

# Risk QRA Mitigation 751



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# The Journey

- Understand RP-751 Requirements
- Determine the risk
- Perform QRA
  - Base line Mitigated
  - Results Analyzed
  - Added Mitigation
- Understand water mitigation
- Set risk basis to evaluate results
- Complete the work

# 751 Requirements

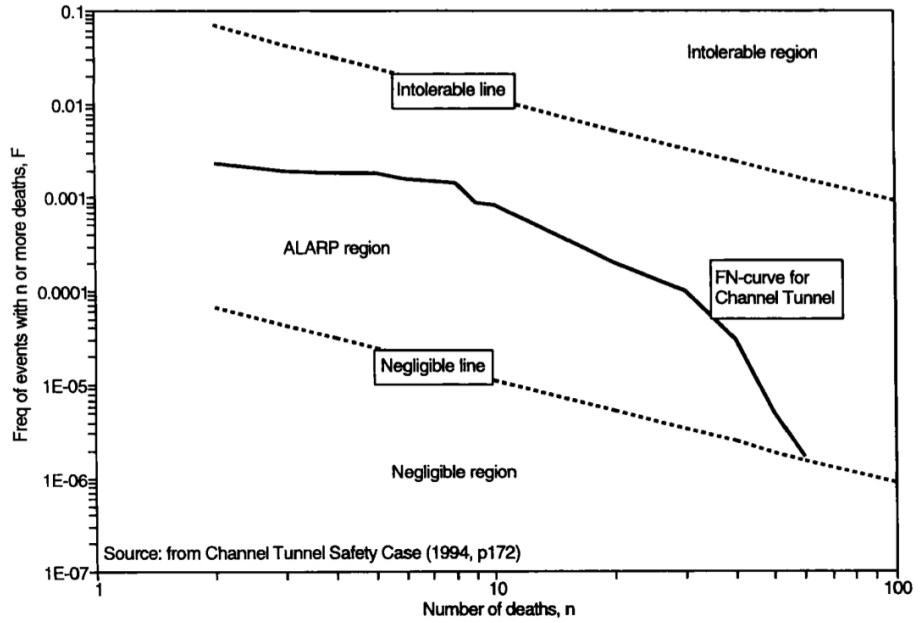
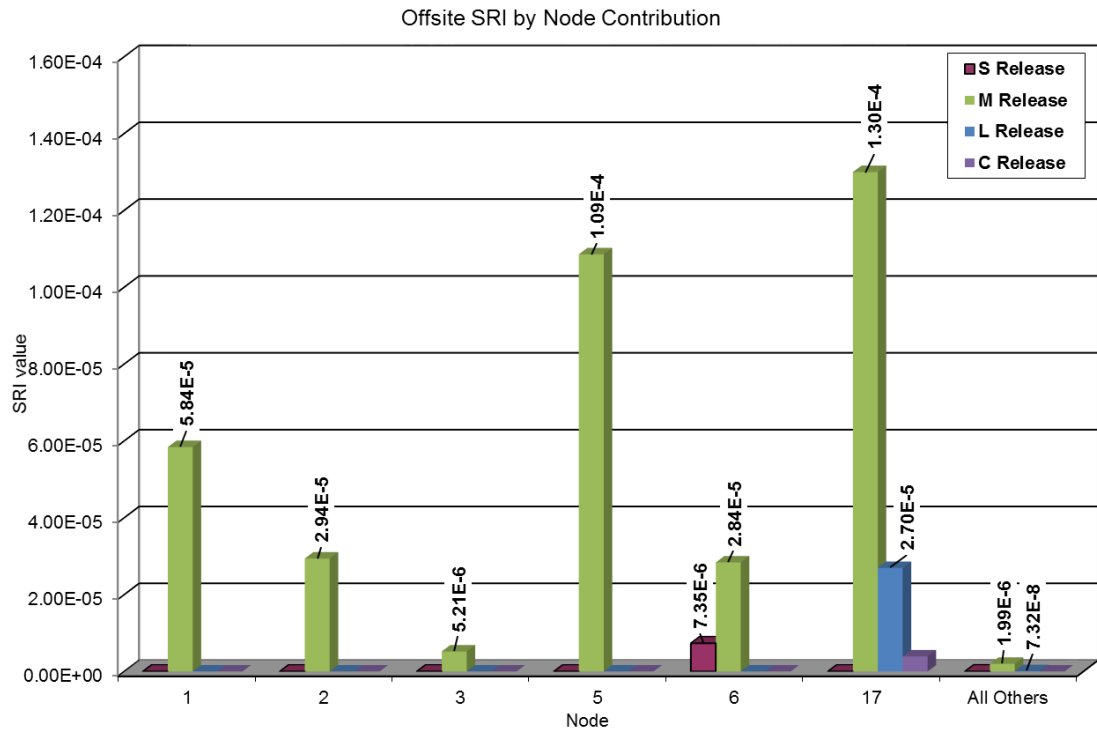
9.2 *A quantitative assessment (consequence-based or risk-based) shall be performed at each site to evaluate the off-site HF impacts.*

5.3.5.2 *Operations shall have written procedures describing appropriate responses upon detection of all visible vapor HF leaks beyond smoking or dripping.*

# Determining the Base Risk (QRA)

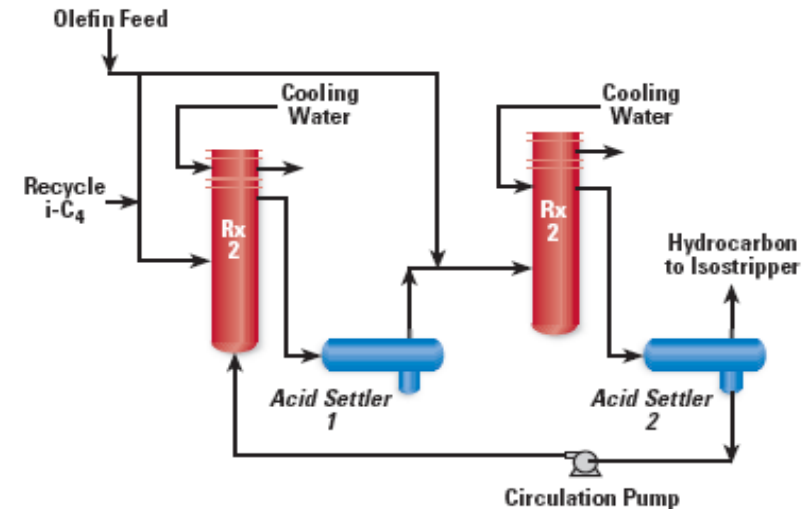
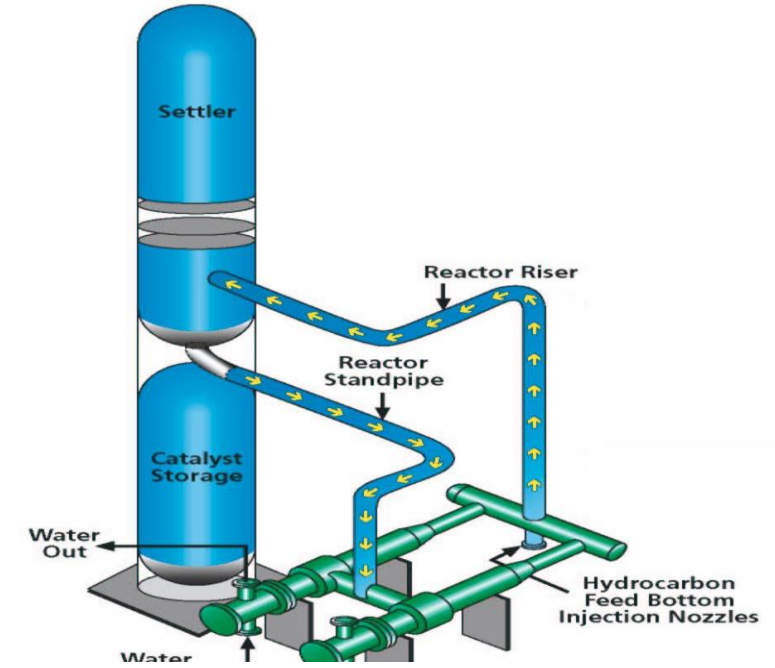
- Determine :
  - Where the Acid equipment is
  - How much acid and what conditions it is at
  - Develop Nodes
  - Piping is pipelines for acid to move- Example Fresh acid pump
  - Add people locations and weather
  - Include any mitigation equipment
    - Detection
    - Isolation
    - De-inventory
    - Water
  - Site responses

# QRA Base Results



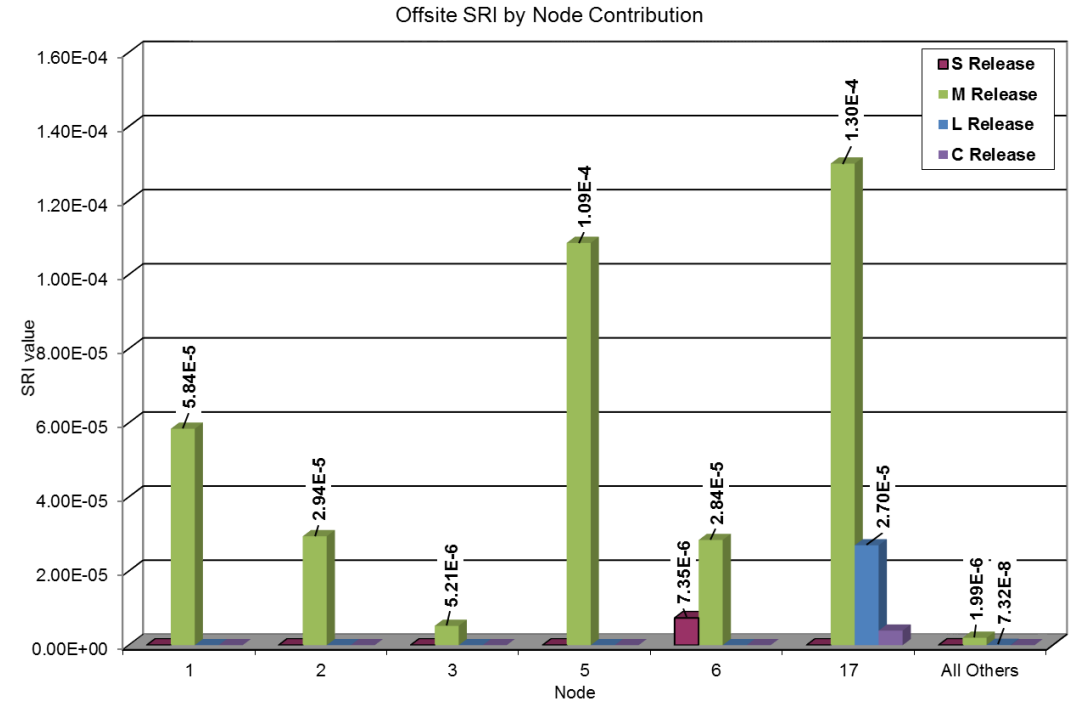
# Analysis of the Base

- Risk drivers
  - Hoses>pumps>flanges>lines>vessels
    - Truck unloading
    - Acid Circulation
    - Acid piping
    - Settler
  - Volume of acid
    - Connection at the bottom or top
    - Reverse flow
    - Liquid or vapor acid



# Apply Mitigation

- MOV's
  - Unloading
  - Regeneration
  - Acid Lines
  - Acid Circulation on High vibration
- Segment the settler
- Barriers
- De-inventory

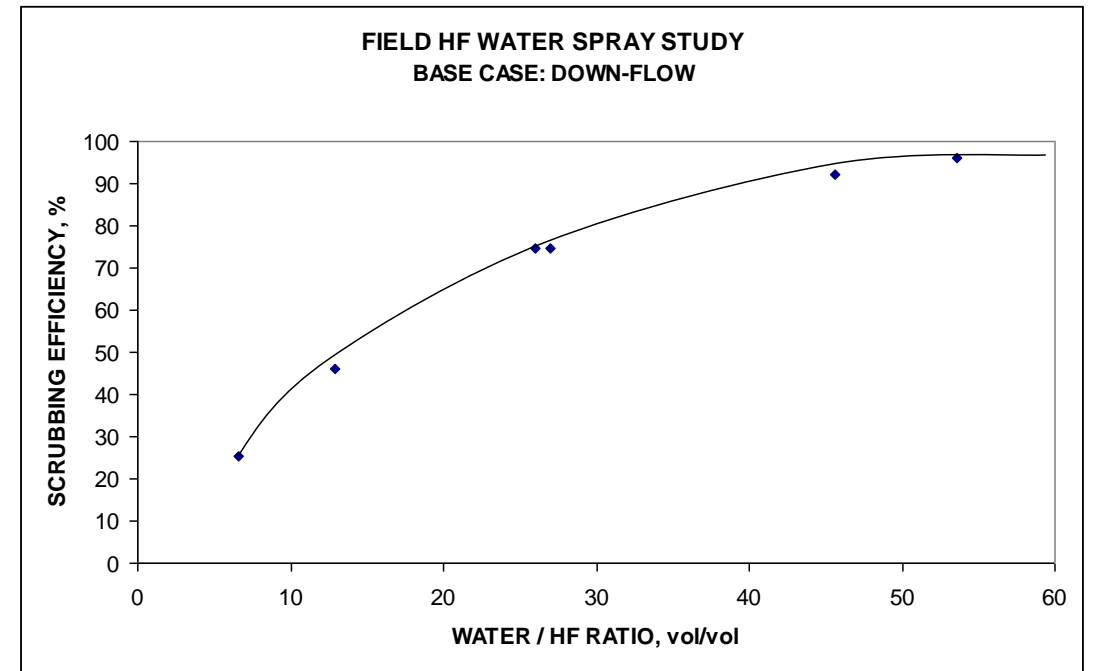


Could it be:

- Regen line
- Acid pumps –fresh and circulating
- Acid Sampling lines
- Reverse flow –iso recycle

# Water Mitigation

- Only the water that comes in contact with the cloud counts
- Water is effective once it is turned on
- Water wall or “aim and shoot”
- Speed of activation
- How much water do you have/need
- Where does the water go
- How and where do you control it
- How do you monitor it



# Water Approaches



# Calculate the Impact

- Check the output
- Do you need:
  - Quicker response
    - More detection
    - Auto Activation
  - Procedures to keep lines empty
  - Mag drive pumps
  - Volume adjustments

# Complete the Work

- Once your numbers are set, and the site's risk profile determined communicate results and update response procedures
  - Evaluation time before de-inventorying
  - Isolation assumptions
  - Maximum acid levels- not to exceed
  - Water efficiency and approach
  - Water optimization requirements
  - Where the water goes
- Train and drill

*5.3.5.2 Operations shall have written procedures describing appropriate responses upon detection of all visible vapor HF leaks beyond smoking or dripping.*



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