

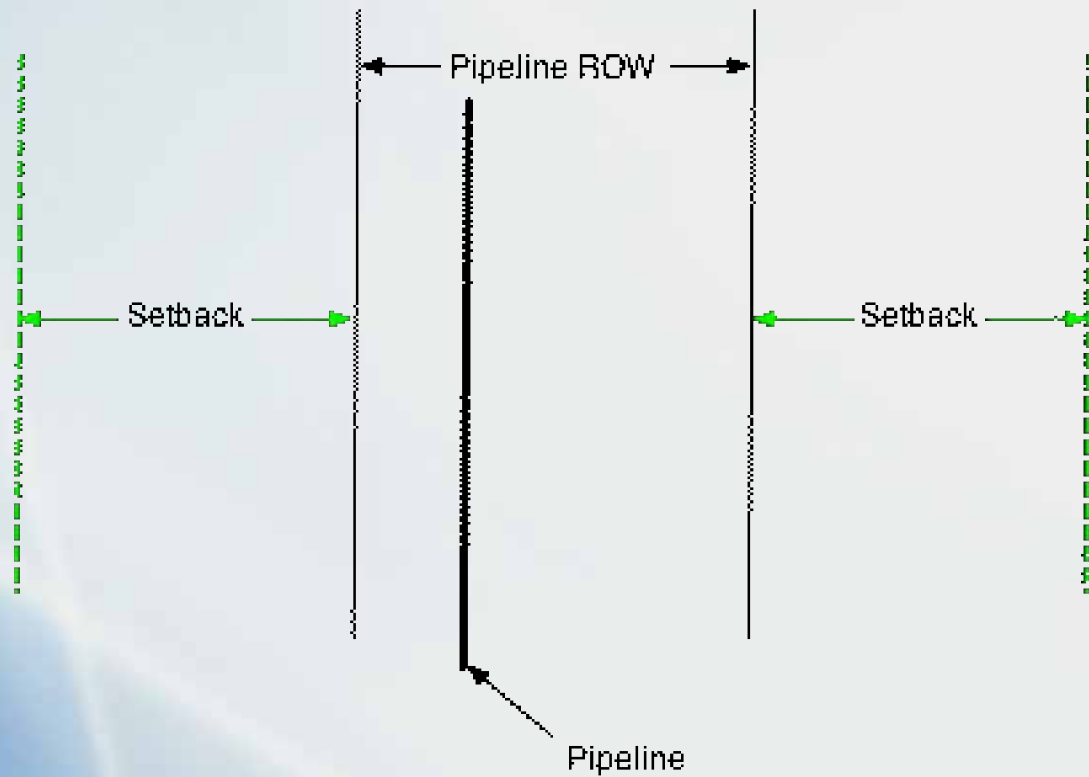
Pipeline Setbacks A Safety or an Illusion?

A Focus on Transmission Pipelines

Today's Focus

- Clarify What is a Setback
- Why A Setback Isn't Really a Safety
- Suggests Where to Go From Here

ROW Versus Setbacks



Setback's Objective?

- Mainly to Protect the Pipeline
 - From Some Third Party Activity
 - A Proper ROW Program Can Do This Task
 - Must Go Beyond One-Call
 - One Call Enforcement Actions (PIPES 2006)!!!
 - Sterilized ROW is Usually Overkill
- Not Really A Safety from Pipeline Failure
 - Some Limited Protection From Leaks
 - Not A Protection From Most Ruptures
 - Many Ruptures Have Very Large Impact Zones
 - Setback Safety Mostly an Illusion
 - Site/Operate Transmission Pipelines & Surrounding Infrastructure Wisely

One ROW Extreme

- Any Laws Being Violated?



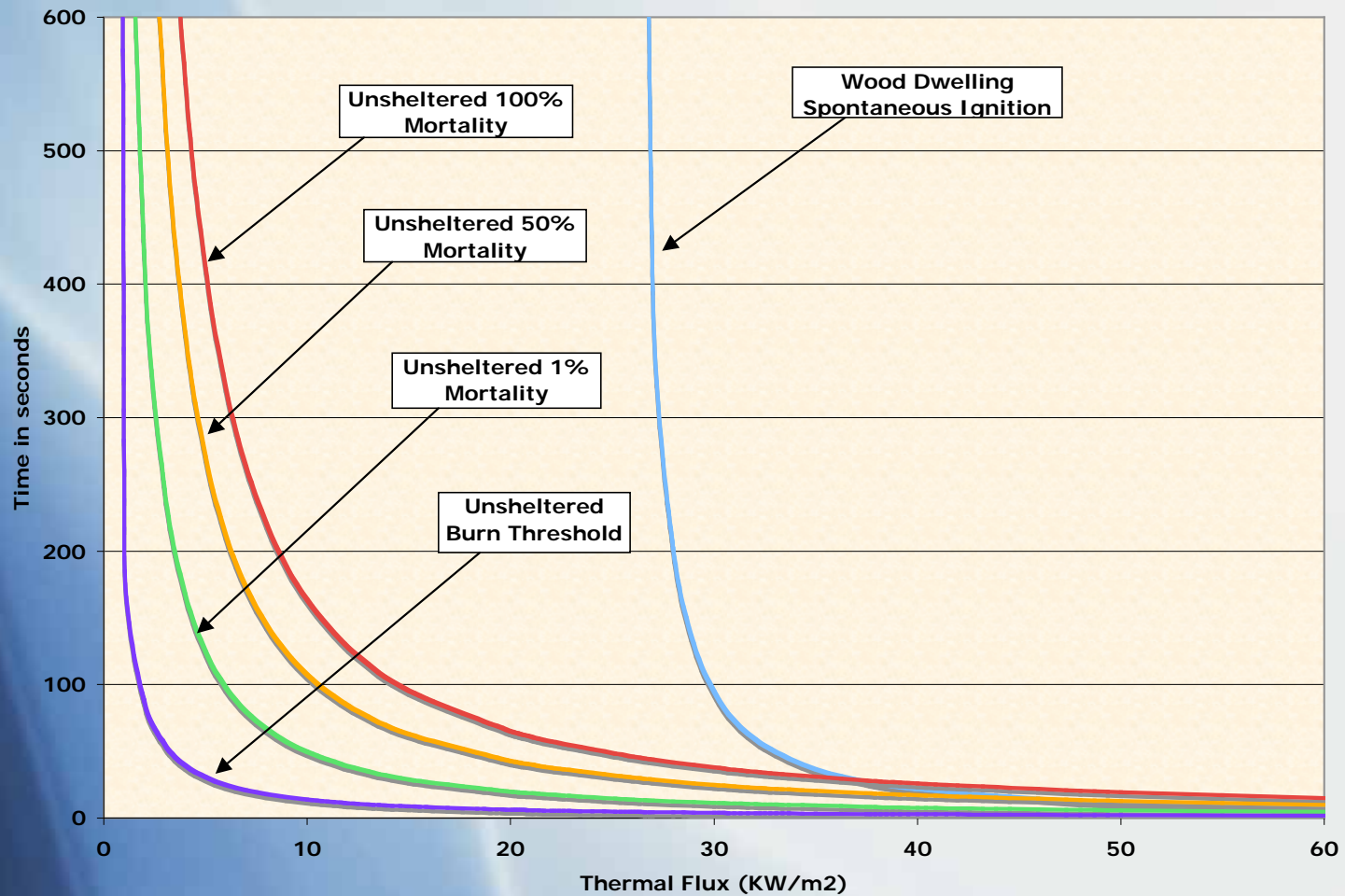
Pipeline Releases

- All Carbon Based Fuels Can Be Made to Detonate
 - “Sensitivity” To Explosion/Fire Depends on -
 - The Fuel/The Release Mechanism/The Environment
 - All Releases Pass Through the “Flammability” Zone Somewhere
- Mass Rate Release “Fingerprint” Key
 - Leaks
 - Usually Limited Migration (Watch for Paths - e.g. gophers, frost)
 - Distribution Systems and Setbacks Incompatible
 - Ruptures
 - Larger Potential Impact Zones (PIZs)
 - Detonation Zone Hard to Accurately Estimate
 - Thermal Radiation Flux Zone Easier to Estimate
 - Large Diameter Pipelines - A Whole Different Animal
 - Siting / Encroachment Needs Special Consideration
 - Time to Ignition Critical

Rupture Failure Boundary Conditions

- Blast/Explosion
 - Pressures Don't Have to Be Very High to Destroy/Kill
 - Open Fields
 - Pressures Dissipate Rapidly With Distance
 - Blast Originating Within Structures Not Good
- Thermal Radiation
 - Usually Controls Size of PIZ from Pipeline
 - Flux Level and Exposure Time is the Factor
 - How Hot is Hot?
 - Running is Probably Not a Bona fide Safety

Thermal Radiation and Time



Near a Pipeline ROW

- Place “Appropriate” Structures Toward the ROW
 - Not Talking Bunkers!
 - Avoid Walling or Congestion Effect!
 - Shadowing Buys Important Time for Unsheltered
- Avoid Large Unsheltered Gatherings Sites
 - Sensitive to Blast or High Thermal Flux Radiation
- Want Easy Exit Away from a Pipeline
 - Best Path - Screened to Avoid Thermal Exposure
- Avoid Excessive Tree Removal
 - Trees Good Blast / Thermal Shields
 - Over Reaction to “Killer Tree Syndrome”

Killer Tree Syndrome

- Trees Over Pipelines Vs Trees in/near ROW
- Is it Really a Coating Issue?
 - Abnormal Loading
 - Lightening Strike in Some Areas
- Avoid Abuse of Easement Privileges
 - Cost Reduction Appears to Be Driving Extreme Tree Removal



Thoughts Going Forward

- On ROW
 - Develop a More Informed Standard ROW Width
 - Construction Usually Sets the Minimum Width
 - Varies for Larger Pipelines
 - ROW with Multiple Pipelines
 - Activities Permitted on ROW
 - Sterilized ROWs Unwarranted
- Off ROW
 - Develop Recommended Guidelines
 - The Reality - Can't Be Retroactive!
- Extreme Positions on Either Side Unwarranted
- Setbacks Not the Answer