# PRELIMINARY VIRTUAL TECHNICAL GRID

The UESI Pipelines 2020 Virtual Experience will occur during Eastern Daylight Time (EDT). All the information shared in this document is subject to change. A final program will be made available closer to the conference start date.

**Tuesday, August 11, 10:30 am to 11:30 am**

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**SESSION A1**
- 535184 – AWWA C305 – A New Standard for CFRP Renewal and Strengthening of PCCP
  - Speaker(s): Mehdi Zarghamee
- 535114 – Designing an Economical FRP System for Pipeline Rehabilitation
  - Speaker(s): Firat Sever, Mo Ehsani
- 534937 – Thin-Walled Synthetic Fiber Reinforced Concrete Pipe Performance Under Cyclic Loading
  - Speaker(s): Fouad Al Rikabi, Shad M. Sargand, Issam Khoury, John Kurdziel, Safiya Ahmed, Husam Hussein

**SESSION B1**
- 524086 – 12-inch Water Line Horizontal Directional Drill across Hunting Bayou using Cartridge Method
  - Speaker(s): Christine Kirby, Eric Hernandez, Anh Hunter, Samson D’Silva
- 532037 – 24-inch Force Main by HDD for Dallas Water Utilities
  - Speaker(s): James Bryan, Marty Paris
- 742619 – Parametric Study on Ground Settlement of Sand and Clay Layer due to Horizontal Directional Drilling
  - Speaker(s): Asif Ahmed, MD, Azijul Islam

**SESSION C1**
- 744390 – Sliplining 120-Inch RCP Wastewater in Dallas, Part 2
  - Speaker(s): Marty Paris
- 747452 – CIPP for Tomorrow — What is Needed?
  - Speaker(s): Michael Gipsov
- 535617 – Estimating Level of Service Interruption from Water Main Breaks as Consequence of Failure
  - Speaker(s): Amin Ganjidoost, Karl Ivan San Luis, Craig M. Daly

**SESSION D1**
- 535316 – Rehabilitation of a Critical High-Pressure Transmission Main Underneath and in the Vicinity of a Major Highway
  - Speaker(s): Murat Engindeniz, Roman Obzejta, Sara Mathis, Kristen Peterson
- 535568 – A Modern Solution for an Old Problem – Utilizing both CIPP and CFRP for Aerial Pipeline Rehabilitation
  - Speaker(s): Tim Peterie, Amber Wagner
- 535577 – Thorny Details of the Rose Canyon Trunk Sewer Rehabilitation
  - Speaker(s): Casey Raines, Greg Watanabe

**SESSION E1**
- 535483 – A 60-year History of the Efficacy of Polyethylene Encasement of an Iron Pipe Installation in an Aggressive Soil Environment
  - Speaker(s): Lewis Horn
- 535572 – Characterization of Graphene Reinforced Epoxy Coatings for Internal Surface of Oil and Gas Pipelines
  - Speaker(s): Zhibin Lin, Xingyu Wang, Xiaoning Qi, Dante Battocchi, Mingli Li
- 534305 – Detecting High Risk Zones Using a Spatial Clustering of Pipe Breaks
  - Speaker(s): Thomas Chen, Kate Zhao, Craig M. Daly
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**SESSION A2**
534246 – Preparing for the Unexpected During Design and Construction  
**Speaker(s):** Sierra McCreary, Timothy Weaver  
535385 – Balancing Present and Future Needs  
**Speaker(s):** Nathan Boyd, Thomas Dumm  
535044 – Pojoaque Basin Regional Water System Modeling and Challenges  
**Speaker(s):** Julia Chivington-Buck, Eric Smith, Stephen Shumaker, Sri Rajah, Leonel Almanzar, Chris Ott, Juan Samaniego, Jerry Edwards, Fabian Montana, James Kim

**PANEL SESSION B2**
535268 – Applying Risk Management Principles and Innovative Technologies to Effectively Manage Water Infrastructure  
**Speaker(s):** Sunil Sinha, Ahmad Habibian, Devan Thomas, Matt Carter, Jian Zhang

**SESSION C2**
536199 – Does Acoustic Wave Propagation Detect Damage in Large Diameter Cast-Iron?  
**Speaker(s):** Ali Alavi, Marshall Kennedy, Cameron White  
744185 – Uncertainty Quantification of the Structural Capacity of Pipelines Using Separation of Variables Methodology  
**Speaker(s):** Juan Jimenez-Chong, Omer Erbay, Frederic Grant, Peter Nardini, Murat Engindeniz  
535620 – Shifting to a Monetized Quantitative Approach for Risk Analysis Using Property Damages  
**Speaker(s):** Amin Ganjidoost, Ivan San Luis, Craig M. Daly

**SESSION D2**
535493 – A Novel Water Pipeline Asset Management Scheme Using Hydraulic Monitoring Data  
**Speaker(s):** Kalyan R. Piratla, Ahmad Momeni  
742403 – Line Stopping the City of Houston’s Large Diameter Transmission Line for Valve Replacement  
**Speaker(s):** Eric Hernandez, Gregory Henry, Singarpal Sekhon  
744034 – Successfully Navigating the Challenges of Emergency Interceptor Repair Under the Wall Street of Whiskey  
**Speaker(s):** David Hafner, Heather Dodds, Nick Ulliman, Michael McReynolds

**SESSION E2**
525454 – Mains, Trains, and Automobiles: Utilizing Fort Worth’s Risk Assessment Data to Drive Sanitary Sewer Rehabilitation  
**Speaker(s):** Josh Kercho, Liam Conlon  
743824 – Resilience of Sanitary and Combined Sewer Networks to Extreme Weather Events  
**Speaker(s):** Soroush Zamanian, Abdollah Shafieezadeh, Mehrzad Rahimi  
743247 – Leveraging a Risk-Based Decision Strategy for Pipeline Management at the City of Houston  
**Speaker(s):** David Totman, Fazle Rabbi
**Tuesday, August 11, 2:30 pm to 3:30 pm**

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**PANEL SESSION A3**

750185 – Nuclear Power Generation – Buried Piping Panel Discussion

*Speaker(s):* Mark Geraghty, Christopher Burton, David Smith

**SESSION B3**

742062 – Sewer Alignment Complexities in Historic Downtown Temecula

*Speaker(s):* Steve Friedman

736127 – Trenchless Soil Stabilization of Marl Prior to Using Pilot Tube Method to Install New Sanitary Sewer Line

*Speaker(s):* Stephen Matheny, Daniel DiLeggi, Ben Croy, Britt Babcock

743689 – Finding Big Leaks with Big Data: Case Studies from an Internet-of-Things Leak Detection Platform

*Speaker(s):* Matthew Barrett, Robert Welch, Zahreh Andalibi, Tatiana Baeva, Adam Chan

**SESSION C3**

744264 – Dallas Water Utilities Proactive Assessment Program Conserves Water and Prevents Catastrophic Pipeline Failures

*Speaker(s):* George Schaaf, Michelle Antilla, Felipe Lopez, Johnny Partain

741123 – Performing an RCM/RCD Workshop on the World’s Largest Prestressed Concrete Pipe

*Speaker(s):* Jim Geisbush

744389 – Large Diameter Cured-in-Place Pipe Rehabilitation of Twin 90-Inch Culverts in Environmentally Sensitive Area

*Speaker(s):* William Barloon, Wayne Lindsay, Duane Gilles

**SESSION D3**

742050 – Decision Making Process for Identifying Optimum Trenchless Method for Corrugated Metal Pipe Rehabilitation in Stormwater

*Speaker(s):* Olufunso Ogidan, Nefi Gazra, Roberto Reyna, Noelle Gaspard

743475 – Mission Critical CMP Replacement

*Speaker(s):* Craig Camp

**SESSION E3**

744256 – Seeing from Above, What’s Below: How Drones can be used in Pipeline Design & Construction

*Speaker(s):* William Byland, Natasha Lombard, Michael Liga, Gregory Henry, Venus Price

744512 – A, B, C — 3D Merging the Above-Ground World With What is Below

*Speaker(s):* Joseph Murphy, Peter Borsack

744709 – Utility Coordination in Alternative Delivery Methods for Transportation Projects – Lessons Learned from In-Market Design Phase (Bid process)

*Speaker(s):* Juan Camilo Barrera, Tom Bodera
### Pipeline Engineering – Resiliency in Infrastructure

**Wednesday, August 12, 10:00 am to 11:00 am**

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#### SESSION A4
534866 – Utilizing District Metered Area Water Loss Analysis in a Mid-size Utility<br>
**Speaker(s):** Jim O’Dowd
534291 – Design of Sprayed Cementitious Liners Within Corrugated Steel Pipes<br>
**Speaker(s):** Ian Moore
534096 – One Liner to Rule Them All – King County Interbay 48-inch Sewer Forcemain Rehabilitation Story<br>
**Speaker(s):** Matthew Tooley, Steve Lindsey, Raynold (Ray) Nickel, Jeffrey Schmidt

#### SESSION B4
744604 – “Underground, Under Where?” How Many Communities are Turning to Trenchless Applications to Solve Their Challenges<br>
**Speaker(s):** Jason Swartz
744648 – Case Study: Repurposing an Abandoned 3.2 Mile 66-inch RCP Gravity Sewer as a New Force Main<br>
**Speaker(s):** Andy Stanton, Sandy Scott-Roberts, Richard ten Bosch
741852 – Reducing Damages to Underground Infrastructure: Utility Locators’ Perspectives<br>
**Speaker(s):** Ahmed Al-Bayati, Louis Panzer, Khalid Kaddoura

#### PANEL SESSION C4
735044 – Asset Management Victories and Future Needs<br>
**Speaker(s):** Devan Thomas, Celine Hyer, Ahmad Habibian, Sunil Sinha

#### SESSION D4
742891 – The City of San José Demonstrates Flexibility and Resolution to Accomplish Yard Piping Repairs Safely and Quickly<br>
**Speaker(s):** Bernadette Visitacion-Sumida
**Speaker(s):** Steve Henning
753493 – Assessment and Application of Trenchless Technologies for the Rehabilitation of Sewer Laterals<br>
**Speaker(s):** Joanne Carroll

#### SESSION E4
535310 – Transmission Main Leak Monitoring to Reduce Risk and Non-Revenue Water<br>
**Speaker(s):** Paul Murray, Waseem Khan
737033 – Analyzing Existing Flow and Precipitation Records to Allocate Resources for Sewer Inflow and Infiltration Studies<br>
**Speaker(s):** Charles Hercks
743372 – Acoustic-based Underground Utility Mapping at the Annacis Island WWTP<br>
**Speaker(s):** Michael Metcalf, Kenneth Hui, Dave Hoffman, Victor Castellanos, Mike Thorstenson, Gary Skipper, Grey Tarkenton
### PIPELINES 2020
#### CONFERENCE
A Virtual Experience | Aug. 10–13

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**Wednesday, August 12, 1:00 pm to 2:00 pm**

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#### SESSION A5
**743481** – Analyzing Transient Responses of Pumped Pipelines using an Analytic-Energy-Based Approach
**Speaker(s):** David McPherson, Ahmad Malekpour

**744452** – A Tried and True Method of Surge Control for Water Transmission Pipelines
**Speaker(s):** Alan Hutson, Tom Hill

**743951** – Numerical Methods for Analyzing Surge, What’s Behind Those Messy Equations
**Speaker(s):** Thomas Hill

#### SESSION B5
**740310** – Developing a Proactive City-Wide Stormwater CCTV Master Plan and Condition Assessment Program, San Antonio, TX
**Speaker(s):** Noelle Gaspard, Nehi Garza, Olufunso Ogidan, Martin Hernandez

**735614** – Four Trenchless Water Main Installations Under an Active Railroad in Southeast Florida
**Speaker(s):** Janine Alexander, Wilhelmina Montero

**744058** – Simplified Application of the Delft Method to Estimate Maximum Allowable Annular Pressure in HDD
**Speaker(s):** Inshik Park, Alireza Bayat

#### SESSION C5
**736496** – A Data-Driven Approach to Determine If New Water Mains Construction Can Cause Neighboring Old Water Mains to Break
**Speaker(s):** Muhammad Tak, James Kaefer, Warren McHenry

**535351** – Mechanical Performance of a Pressure Pipe CIPP Liner with Stress Concentration Effects Associated with Local Defects
**Speaker(s):** Shawn Kenny, Xiaoan He

**743570** – Prioritizing Pit Cast Iron Small Diameter Watermains For Assessment
**Speaker(s):** Rabia Mady

#### SESSION D5
**743565** – The High Cost of Using AWWA’s Buried No Longer Pipe Service Life Table for Capital Budgeting
**Speaker(s):** Gregory Baird

**744445** – Forecasting Pipeline Construction Costs Using Time Series Methods
**Speaker(s):** Sooin Kim, Bahram Abediniangarabi, Mohsen Shahandashti

**742686** – 2019 Second Edition of AWWA M55 HDPE Pipe
**Speaker(s):** Amster Howard, Camille Rubeiz

#### PANEL SESSION E5
**535663** – Unified Approach to Thrust Restraint Design Panel Session
**Speaker(s):** Stephen Shumaker, Sri Rajah, Henry Bardakjian, Randall Conner, Martin McCabe

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## PIPELINES 2020 CONFERENCE
A Virtual Experience | Aug. 10–13

Pipeline Engineering – Resiliency in Infrastructure

**Wednesday, August 12, 3:00 pm to 4:00 pm**

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### SESSION A6
736902 – How to Make Your Engineer Think Like a Contractor and Vice Versa  
**Speaker(s):** Alisa Gruber, Beth Kochur, Bill Williams

744795 – How a Successful Texas Public-Private Partnership Brings Water for the Next Generation  
**Speaker(s):** Marisa Vergara, Bill Williams, Carissa Shelley

743495 – CMaR Delivery of Critical Water and Wastewater Pipelines  
**Speaker(s):** Steve Pool, Tanner Randall

### SESSION B6
712639 – Risks and Rewards in Completing a Design/Build Tunneling Project  
**Speaker(s):** Michael Ramirez, Ivan Hernandez

743838 – Crossing the 4th Largest City in the U.S. with a 96"/84" Pipeline: A Case Study  
**Speaker(s):** Jared Barber, Jason Ward, Alan Hutson, Melinda Silva

744580 – Crossing the Red, Managing Construction Changes on a Challenging 1200 mm Microtunnelling River Crossing in Winnipeg, Manitoba, Canada  
**Speaker(s):** Adam Braun, Nathan Kehler, Jordan Thompson, Stacy Cournoyer

### SESSION C6
743702 – DeKalb County: A Large Utility Gaining Efficiencies to Accurately Rehab Assets in a Timely Fashion  
**Speaker(s):** Gerardo Boquin, Burhan Shaikh, Darren Eastall

743799 – Estimating Groundwater Infiltration in Sewers  
**Speaker(s):** Kevin Enfinger, Patrick Stevens

744644 – Culvert Profiling Using Digital Image Correlation  
**Speaker(s):** Amin Darabnounsh Tehrani, Zahra Kohankar Kouchesfehani, Mohammad Najafi

### SESSION D6
755000 – Near Misses and Close Calls – Risk Management in Utility Construction Panel Session  
**Speaker(s):** Jim Anspach, Steve Lang, Paul Bizier

### PANEL SESSION D6

### SESSION E6
751568 – Development of a Consequence of Failure Model and Risk Matrix for Water Pipeline Infrastructure Systems  
**Speaker(s):** Anmol Vishwakarma, Sunil Sinha

714868 – Surge Phenomenon During Slow Valve Closures in Short Pipelines  
**Speaker(s):** Guohua Li

742424 – Mutual Learning: A Comparison Between the Dutch and International Utility Surveying Approaches  
**Speaker(s):** Ramon ter Huurne, Léon olde Scholtenhuis, André Dorée
### TRACK A
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Rosser Standifer

### TRACK B
**Trenchless**
Jeffrey Shoaf

### TRACK C
**Condition Assessment**
Jonathan Shirk

### TRACK D
**Construction and Rehab**
Alisa Gruber/Rich Milke

### TRACK E
**UES/Multidiscipline**
Doug Jenkins/Jerry Snead

#### SESSION A7
**720087 – Developing a Decision-Support-System to Optimize Rehabilitation and Replacement Programs for Ferrous Distribution Mains in Municipal Water Systems**
*Speaker(s):* Khalid Kaddoura, Bruce Gehrig, Ahmed Al Bayati

**742418 – Probabilistic Corrosion Modeling to Estimate Design Life of Pipes**
*Speaker(s):* Chris Atkins, Paul Lambert, Sean Greenwood, Mossan Mahmood

**743659 – Cathodic Protection of a Long-Distance, Multi-Material Water Pipeline**
*Speaker(s):* Christopher Sheldon, Chelsea Teall, Shaun Tidwell

#### SESSION B7
**743309 – Evaluation of Ground Displacements and Pulling Forces During Pipe-Swallowing Replacement of Water and Wastewater Pipes in Well-Graded Sand**
*Speaker(s):* Samuel Ariaratnam, Xufeng Yan, Baosong Ma, Cong Zeng

**744560 – Evaluation of Construction Methods for a 135-inch Diameter Tunnel Crossing of a Major Highway Bridge**
*Speaker(s):* Michael Liga, Yovani Zelaya, Kevin Tran

**736001 – Predicting Condition of Sanitary Sewer Pipes with Gradient Boosting Tree**
*Speaker(s):* Mohammadreza Malek Mohammadi, Mohammad Najafi, Nazanin Salehabadi, Ramtin Serajian Tehrani, Vinayak Kaushal

**718417 – Kennedy Newton Main and the Challenges of Design and Construction of Large Diameter Watermains in Urban Areas**
*Speaker(s):* Yariv Ben-Shooshan, Amer Nawaz

#### SESSION C7
**744133 – One If by Air, Two If by Land – Savings with Aerial Surveying for Transmission Lines**
*Speaker(s):* Hunter Hanson, Mike Dooley

**736021 – Predicting Condition of Sanitary Sewer Pipes with Gradient Boosting Tree**
*Speaker(s):* Mohammadreza Malek Mohammadi, Mohammad Najafi, Nazanin Salehabadi, Ramtin Serajian Tehrani, Vinayak Kaushal

#### SESSION D7
**744788 – Positive Unintended Consequences – How Campbell Lake Gravity Sewer Pipeline Line Survived a Magnitude 7.1 Earthquake**
*Speaker(s):* David A Persinger, Maury Gaston

**744523 – Valve Houses at Houston Ship Channel**
*Speaker(s):* Benjamin McCray, Manny DePau, Anh Hunter

**742499 – DC Water At Work: Mitigating Century Old Infrastructures From Historic Storms**
*Speaker(s):* Steve Bian, Renni Zhao, Tayo Olatunji, Dunbar Regis

#### SESSION E7
**744640 – Ten Things You Need to Know About State Revolving Fund American Iron and Steel Requirements**
*Speaker(s):* Kirsten Anderer

**752167 – How Innovative and Adaptive Solutions were used to Solve Challenges Faced by Contra Costa Water District’s Canal Replacement Project**
*Speaker(s):* Colin Dudley, Peter Bellows, Peter Stabb, Sarah La Valle

**535521 – What is Pipeline Resilience?**
*Speaker(s):* Maury Gaston
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<td>744330 – Seismic Resilience Enhancement of Water Pipe Networks Using Hybrid Metaheuristic Optimization <strong>Speaker(s):</strong> Binaya Pudasaini, Mohsen Shahandashti</td>
<td>744210 – Save Money by Shopping Around – Competing Pipe Materials for Large Diameter Pipelines <strong>Speaker(s):</strong> Eric Engelskirchen, Chad Sharbon, Travis Williams</td>
<td>736974 – Beating the Clock: Leveraging the Flexibility of Design Build to Fast Track Pipe Delivery <strong>Speaker(s):</strong> Alisa Gruber, Bill Williams, Ricky Wu</td>
<td>744769 – Framework for Life-Cycle Cost Analysis of Trenchless Renewal Methods for Large Diameter Culverts <strong>Speaker(s):</strong> Ramtin Serajian, Mohammad Najafi, Mohammadreza Malek Mohammadi, Vinayak Kaushal</td>
<td>753687 – Ethics Session <strong>Speaker(s):</strong> Anna Pridmore</td>
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<td>744342 – Evaluating Welded and Mechanical Pipe Joint Strength for Seismic Design: Part 1 – Testing Protocol <strong>Speaker(s):</strong> Chris Sundberg, Terri Tovey</td>
<td>744005 – Experimental Investigation of Steel Lap-Welded Pipe Joint Performance Under Severe Axial Loading Conditions in Seismic or Geohazard Areas <strong>Speaker(s):</strong> Spyros Karamanos, Brent D. Keil, Fritz Gobler, Richard Mielke, Gregory Lucier, Giannoulia Chatzopoulou, Gregory Sarvanis, Dimitris Fappas</td>
<td>736596 – Threading the Needle Through Time and Space: The Challenges of Designing a Wastewater Main Through Tight Corridors and Time Constraints <strong>Speaker(s):</strong> Robb Otey</td>
<td>744592 – Internal Joint Bonding of Prestressed Concrete Cylinder Pipe: The Improbable Project <strong>Speaker(s):</strong> Gregory Smith</td>
<td>731194 – Bonded or Unbonded Liners? How Longitudinal Bending Impacts Pipe Lining Design and Performance <strong>Speaker(s):</strong> David P. Kozman</td>
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**SESSION A9**
741981 – Lake Perris Modifications – Putting the Long-term Benefits Above Cost  
**Speaker(s):** Michael McReynolds, Andrew Brainard, Wayne Thilo, Cherylle Barrido

**SESSION B9**
741798 – Too Pure Water from Orange County Water District Results in Pipeline Rehabilitation Project  
**Speaker(s):** Sandy Scott-Roberts, Benjamin Smith

**SESSION C9**
742271 – Diagnosing Pumping Instabilities in the Southern Delivery Raw Water System  
**Speaker(s):** Thomas Charles, Joseph Rasmussen, Mark Allen

**SESSION D9**
742525 – Design of Large Diameter Steel Pipe Tees and Wyes  
**Speaker(s):** Russell Gibson, Steven Metzler, Himan Jalali, James Johnson, Peter Bartels

**SESSION E9**
535636 – Joint Strength or “Efficiency” Factors of Steel Lap-Welded Joints for Use in Water Conveyance  
**Speaker(s):** Spyros Karamanos, Robert Card, Giannoula Chatzopoulou, Gregory C. Sarvani

**SESSION A9**
744564 – Keeping the Water Moving: Solving Pressure Problems with Multiple Constraints in Stillwater, Oklahoma  
**Speaker(s):** Lars Ostervold, Jennifer Henke, William (Bill) Millis, David Barth

**SESSION B9**
743551 – Pipeline Design for Predetermined Levels of Seismically Induced Differential Settlement  
**Speaker(s):** Geoffrey Bee, Farid Sariosseiri, Mark Havekost; Mike Britch

**SESSION C9**
744493 – Revising the City of Houston’s Standard Butterfly Valve Detail for Large Diameter Butterfly Valves  
**Speaker(s):** Michael Salinas, Warren Green, Kevin Tran

**SESSION D9**
736544 – Large Diameter Welded Steel Pipe Deflection, Working Beyond the Traditional  
**Speaker(s):** Kevin Martinez, Phil Ryan, Ted Davis

**SESSION E9**
744466 – Construction of 176-in and 156-in Diameter Cast-in-Place Reinforced Concrete Siphons Expanding the East Low Canal  
**Speaker(s):** Kylie Pelzer

**SESSION A9**
743732 – Dallas Water Utilities Uses Sliplining to Rehabilitate Aging 24-Inch Water Transmission Main  
**Speaker(s):** Kevin C. Minkler, Eduardo Valerio, Thelma Box

**SESSION B9**
744117 – Structural Renewal of Non-Circular Pipe: Trenchless Rehabilitation in a Congested Utility Corridor  
**Speaker(s):** Carl Krogness, Kara Britt, Michael A. Owen

**SESSION E9**
736362 – Life of a 96-inch Water Line  
**Speaker(s):** Gregory Henry, James Wilson

**SESSION A9**
753284 – Five Trenchless Rehab Projects Save Failing Large Diameter Combined Sewer Structures in Albany NY  
**Speaker(s):** Keith Walker, Rebecca Caidon

**SESSION B9**
744411 – Revising the City of Houston’s Standard Butterfly Valve Detail for Large Diameter Butterfly Valves  
**Speaker(s):** Michael Salinas, Warren Green, Kevin Tran

**SESSION C9**
570122 – Joint Strength or “Efficiency” Factors of Steel Lap-Welded Joints for Use in Water Conveyance  
**Speaker(s):** Spyros Karamanos, Robert Card, Giannoula Chatzopoulou, Gregory C. Sarvani

**SESSION D9**
743732 – Dallas Water Utilities Uses Sliplining to Rehabilitate Aging 24-Inch Water Transmission Main  
**Speaker(s):** Kevin C. Minkler, Eduardo Valerio, Thelma Box

**SESSION E9**
570122 – Joint Strength or “Efficiency” Factors of Steel Lap-Welded Joints for Use in Water Conveyance  
**Speaker(s):** Spyros Karamanos, Robert Card, Giannoula Chatzopoulou, Gregory C. Sarvani