. May include: - Excessive use of continuances - No Directives (off by default)	**Low Risk** These issues are generally low-risk but they make the requirements more difficult to work with and should be addressed.
	**Major problem** with this requirement. May include: - A single vague, subjective, or weak term - A single negative imperative	**Medium Risk** The presence of these terms usually indicates that the meaning of the requirement will be ambiguous, and it may be difficult to test.
	**Multiple major problems** with this requirement. More than one: - Vague, subjective, or weak terms and/or - Negative imperatives	**High Risk** Having multiple quality issues within the same requirement heightens the risk of misinterpretation. This can lead to product failure or costly rework.
	Critical problems with this requirement. May include: - No imperative or multiple imperatives, and/or - Several vague, subjective, or weak terms	**Very High Risk** Requirements that have problems with the imperatives or more than two instances of problematic language represent the highest risk.
	**Quality Warnings** were found in this requirement. May include: Universal Quantifiers, Passive Voice, Incomplete Sentences, and/or Justification Information	**Potential for Risk** The proper use of phrases identified in these categories depends on the context in which they are used. When these potential issues are found a warning will be shown but they do not impact the Quality Score.

One-Click PDF Reports



Score Summary

Overall Score: 2 ⚠ Number of Quality Warnings: 81

Score	# of Reqs.	Percentage	What should I do?
5	20	21%	
4	1	1%	
3	25	27%	
2	8	9%	
1	40	43%	

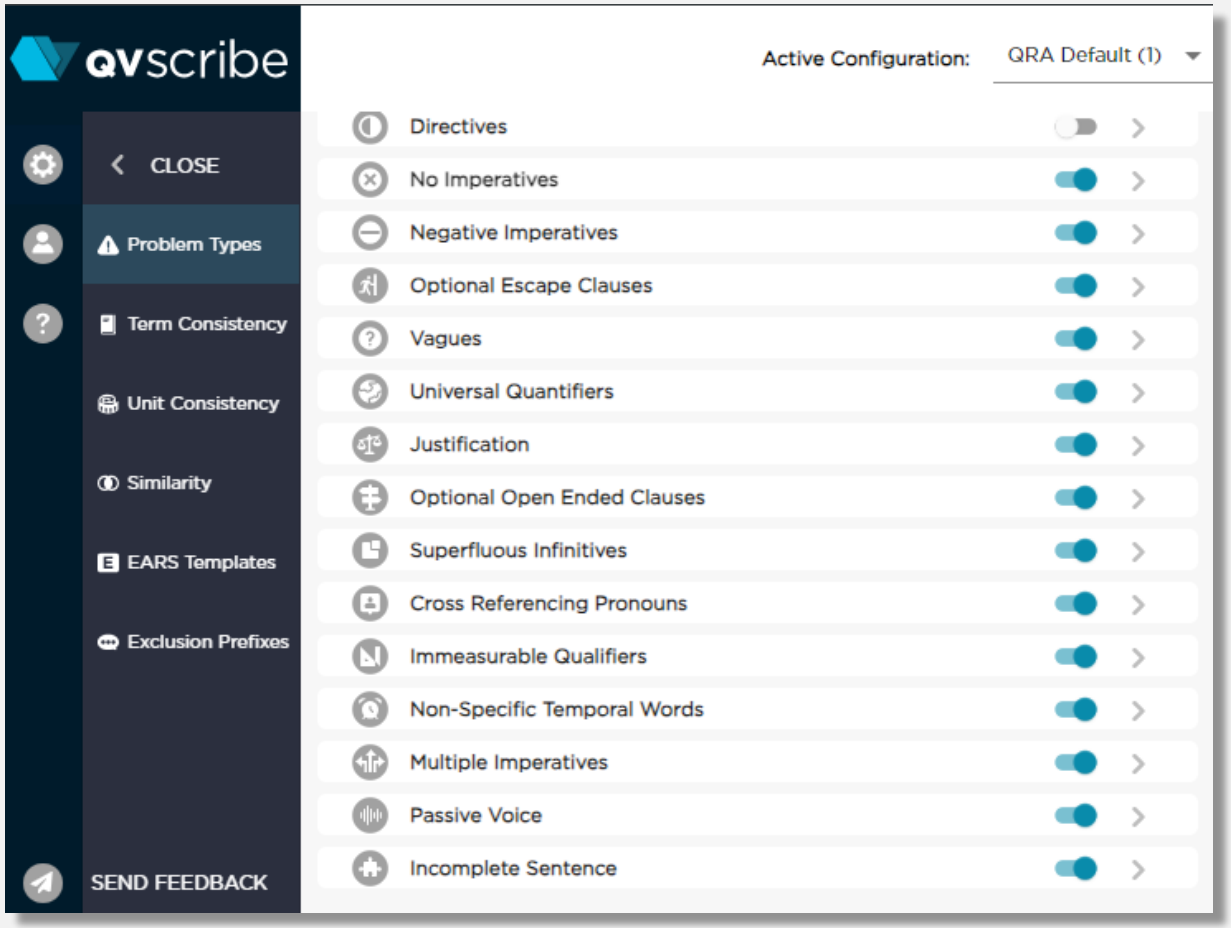
qvscribe for Microsoft Word

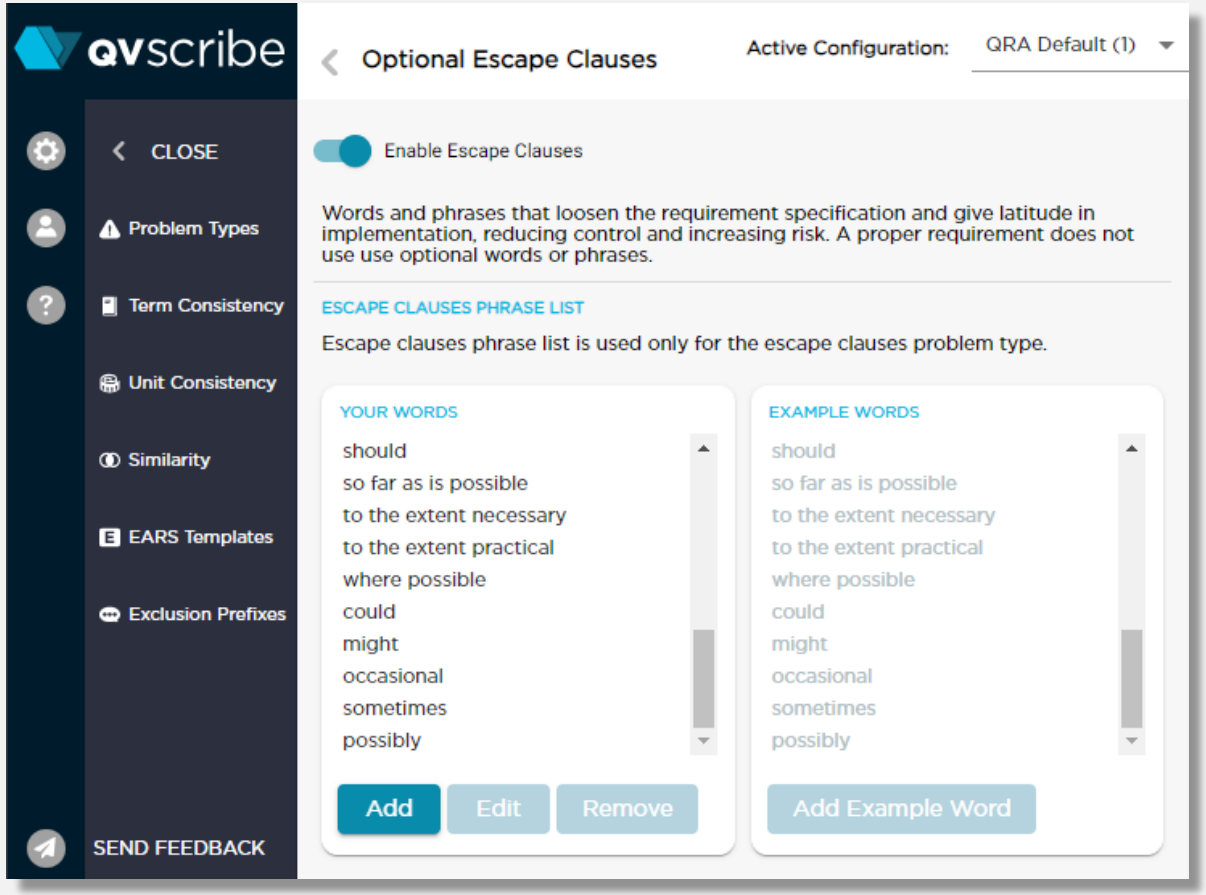
Analysis Report

Document Name: Lunar Rover Requirements.docx

Report File Name: Lunar Rover Requirements Report
Date Analyzed: April 29, 2021 at 1:49PM
Configuration Name: *QRA - Aerospace(1)
Total Requirements Analyzed: 94

Custom Configurations





QVscribe Integrations

QVscribe interfaces with virtually any database and runs directly within select requirements management tools.

Analysis configurations are automatically synced across all users and all versions of QVscribe to ensure consistent quality across your organization.

QVscribe for Microsoft Word & Excel

QVscribe for POLARION

QVscribe for DOORS Next

QVscribe for Jama Software®

Quality Analysis

QVscribe for Word

AutoSave On | Pipeline Examples • Saved | Search

File Home Insert Draw Design Layout References Mailings Review View Help QVscribe

QVscribe | QVscribe for Teams | User: james | License Pool: pool2 | -QV1 System Requirements... | Configuration

Mark Requirements | Remove Marks | Find Requirements | Requirement Marking

Toggle Color Background | Export Requirements | Utilities

Place Requirement Template | EARS

Pipeline Specification

5. Railroad Crossings

5.4 Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval and work on the railroad right of way shall be subject to their inspection. The Contractor shall bear all costs incurred.

5.4.1a Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval.

QVscribe Marked Requirement

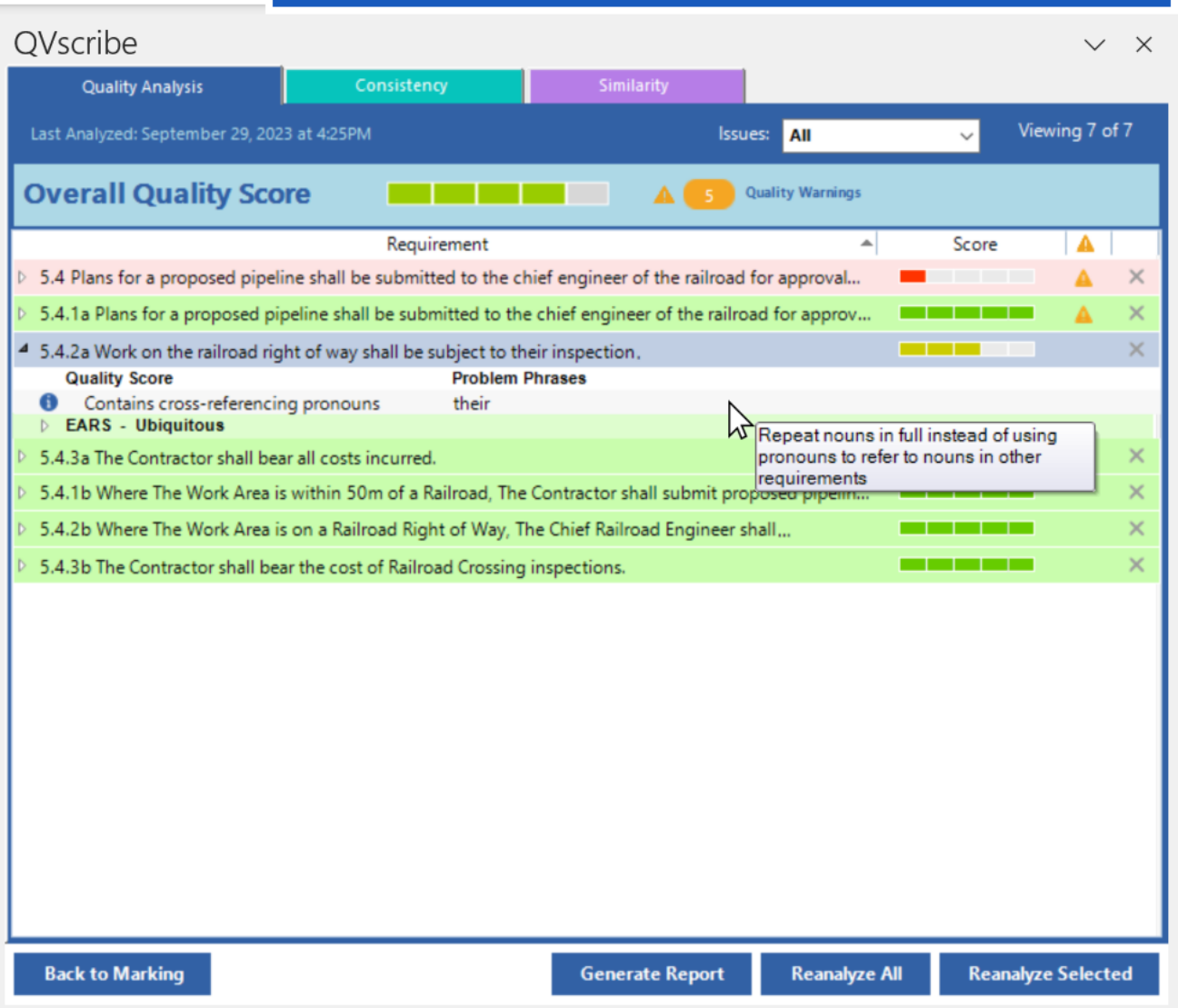
5.4.2a Work on the railroad right of way shall be subject to their inspection.

5.4.3a The Contractor shall bear all costs incurred.

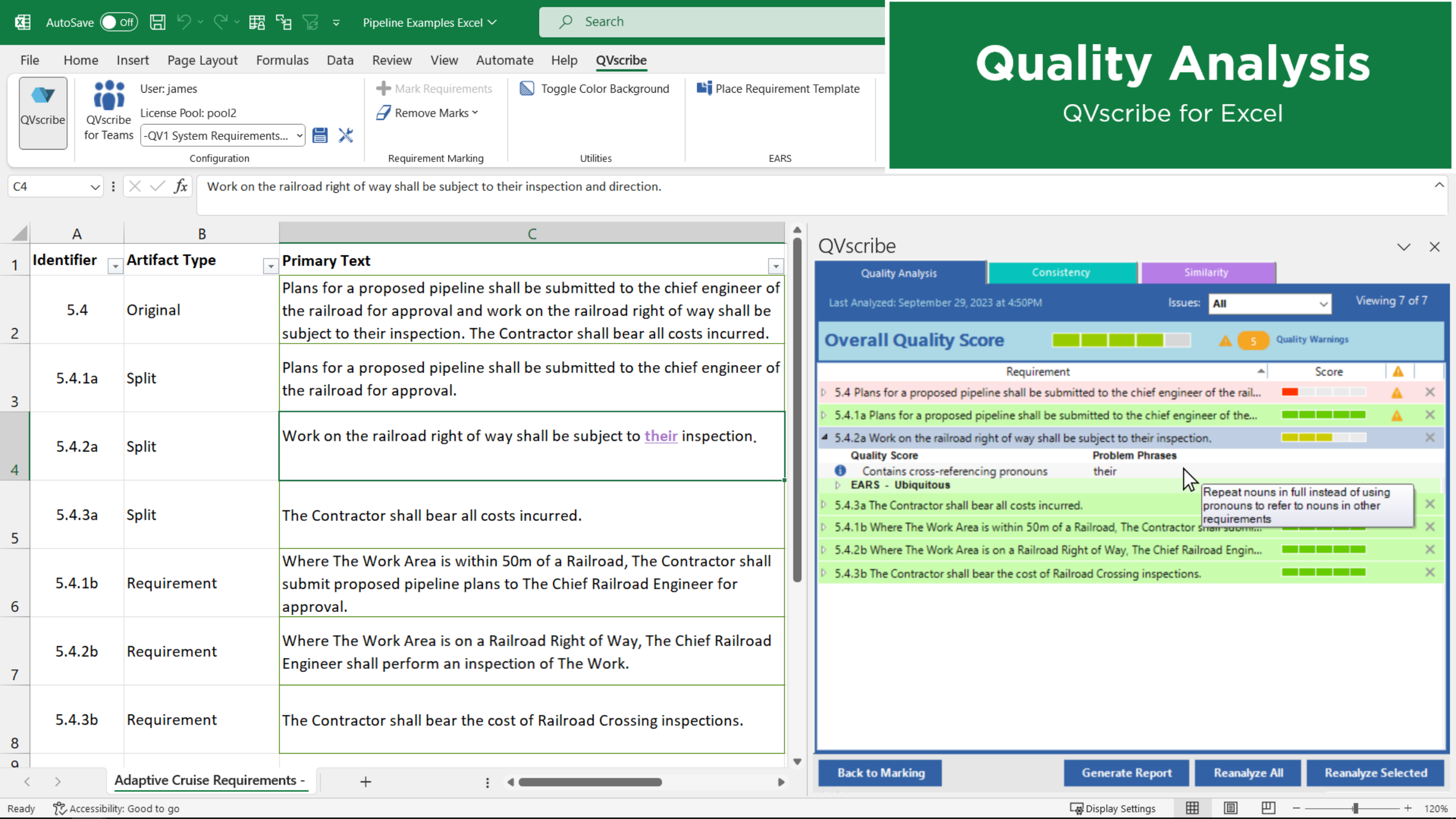
5.4.1b Where The Work Area is within 50m of a Railroad, The Contractor shall submit proposed pipeline plans to The Chief Railroad Engineer for approval.

5.4.2b Where The Work Area is on a Railroad Right of Way, The Chief Railroad Engineer shall perform an inspection of The Work.

5.4.3b The Contractor shall bear the cost of Railroad Crossing inspections.



147 words | Text Predictions: On | Accessibility: Investigate | Display Settings | Focus | 80%


AutoSave Off
Pipeline Examples Excel
Search
File Home Insert Page Layout Formulas Data Review View Automate Help QVscribe
QVscribe
QVscribe for Teams
User: james
License Pool: pool2
-QV1 System Requirements...
Configuration
Mark Requirements
Remove Marks
Requirement Marking
Toggle Color Background
Utilities
Place Requirement Template
EARS
Quality Analysis
QVscribe for Excel
C4
Work on the railroad right of way shall be subject to their inspection and direction.
Identifier
Artifact Type
Primary Text
5.4 Original Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval and work on the railroad right of way shall be subject to their inspection. The Contractor shall bear all costs incurred.
5.4.1a Split Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval.
5.4.2a Split Work on the railroad right of way shall be subject to their inspection.
5.4.3a Split The Contractor shall bear all costs incurred.
5.4.1b Requirement Where The Work Area is within 50m of a Railroad, The Contractor shall submit proposed pipeline plans to The Chief Railroad Engineer for approval.
5.4.2b Requirement Where The Work Area is on a Railroad Right of Way, The Chief Railroad Engineer shall perform an inspection of The Work.
5.4.3b Requirement The Contractor shall bear the cost of Railroad Crossing inspections.
Adaptive Cruise Requirements -
QVscribe
Quality Analysis
Consistency
Similarity
Last Analyzed: September 29, 2023 at 4:50PM
Issues: All
Viewing 7 of 7
Overall Quality Score
5 Quality Warnings
Requirement
Score
5.4 Plans for a proposed pipeline shall be submitted to the chief engineer of the rail...
5.4.1a Plans for a proposed pipeline shall be submitted to the chief engineer of the...
5.4.2a Work on the railroad right of way shall be subject to their inspection.
Quality Score
Problem Phrases
Contains cross-referencing pronouns
their
EARS - Ubiquitous
Repeat nouns in full instead of using pronouns to refer to nouns in other requirements
5.4.3a The Contractor shall bear all costs incurred.
5.4.1b Where The Work Area is within 50m of a Railroad, The Contractor
5.4.2b Where The Work Area is on a Railroad Right of Way, The Chief Railroad Engin...
5.4.3b The Contractor shall bear the cost of Railroad Crossing inspections.
Back to Marking
Generate Report
Reanalyze All
Reanalyze Selected
Ready
Accessibility: Good to go
Display Settings
120%

QVscribe for DOORS Next

IBM Engineering Requirements Management DOORS Next (/rm)

Requirements

Requirements Initial Stream | James Carr

Project Dashboard | Artifacts | Reviews | Reports

Search Artifacts

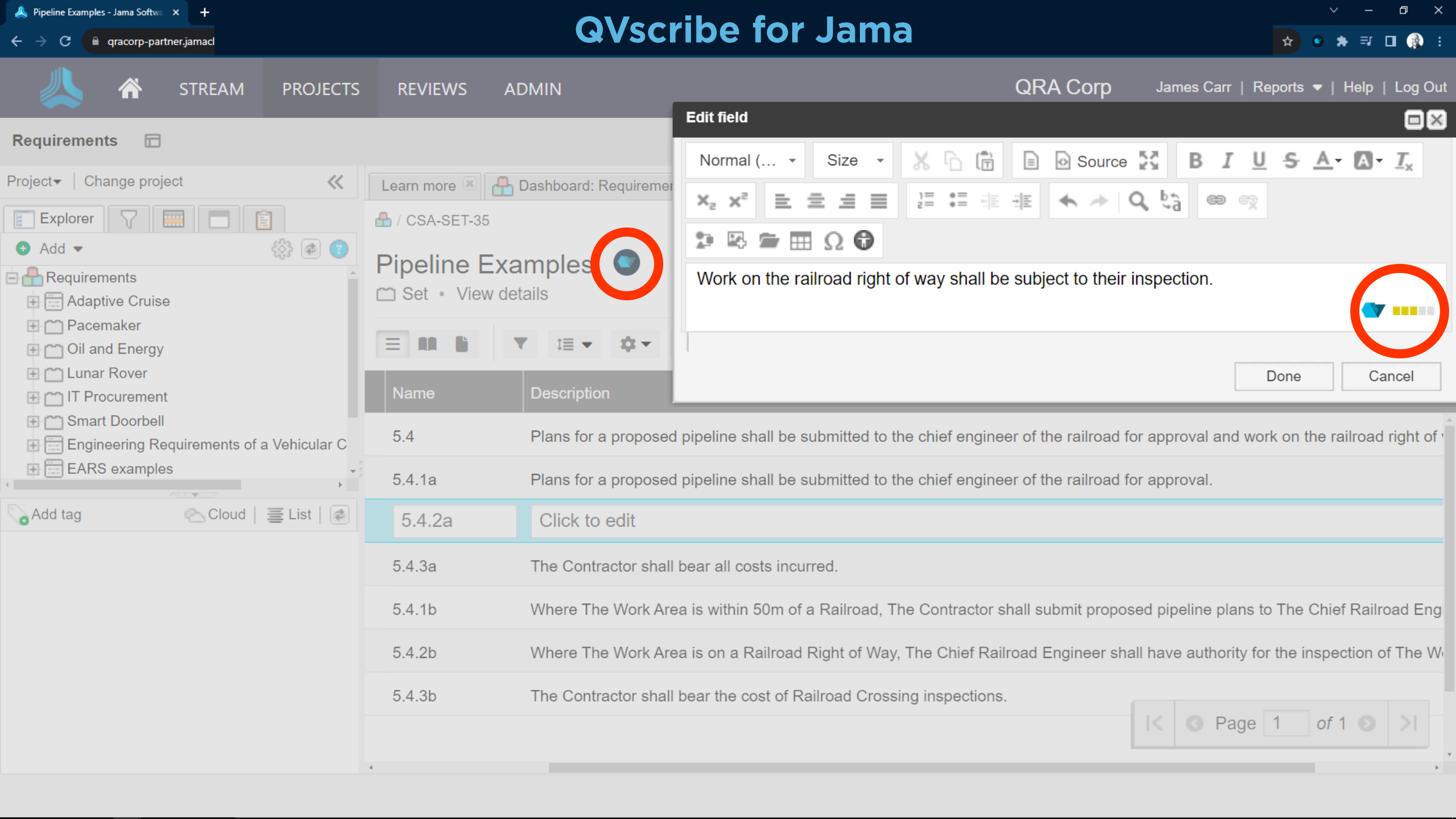
Requirements / 10327 Pipeline Examples

Create | Type to filter artifacts by text or by ID

Artifact Type	Contents	ID	Score
Heading	1 PIPELINE SPECIFICATION	10335	
Heading	2 Railroad Crossings	10336	
Requirement	2.4 Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval and work on the railroad right of way shall be subject to their inspection. The Contractor shall bear all costs incurred.	10328	
Feature	2.4.1a Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval.	10329	
Feature	2.4.2a Work on the railroad right of way shall be subject to their inspection.	10330	
Feature	2.4.3a The Contractor shall bear all costs incurred.	10331	
Requirement	2.4.1b Where The Work Area is within 50m of a Railroad, The Contractor shall submit proposed pipeline plans to The Chief Railroad Engineer for approval.	10332	
Requirement	2.4.2b Where The Work Area is on a Railroad Right of Way, The Chief Railroad Engineer shall have authority for the inspection of The Work.	10333	
Requirement	2.4.3b The Contractor shall bear the cost of Railroad Crossing inspections.	10334	

Showing 9 of 9 (100%)

QVscribe for Jama



QVscribe for Polarion

Pipeline Examples < Default Spa

polarion4.qracorp.com

Requirements

Search

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My Polarion

- Default Space
  - Index
  - Adaptive Cruise
  - IT Procurement
  - Lunar Rover
  - Oil and Energy
  - Pacemaker
  - Pipeline Examples
  - Pipeline Specification
  - Smart Doorbell
- Features
- Master Specifications
- Reports
- Variants

Expand

7 found

ID	Title	Req. Type	Severity
REQU-669	Plans for a proposed pipeline shall be submitted to the chief engineer	Functional Requirement	Must Have
REQU-670	Plans for a proposed pipeline shall be submitted to the chief engineer	Functional Requirement	Must Have
REQU-671	Work on the railroad right of way shall be subject to their inspection.	Functional Requirement	Must Have
REQU-672	The Contractor shall bear all costs incurred.	User Requirement	Must Have
REQU-673	Where The Work Area is within 50m of a Railroad, The Contractor shall	User Requirement	Should Have
REQU-674	Where The Word Area is on a Railroad Right of Way, The Chief Railroac	User Requirement	Should Have
REQU-675	The Contractor shall bear the cost of Railroad Crossing Inspections.	Functional Requirement	Should Have

Edit | Save | Cancel | Open in Document

Description

Segoe UI 10

Work on the railroad right of way shall be subject to their inspection.

QVscribe for Polarion

Pipeline Examples < Default Spa

polarion4.qracorp.com

Requirements

Search

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My Polarion

- Default Space
  - Index
  - Adaptive Cruise
  - IT Procurement
  - Lunar Rover
  - Oil and Energy
  - Pacemaker
  - Pipeline Examples
  - Pipeline Specification
  - Smart Doorbell
- Features
- Master Specifications
- Reports
- Variants

Expand

Normal | Segoe UI | 10

Pipeline Specification

Railroad Crossings

REQU-669 - Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval and work on the railroad right of way shall be subject to their inspection. The Contractor shall bear all costs incurred. Draft

REQU-670 - Plans for a proposed pipeline shall be submitted to the chief engineer of the railroad for approval. Draft

REQU-671 - Work on the railroad right of way shall be subject to their inspection. Draft

REQU-672 - The Contractor shall bear all costs incurred. Draft

REQU-673 - Where The Work Area is within 50m of a Railroad, The Contractor shall submit proposed pipeline plans to The Chief Railroad Engineer for approval. Draft

REQU-674 - Where The Word Area is on a Railroad Right of Way, The Chief Railroad Engineer shall have authority for the inspection of The Work. Draft

REQU-675 - The Contractor shall bear the cost of Railroad Crossing Inspections. Draft

CURRENT: Pipeline Examples

Quality Score Summary

SCORE	# OF REQ.	*PERCENTAGE	WHAT SHOULD I DO?
	1	14%	**Very High Risk** The requirement lacks an imperative, or contains multiple imperatives, and/or contains excessive vague terms. The requirement could also have multiple instances of low-risk errors such as excessive continuances, vague phases, etc which have a cumulative effect on the score. Consider rewriting the requirements or separating into multiple concise requirements.
	0	0%	**High Risk** Includes multiple instances of vague, subjective, or weak terms, and/or negative imperatives. Replace negative or ambiguous terms with clear and concise terms.
	1	14%	**Medium Risk** Includes a single instance of a vague, subjective, or weak term, and/or a single negative imperative. Replace the negative or ambiguous term with a clear and concise term.
	0	0%	**Low Risk** May include excessive use of continuances, and/or No directives. Check the flow and clarity of the requirement.
	5	71%	**Very Low Risk** Includes clear and unambiguous terminology to express the requirement.

Total # of Requirements

7

Score Summary ● ○ Score Breakdown ›

Quality Warnings

WARNINGS	*PERCENTAGE	# FOUND
Incomplete Sentences	0%	0
Justification	0%	0
Passive Voice	43%	3
Universal Quantifier	29%	2

Total # of Quality Warnings

5

Unit Consistency

of Units

1

Term Consistency

of Terms

21

* Percentages are based on the occurrences of each quality issue within all analyzed requirements. Note that these percentages are not correlated and will not generally add up to 100% (since some requirements have multiple issues and others may have none)

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Overall Score:

- Summary Dashboard
- Quality Analysis
- Term Consistency
- Unit Consistency
- Similarity
- Send Feedback

Create Report

This is a Non-Production version of Jama. Please contact Jama for commercial licenses.

Return to Quality Review

REQUIREMENT I.D. : CSA-PE-3

Work on the railroad right of way shall be subject to their inspection.

2 All Alerts

QUALITY SCORE | CROSS-REFERENCING PRONOUNS

their

Reduce ambiguity by replacing pronouns such as "**it**", "**other**" and "**both**" with the proper unique name for the entity being referenced.

Incorrect Example	If it drops below 6%, then the Alert System shall send a notification to the Mobile App.
Correct Example	If the Backup Battery Level drops below 6%, then the Alert System shall send a Low Battery notification to the Mobile App.

EARS | COMPLIANT

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Quality Score:

Cross-Referencing Pronouns 1

All Alerts 2

EARS Ubiquitous

Send Feedback

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Return to Quality Review

REQUIREMENT I.D. : CSA-PE-6

Where The Work Area is on a Railroad Right of Way, The Chief Railroad Engineer shall perform an inspection of The Work.

1 All Alerts

EARS | COMPLIANT

Optional Feature

Optional features requirements apply only when an optional feature is present.

Where **<feature is included>**, the **<system> <imperative> <system response>**.

TEMPLATE SECTION	FOUND IN REQUIREMENT
<feature is included>	The Work Area is on a Railroad Right of Way
<system>	Chief Railroad Engineer
<imperative>	shall
<system response>	have authority for the inspection of The Work

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Quality Score:

All Alerts 1

EARS Optional Feature

Send Feedback

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How to Support Requirement Authors and Reviewers

Free Resource: Mastering Atomic Requirements in Engineering

https://qracorp.com/datasheets

QRA

How to Support Requirement Authors and Reviewers

Curious about how the JIP33 team elevated their diverse team of requirement engineers to an extraordinary level?

QRA's upcoming case study discusses JIP33's novel approach to requirement education and successful implementation of QVscribe.

https://qracorp.com/jip33

JIP33 JOINT INDUSTRY PROGRAMME
Standardizing procurement specifications

An IOGP programme
International Association of Oil & Gas Producers

QRA

What makes a good requirement?

Thank you!

If you'd like a recording of this presentation please send an email to the address below

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james.carr@qracorp.com

https://qracorp.com/jip33

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Standardizing procurement specifications

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