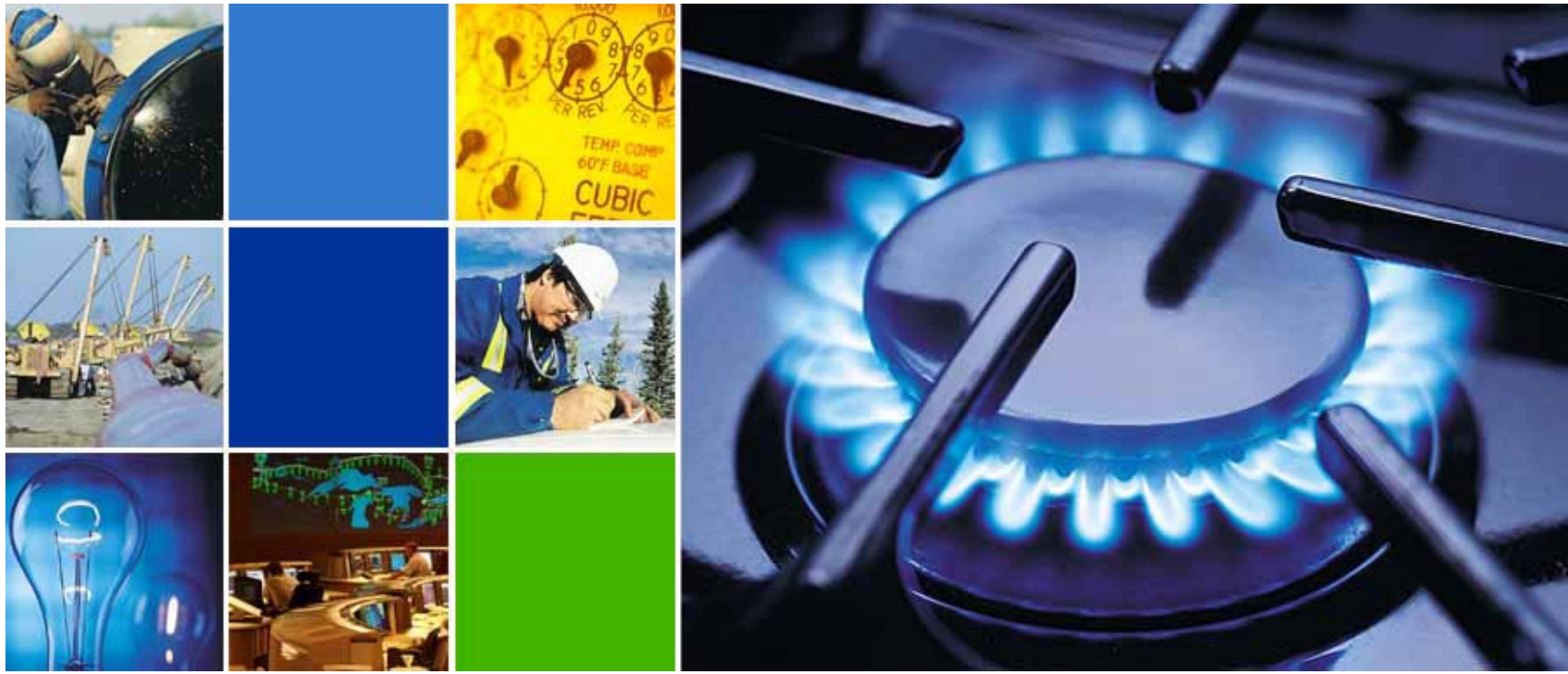


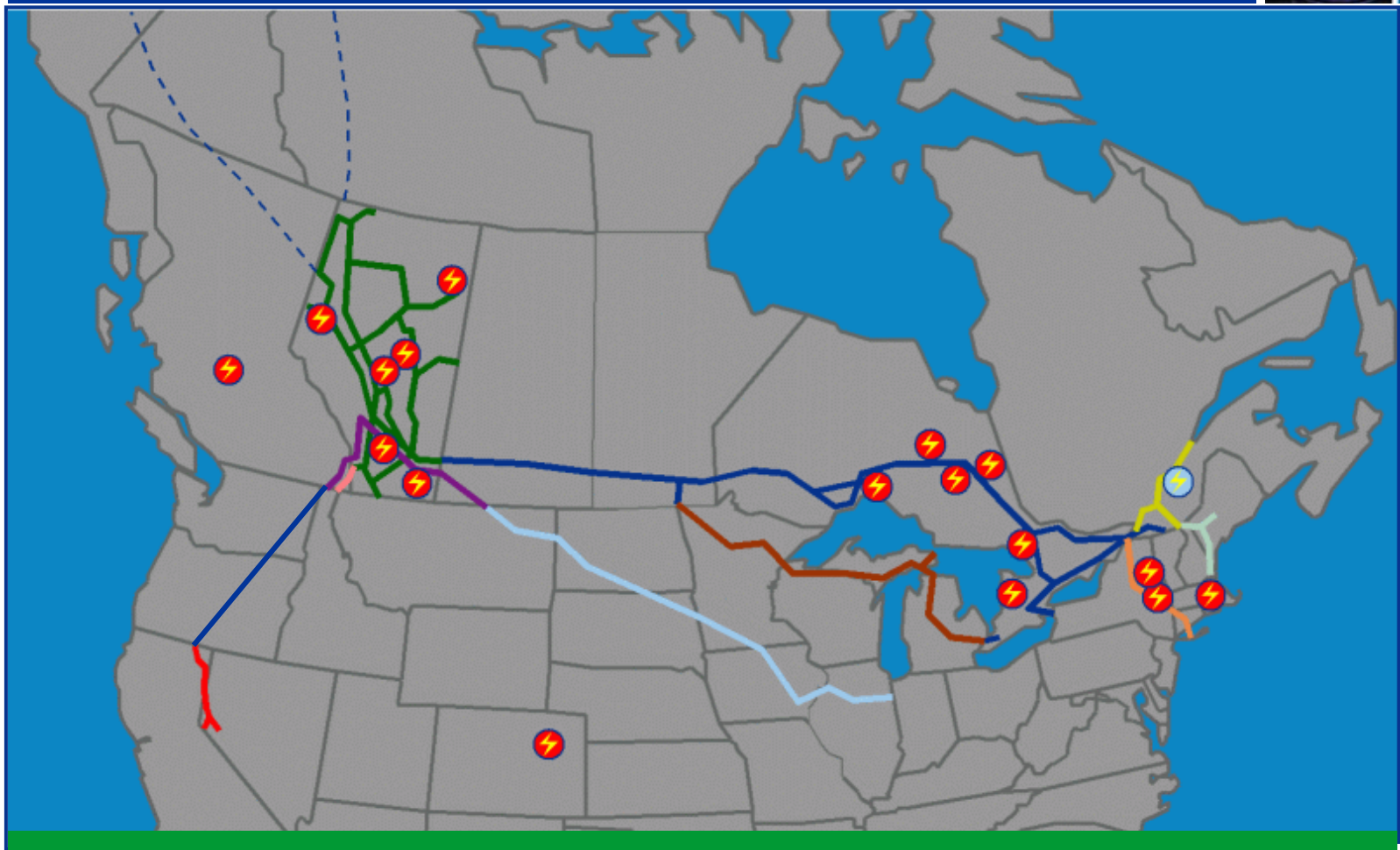
SCC Direct Assessment Experience

Government/Industry R&D Forum

A **Trans**Canada Perspective

TransCanada
In business to deliver

Gas Transmission and Power assets



Transmission - 42,000 kms (26,000 miles) of pipeline;
Power - 19 Plants

SCC at **Trans**Canada

Managing Near Neutral pH and High pH SCC since mid 1980s

Extensive experience and R&D in:

- Susceptibility assessments – Soils modeling
- Hydrostatic testing
- ILI – Elastic Wave, EMAT, USCD
- MPI, In ditch sizing, Severity analysis
- Pressure spectrum analysis

Participated in development of CEPA SCC Guidelines and NACE SCCDA RP

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In-House SCCDA Document

Written in Accordance with:

- Part A3 of ASME B31.8S,
- CEPA SCC Recommended Practices, and
- NACE RP 0204-2004 Recommended Practice

Modified to reflect knowledge from

- Company Experience and R&D
- PRCI R&D
- JIPs
- R&D by others

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In-House SCCDA Document

Insure Compliance to:

- Recommended Practices
- 49 CFR 192, Subpart O
- Company Integrity Management Practices
- Consistent and technically sound application
- Improve safety and prevent future SCC impact

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In-House SCCDA Document

- Addresses High pH and Near Neutral pH SCC
- Gas and Liquid Pipelines
- Complements ILI and Hydrostatic Testing for SCC
- Identifies locations where SCC MIGHT occur in the future, not only where it is known to exist
- Condition Monitoring
  - Leverage digs for other reasons
  - (ILI corrosion repairs + other)

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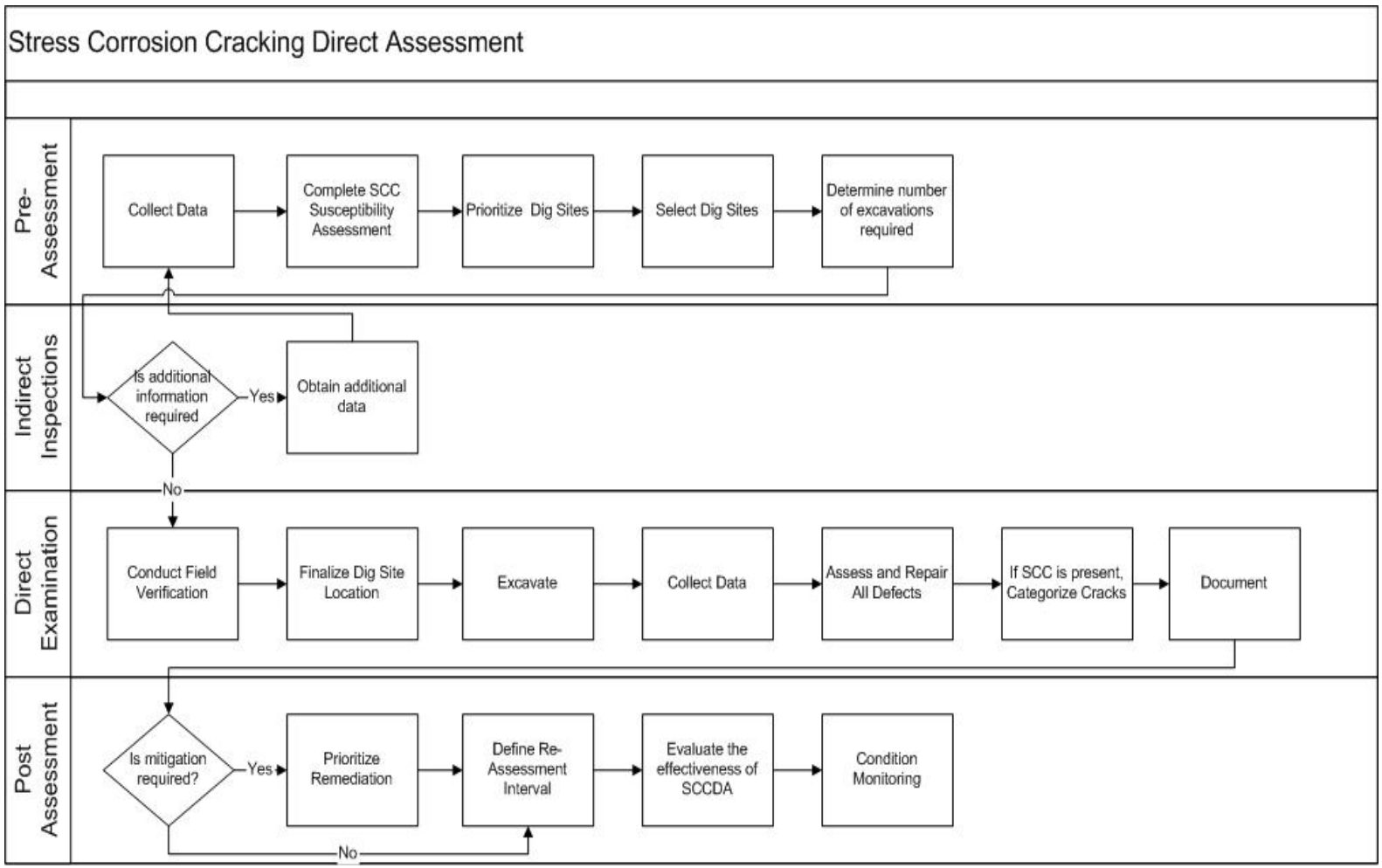
4 Step Process



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Dig Site Selection

- Modified susceptibility criteria
- Segment defined as pipe between Compressor Stations
- Not Valve to Valve
- Dig most probable SCC site in Segment to assess all HCAs
- “Dig” defined as 1 joint + 2 Girth Welds

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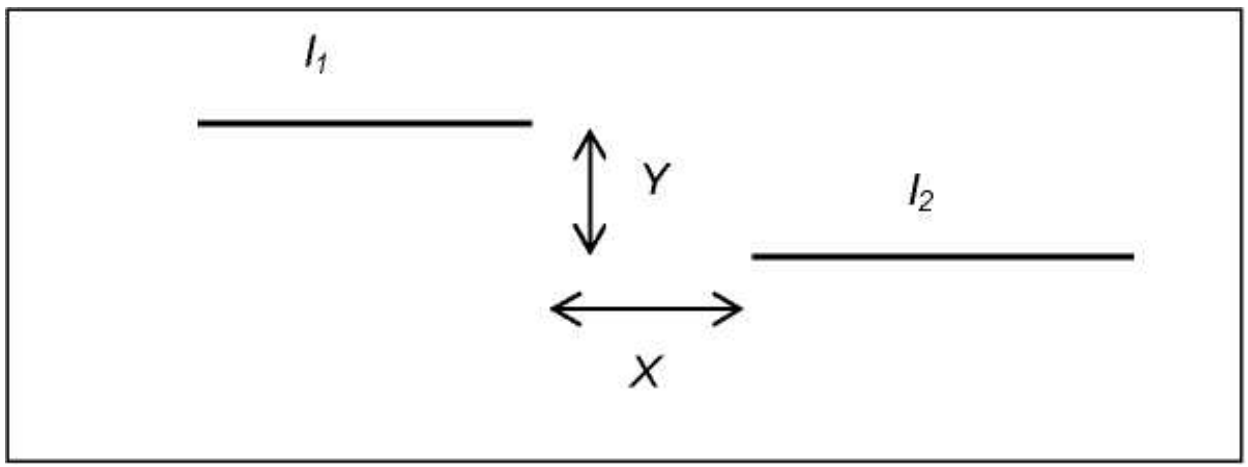
Maximum Crack Length and Crack Interaction

- Crack interaction is dependent on the circumferential and axial separation between individual (or interlinked) cracks



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Crack Severity Rating

Crack Severity	Crack Failure Pressure Criteria
Category 1	Less than 10% deep or will not fail a hydrotest even if 40% deep and > 110% SMYS
Category 2	≤ 110% and ≥ (SF)MAOP
Category 3	< (SF)MAOP
Category 4	< 1.1 MAOP

SF = Safety Factor: 1.25 or 1.39 or as appropriate

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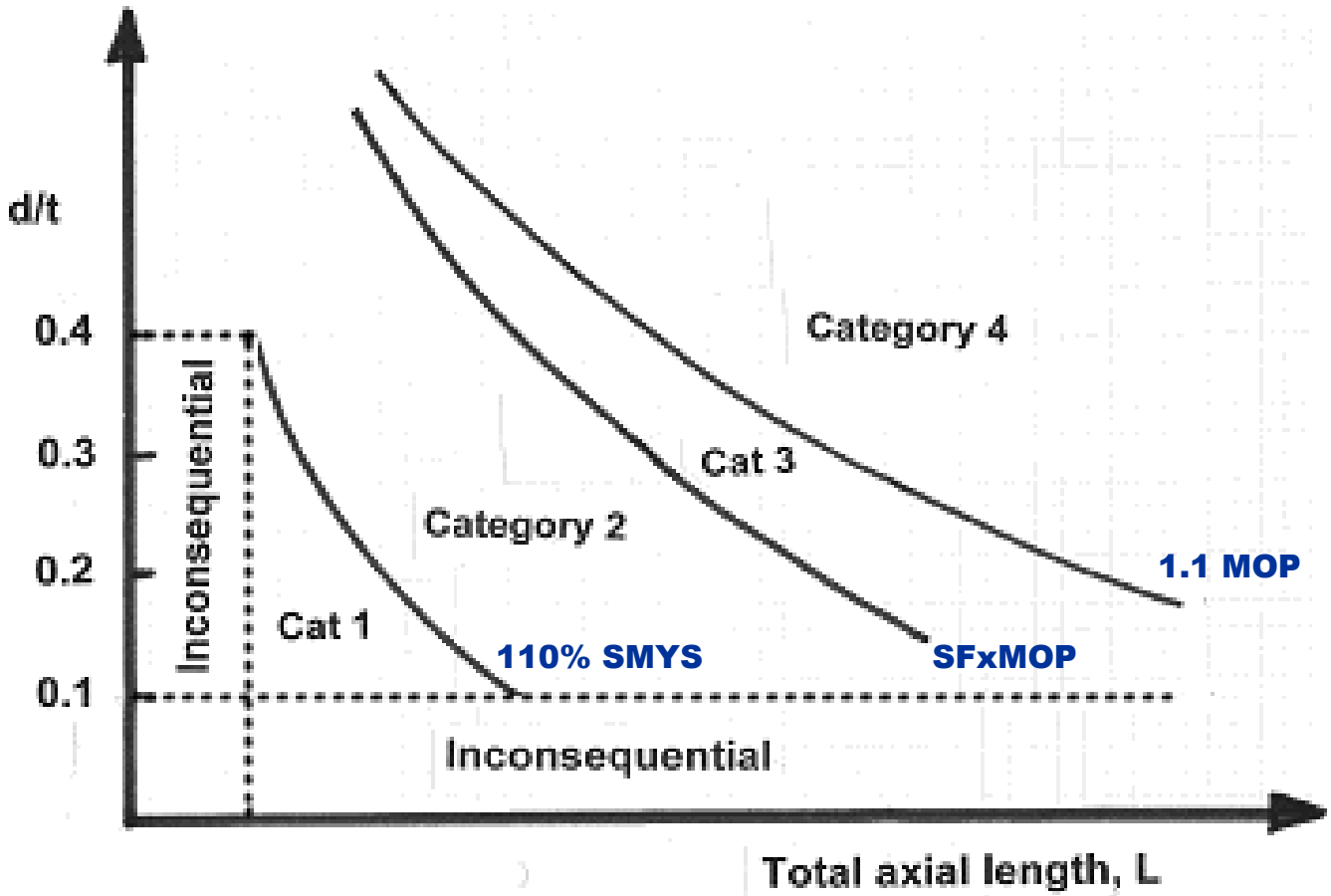
Crack Severity Rating



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General Forms of Mitigation

- Hydrostatic testing of affected segment or segments.
- ILI when appropriate.
- Extensive pipe replacements.
- Recoating.
- More investigative excavations.
- Condition Monitoring.

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Mitigation by Severity: Category 1

Less than 10% deep or will not fail a hydrotest even if 40% deep and > 110% SMYS

- SCC Condition Monitoring until next investigative examination
- Re-inspect in 10 yrs

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Mitigation by Severity: Category 2

≤ 110% and ≥ (SF)MAOP

- These cracks will fail a hydrostatic test
- Perform an engineering critical assessment
- Determine the appropriate timeline for mitigation activity
- Determine the appropriate mitigation activity (Hydrotest, ILI, more direct examinations, discrete mitigation)
- Re-inspect in 3 years at a minimum

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Mitigation by Severity: Category 3

< (SF)MAOP

- Consider pressure restriction (derate)
- Schedule hydrotest, ILI, discrete mitigation

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Mitigation by Severity: Category 4

< 1.1 MAOP

- Failure imminent
- Reduce operating pressure
- Urgent hydrostatic test, ILI, or discrete mitigation

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Needs

In ditch sizing & detection methods

Alternative to MPI, reliable, accurate NDT

Improved ILI tools, detection, discrimination, sizing

Other NDT technologies?

Crack interaction, significance, growth rates

Operating practice influence

Validation of SCCDA via ILI

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Questions

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