



# **Implementing PODS Next Gen (APR-Enabled) at Crestwood Midstream**

## **Petroleum GIS Conference 2018**

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# Implementing PODS Next Gen (APR-Enabled) at Crestwood

## Agenda

- Introduction to Crestwood Midstream Partners
- Asset Data Management in support of Asset Integrity
- Choosing a Data Model
- Choosing Software
- Decisions
- Migration and Software Roll-Out
- Lessons Learned
- Q&A



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## Introduction to Crestwood Midstream Partners

### Crestwood Equity Partners LP (NYSE: CEQP)/ Crestwood Midstream Partners LP

- Publicly traded master limited partnership that owns and operates midstream assets located primarily in the Marcellus Shale, Bakken Shale, Delaware Permian Basin, PRB Niobrara Shale, Barnett Shale and Fayetteville Shale.
- Operations are divided into three segments that include
  - Gathering & Processing,
  - Storage & Transportation
  - Marketing, Supply & Logistics.
- Crestwood is engaged in the gathering, processing, treating, compression, storage and transportation of natural gas; storage, transportation, terminalling and marketing of NGLs; gathering, storage, transportation, terminalling and marketing of crude oil.
- Corporate headquarters located in Houston





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## Asset Data Management in support of Asset Integrity

### Data Models

- The Pipeline industry has come together to collectively develop several influential data models over the years:
  - PODS – Pipeline Open Data Standard
    - PODS Relational (RDBMS) > PODS Spatial (GDB) > PODS Next Gen (Oracle/SQL RDBMS, ESRI GDB, PostgreSQL, etc.)
  - APDM (ESRI) – ArcGIS Pipeline Data Model
  - UPDM (ESRI) – Utilities Pipeline Data Model (Roads and Highways)
  - Vendor-Specific

### Software

- Centerline/Data Maintenance
- ILI Data Load/Align/Analysis
- Alignment Sheet Generation
- HCA Analysis/Class Location
- MAOP/MOP Calculation
- . . .etc.

# Implementing PODS Next Gen (APR-Enabled) at Crestwood

## Choosing a Data Model

### **Crestwood (July, 2016)**

- Disparate, non-robust data sets
  - PODS Relational (SQL Server) – Incomplete data
  - APDM Acquisition
  - Legacy SDE Layer – PHMSA-compliant, but not synced with PODS
  - Lacking work processes

### **Options**

- Stay on PODS Relational until PODS Next Gen Core is rolled out sometime in 2018 (unknown delivery date at the time)
- Migrate to PODS ESRI Spatial
- Migrate to PODS ESRI Spatial followed by second migration to PODS Next Gen Core (2 Migrations in 2 years)
- Migrate to APDM
- Become one of the first implementers of PODS Next Gen Lite (Extended) with the understanding some additional work will need to take place when PODS Next Gen Core rolls out

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# Implementing PODS Next Gen (APR-Enabled) at Crestwood

## Choosing Software

### **Crestwood (July, 2016)**

- Vendor Software running off of PODS Relational
- No Software running off of our other Legacy SDE Layer

### **Options**

- Continue using existing software
- Roll out new software from one of many software vendors
- Become one of first implementers of APR leveraging the ArcGIS Pro platform



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# Implementing PODS Next Gen (APR-Enabled) at Crestwood

## Decisions



### Implement PODS Next Gen “Lite” Spatial (Enhanced)

- PODS Next Gen “Lite” was not enough – we had to extend/enhance to meet business needs
  - Add Activity/ActivityCrossRef, Document/DocumentCrossRef, Asset Type Info (Casings, Elbows, Flange, Tap, Tee, Markers, Meters, etc.), Site/SitePoint, etc.
  - Add Integrity Tables – ILI, CP, etc.
- Crestwood dynamics made us a good candidate for new data model and software
- Personal preference of PODS Spatial over Relational
- Visibility into PODS Next Gen Working Group
- PODS “Lite” hierarchy of was able to handle migrating multiple data models
  - Inergy APDM and PODS Relational) in parallel

### Implement ArcGIS Pipeline Referencing (APR) as Centerline/Data Editing Tool

- Open dialogue with ESRI APR team
- Tested software in AWS Cloud Sandbox Environment with our data
- Strong ArcGIS skill set on the team
  - Enterprise GDB Versioning

ArcGIS Pipeline Referencing

An Extension to the ArcGIS Platform

# Implementing PODS Next Gen (APR-Enabled) at Crestwood

## Migration and Software Roll-Out

### **Database Migration (November, 2017)**

- Implemented PODS Next Gen Lite Spatial (Enhanced)
- Used third party vendor to migrate our data offsite
- Final deliverable was provided and set up on our Production environment
- Note: Added additional Integrity tables to PODS since roll out

### **APR Testing (ArcGIS Pro 2.0)**

- Identified work processes we needed the software to perform
- Stood up Amazon Web Services Cloud Sandbox for software testing
- Used Crestwood data in test environment
- Trained team on software
- Note: Upgraded to ArcGIS 10.5.1, ArcGIS Pro 2.1 and ArcGIS Location Referencing 10.6 following initial installation

# Implementing PODS Next Gen (APR-Enabled) at Crestwood

## Lessons Learned

### **PODS Next Gen**

- We should have included the Integrity tables in the original roll-out
- PODS Next Gen Core deviated from Lite more than I thought it would
- PODS Next Gen is easier to understand than some past models – hierarchy is more simplified, interface with ArcGIS Pro is easy to use

### **APR**

- Simple to use with PODS Lite
- Easy to make simple edits within the database in ArcGIS Pro
- Easy to add events with Event Editor
- Configuring PODS Next Gen for APR is 100% scriptable (ArcGIS Pro GeoProcessing Tools – “Location Referencing”)
- Once work flows are in place, simple to navigate and understand
- Loading centerlines and events have quite a few steps and takes longer than expected
- Deleting a centerline and related events takes longer than expected
- APR Documentation could be improved upon – more direction on how to make complex edits such as joining two lines together or changing lengths of two lines that are connected while maintaining referential integrity of the events

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Questions?

The screenshot displays the APR Event Editor software interface, version v10.5.1.1353. The main window is titled "APR Event Editor" and features a menu bar with "Map", "Edit", and "Review". Below the menu bar is a toolbar with various icons for selection, editing, and navigation. The central area shows a map with a yellow route overlaid on a topographic background. To the left of the map is a panel titled "Add Linear Events" with fields for Network (ENGINEERING STATION NETWORK), Line Name, Route Name, Method, Measure, and Dates. To the right of the map are two panels: "Reassign Route" and "Create Route". Both panels have fields for Network (ENGINEERING STATION NETWORK), Effective Date, Route Name, Line Name, Start Date, From Measure (in feet), and To Measure (in feet). The "Reassign Route" panel also includes options for "From Route Name", "To Route Name", "Use route start measure", "Use route end measure", and "Recalibrate route downstream". The "Create Route" panel includes an "Attributes" section with fields for CreateDate, Creator, Editor, EditDate, OriginIntEventID, StatusCL, Description, Comments, NetworkID, PipelineID, PipelineName, and StationingDirectionCL. At the bottom of the interface is a ribbon with tabs for "Project", "Map", "Insert", "Analysis", "View", "Edit", "Imagery", and "Location Referencing". The "Location Referencing" tab is active, showing a toolbar with icons for "Add Point", "Edit Point", "Delete Point", "Split Centerline", and "Identify Routes".