Government/Pipeline R&D Forum - ICDA for Wet Gas Systems

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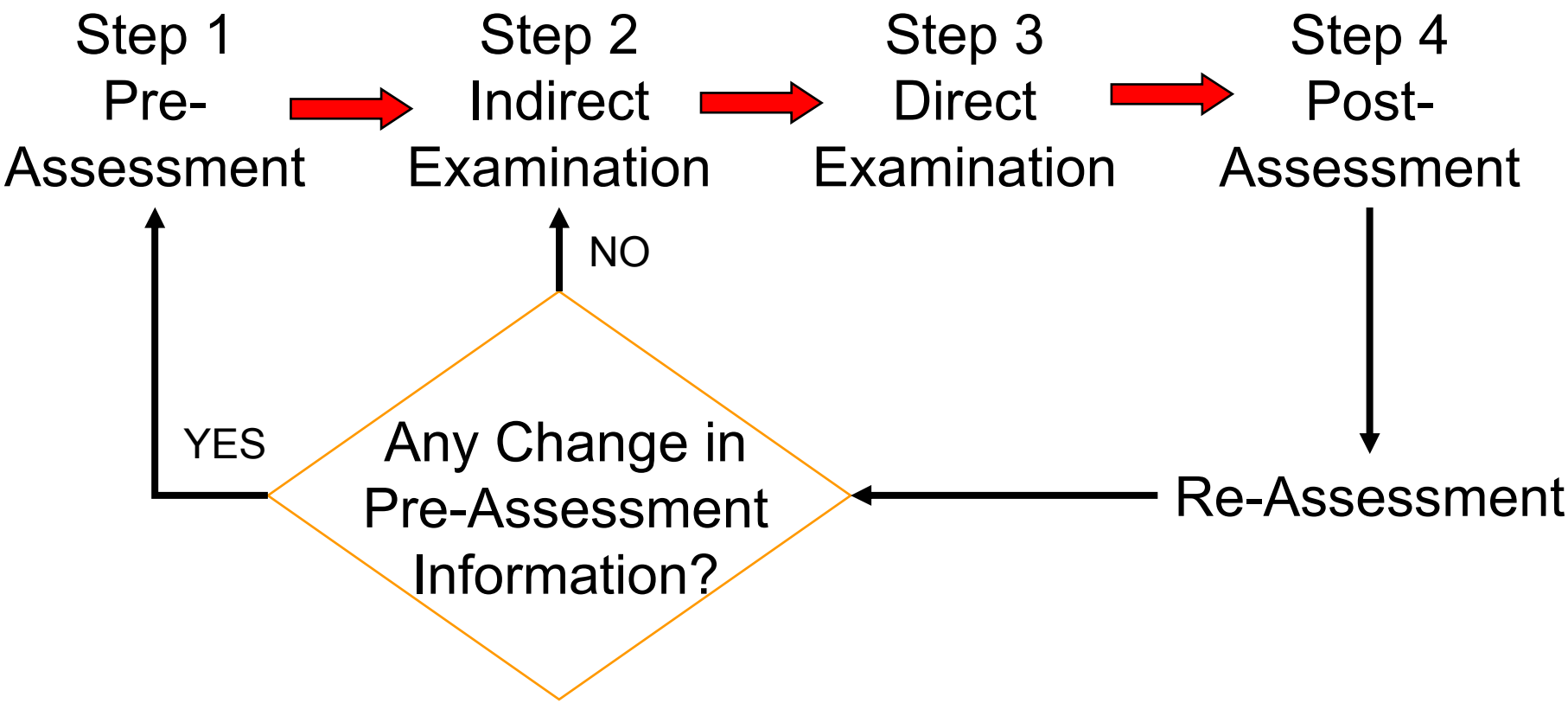
Outline

- Scope of the proposed NACE Standard (TG 305)
- Overview of the four-step procedure
- Indirect Assessment step
- Research Needs

Scope of NACE Standard

- Pipelines
  - Water content in gas exceeds dew point; liquid/gas vol. ratio less than 10%
  - Include
    - Gathering, storage, distribution lines and drips in transmission lines
    - In such lines where ILI tools are not applicable
  - Not
    - down hole or wells; vessels or tanks

Four Step Process



Regions

- Region is a pipe segment defined based on:
  - point of input/output, flow directions, processes of significant change e.g. T and P
  - Important to determine corrosivity by gas composition and mitigation which change abruptly at inlet
  - Done in Preassessment

Indirect-Assessment

- Determine zones and segments inside zones
- Rank overall corrosivity of subzones
- Prioritize locations for excavation

  [10% high, 30% medium, 60% low]
- Minimum of five digs

  -Two highest priority digs; two consecutive medium with minimal corrosion; one low dig for validation

Zones

Table 4.1: Possible Types of Zones for WG ICDA

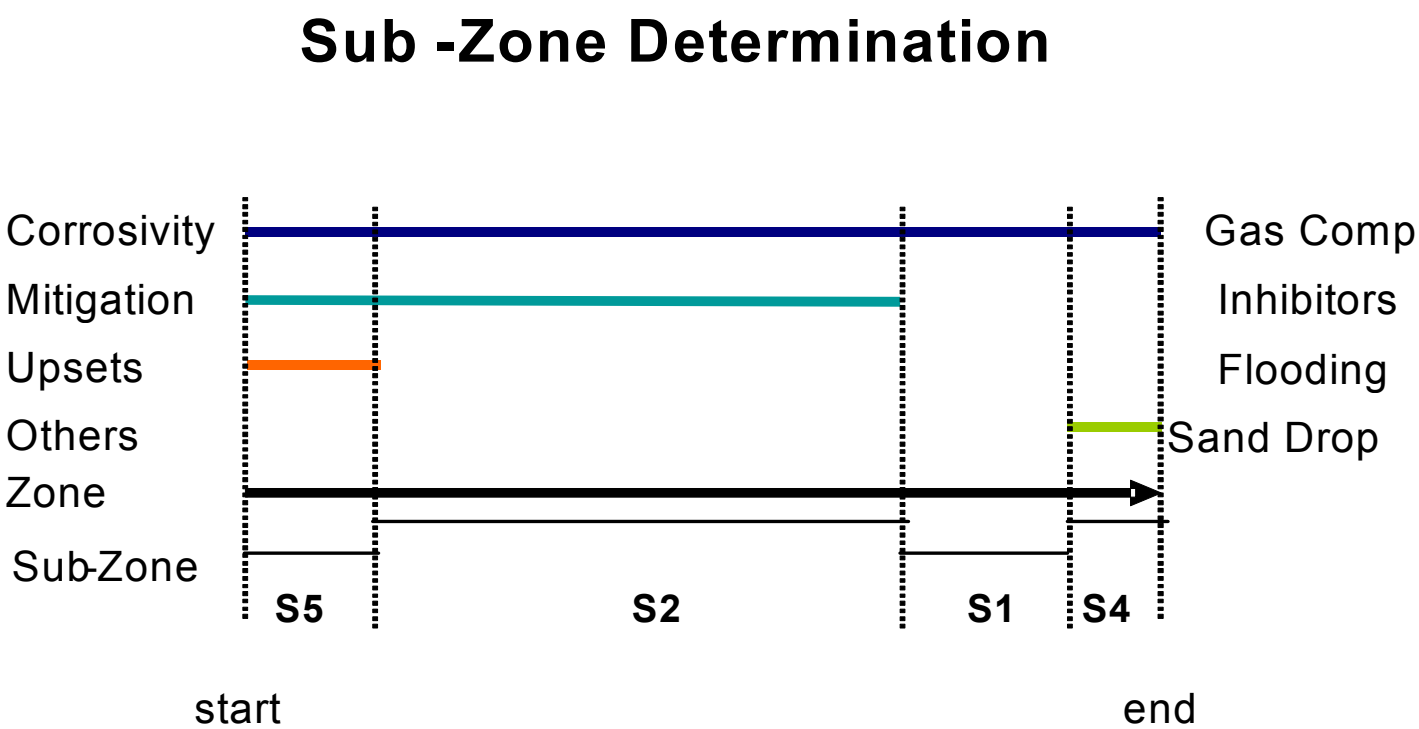
Zone	Flow Regime
Zone 0	No liquid
Zone 1	Mist
Zone 2	Stratified
Zone 3	Slug
Zone 4	Annular

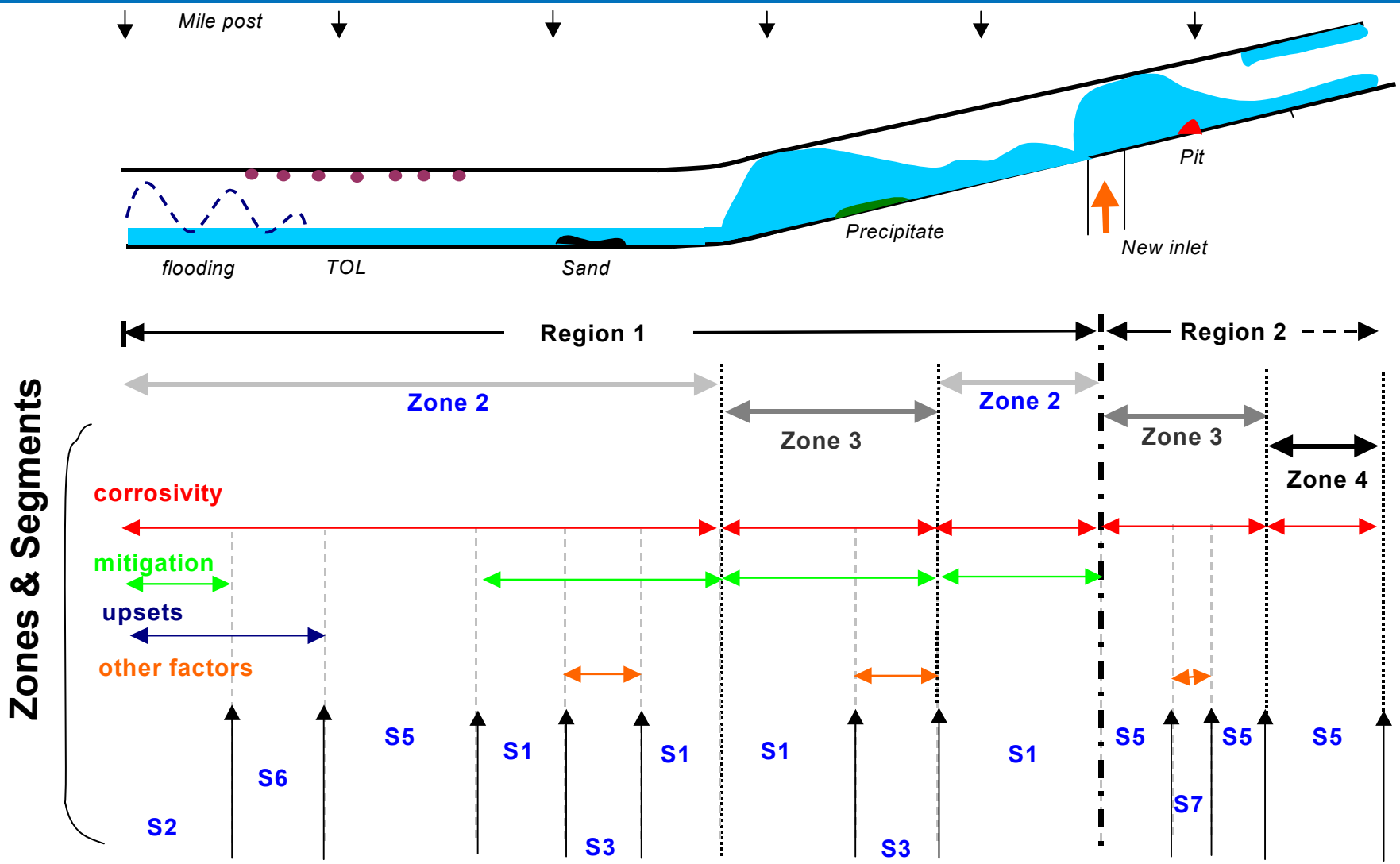
Subdividing-Zones

Influencing factors to determine and rank sub-zones

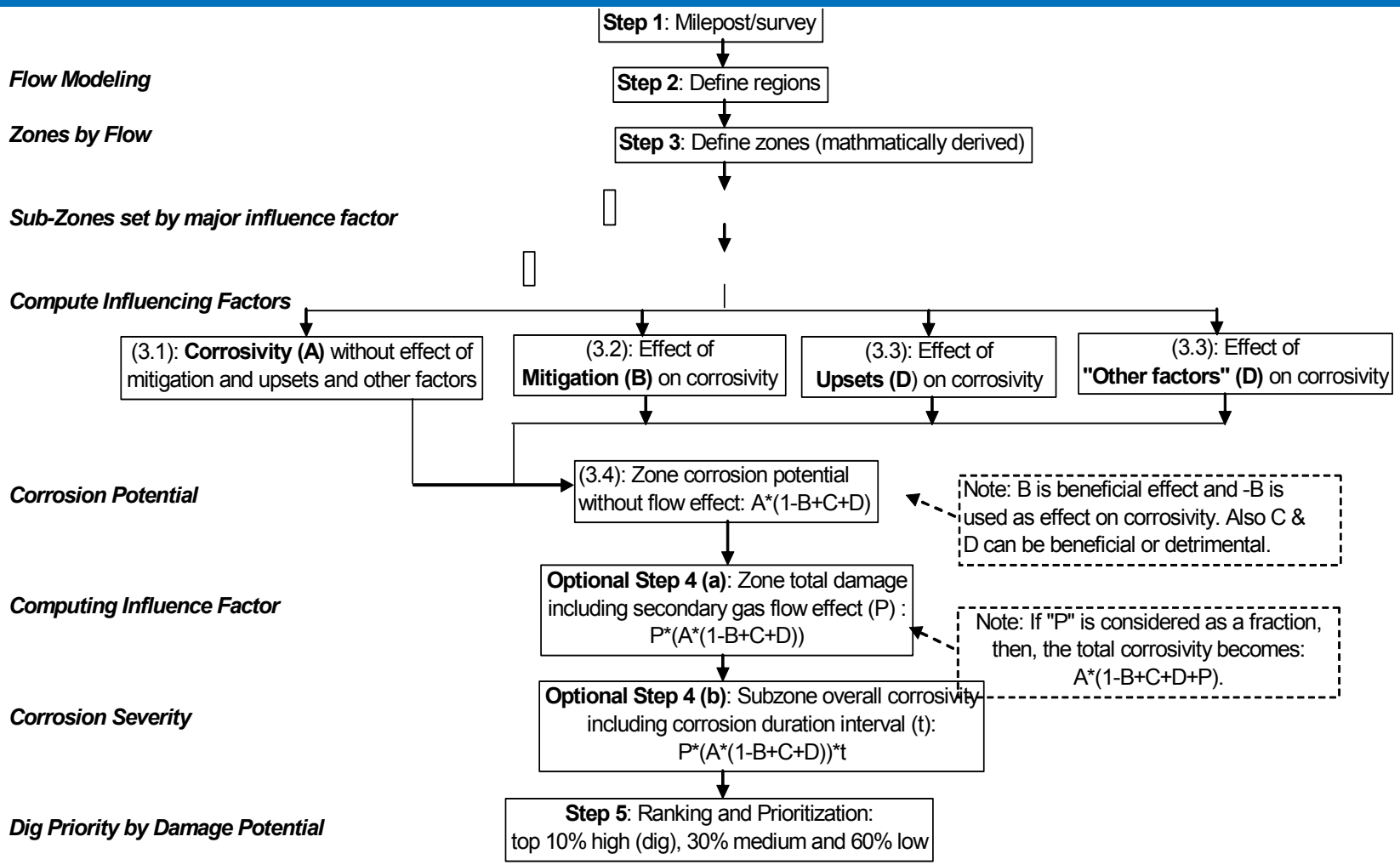
- Mandatory Factor
  - **Corrosivity** (gas composition, liquid chemistry)
- Optional Factors
  - **Mitigation** (inhibitor, biocides)
  - **Upsets** (flow, fluid chemistry, pipeline surface conditions)
  - **Other factors** (bacteria, liquid hydrocarbons, solids)

Segmenting Concept




Mile post
flooding
TOL
Sand
Precipitate
Pit
New inlet
Region 1
Region 2
Zone 2
Zone 3
Zone 2
Zone 3
Zone 4
Zones & Segments
corrosivity
mitigation
upsets
other factors
S2
S6
S5
S1
S3
S1
S1
S3
S1
S5
S7
S5
S5

Flow Chart Jan/07



Research Needs

- Influencing Factors
  - Corrosivity
  - Mitigation
  - Upsets
  - Other (bacteria, liquids, hydrocarbons)
- Detection Inspection Techniques
  - Guided Wave
  - Length of the investigation
- ICDA Wet Gas Process Verification