

Sewage Spill Prevention Plans For Collection Systems

Plan Preparation Guidance

Preparing O, M & ER Plans (SSPPs) – General Procedure

- 1) Identify Elements "Prone to Failure"
- 2) From List 1), Identify Elements "Prone to Failure" That Would Result In Release of Raw Sewage
- 3) Develop Inspection Schedule For List 2)
- 4) Develop "Emergency Contingency Plan" to Reduce Volume and Effect of Spill From List 2) Failure Events

Preparing O, M & ER Plans (SSPPs)

Deadlines:

- O, M & ER Plans For Treatment Plant, Pump Stations and Stream Crossings Due April 1, 2008
- O, M & ER Plans For Collection Systems: July 1, 2010 or Subsequent Permit Renewal

Preparing O, M & ER Plans

- Task May Be Less Daunting Than You Think
- Some Historical Data Available Already
 - Collection System Maintenance Logs
 - CCTV Records



Preparing O, M & ER Plans For Collection Systems (July 1, 2010)

Planning Requirement Limits:

- Not Required For "Acts of God" – Hurricane Floyd, 1998 Ice Storm
- Not Required For Flows As A Result of Storms Larger Than the 2-Year "CSO Design Storm"
 - Above 2.5" In 24 Hours / Above 1.07" In 1 Hour
- Not Required For Events Or Cascading Events Of Very Low Risk Or Probability

Preparing O, M & ER Plans For Collection Systems (July 1, 2010)

- Some Emergency Planning Already Done
 - Emergency Power Failure Plans
 - Emergency Response Plans
 - SOP's Already In Use For Emergency Situations
- Can Use Same "Emergency Contingency Plan" For Many of the Different Failure Events

“Elements Prone to Failure”

10 V.S.A. S 1278 Section 5a.), (b), :

- (1) Identification of those **elements** of the facility, including collection systems that are determined to be **prone to failure** based on age, design, or other relevant factors.
- (2) Identification of those elements of the facility under subdivision (1) of this subsection which, if one or more failed, would result in a significant release of **untreated or partially treated sewage** to the surface waters of the state.

“Elements Prone to Failure”

■ Definitions:

- “Untreated or Partially Treated Sewage”: Undisinfected or Partially Disinfected Wastewater - Any Collection System Release Is “Untreated Sewage”
- “Elements Prone to Failure”: Those Collection System Components With A Moderate Likelihood Of A Failure Occurring That Would Result In A Discharge of Raw Sewage

“Elements Prone to Failure”

Each “Element Prone to Failure” Will Have Some Level of Risk of Release, And Of Probability Of Failure, That Combine To Cause A Moderate Likelihood Of A Sewage Spill

Definitions:

- “Risk”: Possibility That Blockage Or Failure Of A Collection System Component Will Cause Discharge Of Raw Wastes To “Waters of the State”
- “Probability”: Likelihood That Failure Will Occur

“Elements Prone to Failure”

“Elements Prone To Failure” In Collection Systems Are The “Troublespots” In Each Subsection

- Grease Blockages
- Roots
- Misaligned Pipe, Piping Bottlenecks
- Pipe Defects
- Etc.

“Elements Prone to Failure”

Divide Collection System Into Convenient Subsections:

- Similar Age and Materials
- Geographic Separation
- Pump Station Subsections
- Other “Natural” Divisions



Identifying Collection System "Troublespots"

- History of Collection System "Events"
 - Releases to State Waters, Basements of Structures, Ground Surface,
 - Surcharging Without Release
- TV Camera Inspections
 - Use Ranking System To Assess Imminence of Failure

Preparing O, M &ER Plans

- Use Checklist To Assess Probability Of Failure For Troublespots In Each Subsection Of The Collection System Based On:
 - Age, History and Condition
 - Design and Construction
- "Moderate" Probability Of Failure → "Element Prone To Failure" – Include In List (1)

Preparing O, M &ER Plans

- For Each List (1) Element Assess Risk Of Release Of Raw Sewage Due To Blockages Or Failures
- A "Moderate" Risk of Release → "Element Prone to Failure" That "Would Result In Significant Release Of Untreated Or Partially Treated Sewage" – Include In List (2)

Risk and Probability Assessments

- Use Any Convenient Rational Basis
 - "Low", "Medium", "High", etc.
 - Numeric: 1, 2, 3 or 1 – 5, etc.
- Develop and Document Rating Criteria
- Assess Both Risk and Probability
- Document The Rating Process For Each "List 2)" Collection System Subsection

Numeric Risk / Probability Matrix

- Assign Values For:
 - Risk of Significant Release If Failure Occurs
 - Probability of Failure Occurring
- Multiply "R" Times "P" For R-P Value
- Compare R-P to Cut-Off Value

Levels for Risk of Release

Risk	Numeric	Description
Nil	0	Failure Would Not Cause Raw Sewage Release to Waters of the State
Low	1 - 2	Failure Would Cause Raw Sewage Release Under Unusual Circumstances
Mod	3 - 4	Failure Would Possibly-to-Likely Cause Raw Sewage Release
High	5	Failure Event Will Cause Raw Sewage Release

Levels for Risk of Release

Risk Of Release To "Waters Of The State"
Depends On:

- Size Of Upstream Collection System
"Sewage-shed" – Release Volume, Flowrate
- Proximity Of "Waters" – Distance, Terrain, Drainageways, Ground Conditions
- Accessibility, Noticeability

Collection System Risk Level Examples

Risk	Examples
Nil	None (Some Risk With Any Raw Sewage Release) (0)
Low	Very Small Collection System Subsection W/ Release Point To Contained Area (2)
Mod	Moderate-sized Subsection, Release Route To "Waters Of The State" (4)
High	Large Subsection, Any Sized Subsection Proximate To "Waters Of State" (5)

Levels of Probability

Level Numeric Description

Low	1	Failure Event Extremely Unlikely to Occur
Mod	2 - 4	Failure Event Has Occurred In Subsection Or Others Like It
High	5	Failure Event Likely to Occur

Levels for Probability of Release

Probability Of Failure Indicated By:

- Age, Material and Condition of Piping, Services, Manholes, etc.
 - Cracks, Crushes, Breaks
 - Roots
 - Grease
 - Alignment, Piping Bottlenecks
- History of Blockages, Failures

Probability Level Examples

Level	Examples
Low (1)	- Clean, <5 Years Old, Good Condition (1)
Mod (2 - 4)	- Cracked Pipe, Slight Misalignment (2) - Few Roots, Moderate Grease, Moderate Pipe Misalignment, >50 Years (3) - Many Roots Present, Crushed Pipe, Significant Misalignment, Severe Grease (4)
High (5)	- Crushed and Broken Pipe, Bottlenecks, Severe Misalignment, Grease Blockage, >100 Years Old (5)

Risk / Probability Matrix

	Risk		
Probability	Low (1- 2)	Moderate (3-4)	High (5)
Low (1)	1 – 2	3 – 4	5
Moderate (2-4)	2 – 8	6 – 16	10 - 20
High (5)	5 - 10	15 - 20	25

Risk / Probability Matrix

- Determine What R-P Value To Use For Planning Cutoff
- A Value of "10 or Above" Makes Sense
 - Moderate Probability, Moderate Risk
 - High Probability, Relatively Low Risk

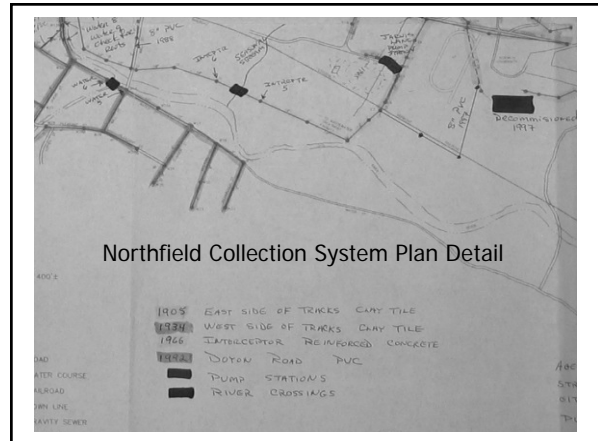
Risk / Probability Matrix Example

- For Moderate-Sized Collection System Subsection, Built In 1957, With Severe Grease, Relief Point 50 Yards From Stream
 - Probability Fairly High – "4"
 - Risk Fairly High – "4"
- R-P Value: $4 \times 4 = 16$, $R-P > 10$
- Must Include In O,M and ER Plan
 - Schedule For Cleaning, Inspection
 - Mitigation Plan – Emergency Response

Plan Preparation

Full-Sized Collection System Plan(s)

- Collection System Subsections
- "Elements Prone To Failure" (Troublespots)
- Age and Materials, Diameter, Flow Direction
- Water Courses
- Overflow Structures



Plan Preparation

Inspection Schedules

- CCTV Inspections
 - Known Troublespots: Every 1 - 2 Years or Less
 - Very Small, Newer Subsections: Every 10 Years
 - Subsections 10 – 25 Years Old: Every 5 Years
 - Subsections > 25 Years Old: Every 10 Years
- Manhole Visual Inspections
 - As Necessary, But No Substitute For CCTV

Plan Preparation

Mitigation Plans- Plan Must Work – Test It

- Flow Handling – Pumps, Septage Haulers
 - Inflatable Plugs, Sand Bags, Hoses, Etc.
- Repair Equipment
 - Jetters, Rodders, Pipe Repair Methods, Etc.
- Cleanup Equipment
 - Booms, Bales, Stakes, Hydrated Lime, Etc.
- Equipment Necessary Must Be On-Hand or Available (WARN, Rental, Etc.)