



Technical Overview

Kirk Cameron – New Century Software

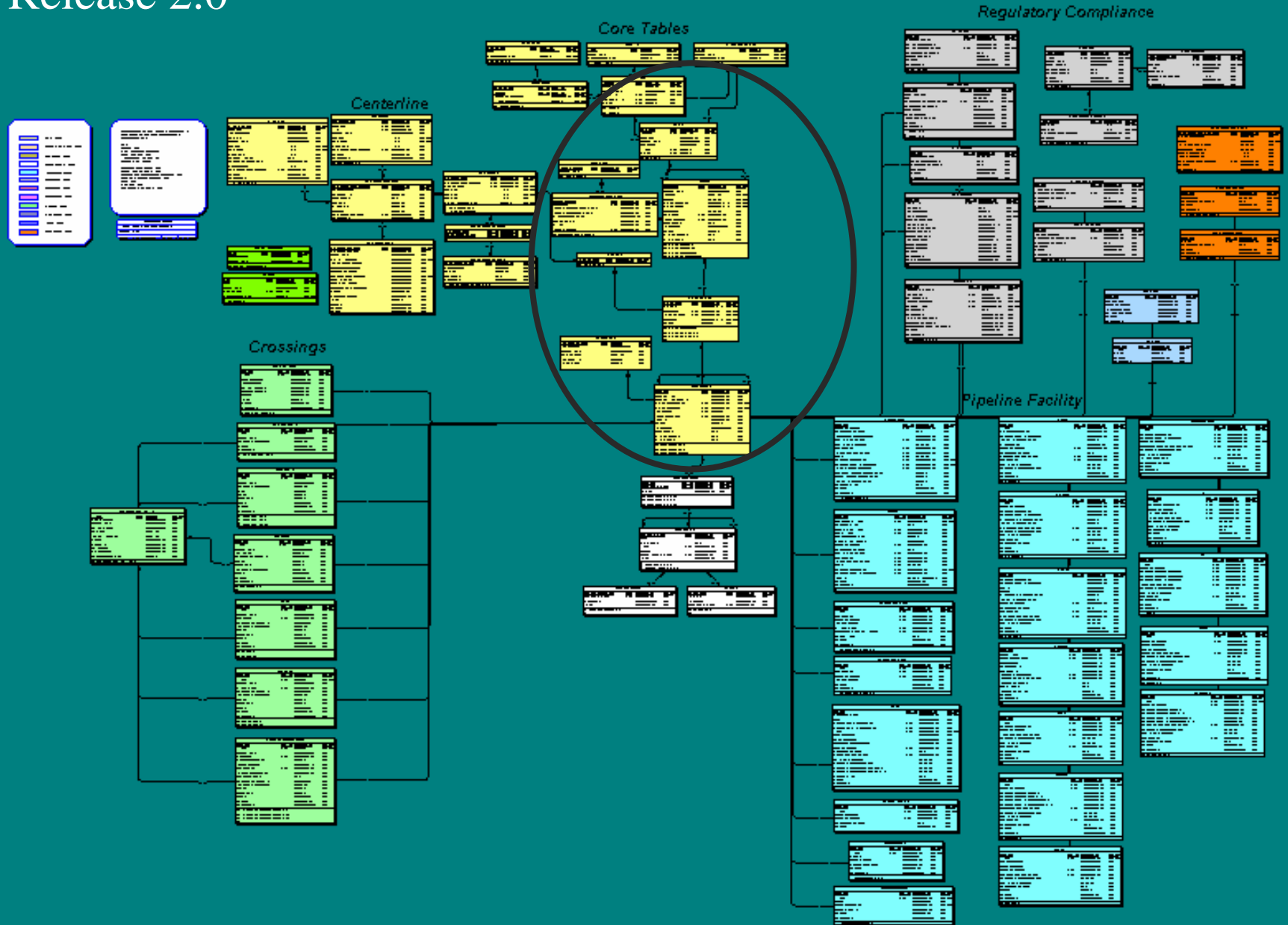
Outline

- Definitions
- Major Design Concepts and Submodels
 - Core Tables (Centerline Model)
 - Stationing
 - Events
 - Coordinates/Geometries

Release 2.0

Pipeline Open Database Standard

Physical Data Model
Post-Modeling Stage



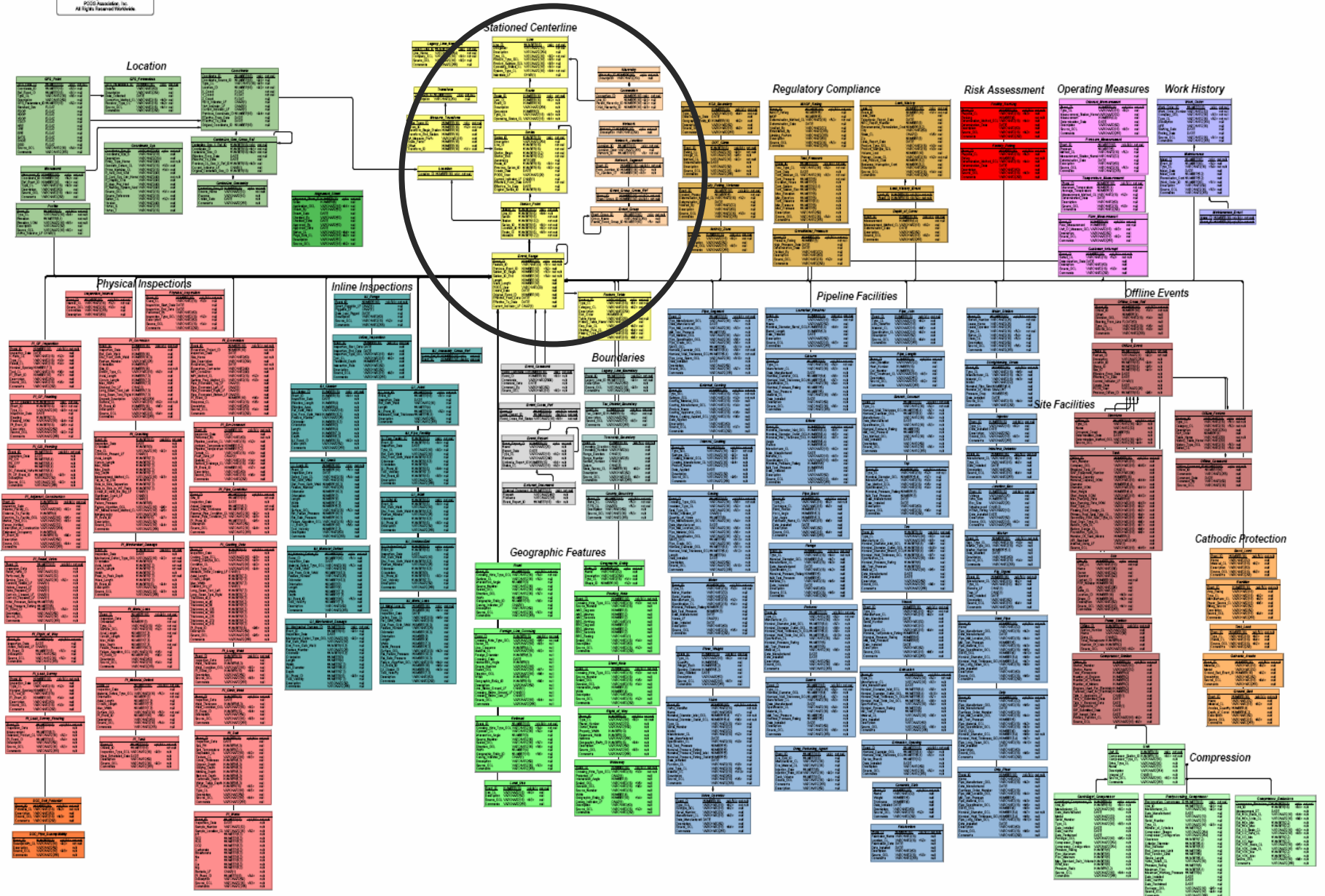
Pipeline Open Data Standard

Release 3.2

Physical Data Model

Model is subject to change

Physical Data Model
Version: 3.2.0
Copyright © 2016-2017
All Rights Reserved



Pipeline Open Data Standard Release 4.01 Final Physical Data Model Model is subject to change



Design Concepts – Core Tables

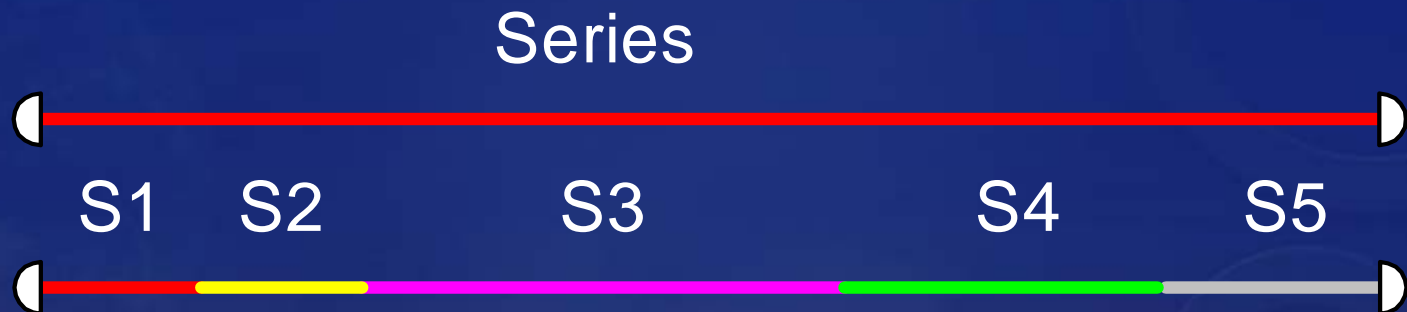


- Basic definitions match table structure
- A line contains many routes
- A route contains many series
- A series has station points

Definitions

Route

- continuous section pipe – pipe characteristics don't matter
- often a route changes at a compressor or pump station
- can be composed of one or more **Series**



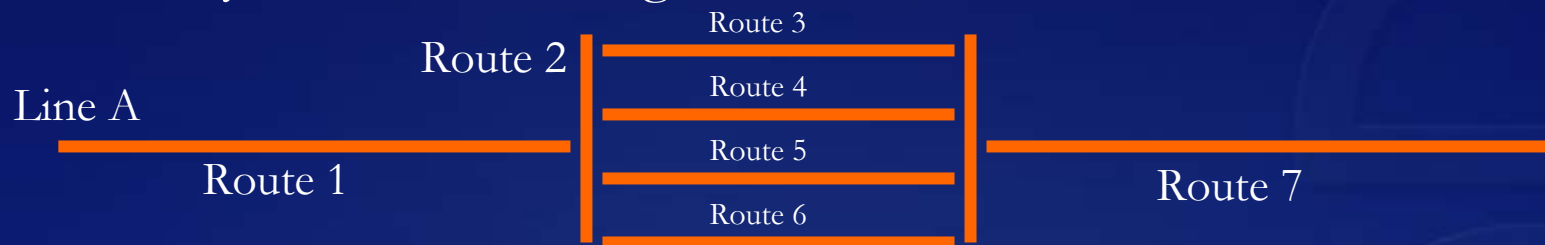
Definitions

Route

- Same concept as ESRI “Route”
- Continuous section pipe – pipe characteristics don’t matter
- Often a route changes at a compressor or pump station
- Can be composed of one or more **Series**
- For small lines, a Route will often be the same as a Line (one line has only one route)
- Longer transmission lines may have two or more routes

Route - Example

Old Style River Crossing



Route Table

<i>Route</i>			
<u>Route_ID</u>	NUMBER(16)	<pk>	<u>not null</u>
Line_ID	NUMBER(16)	<fk2>	null
Event_ID	NUMBER(16)		null
Description	VARCHAR2(254)		null
Sequence	NUMBER(3)		null
Type_CL	VARCHAR2(16)	<fk3>	null
Operating_Status_CL	VARCHAR2(16)	<fk1>	null

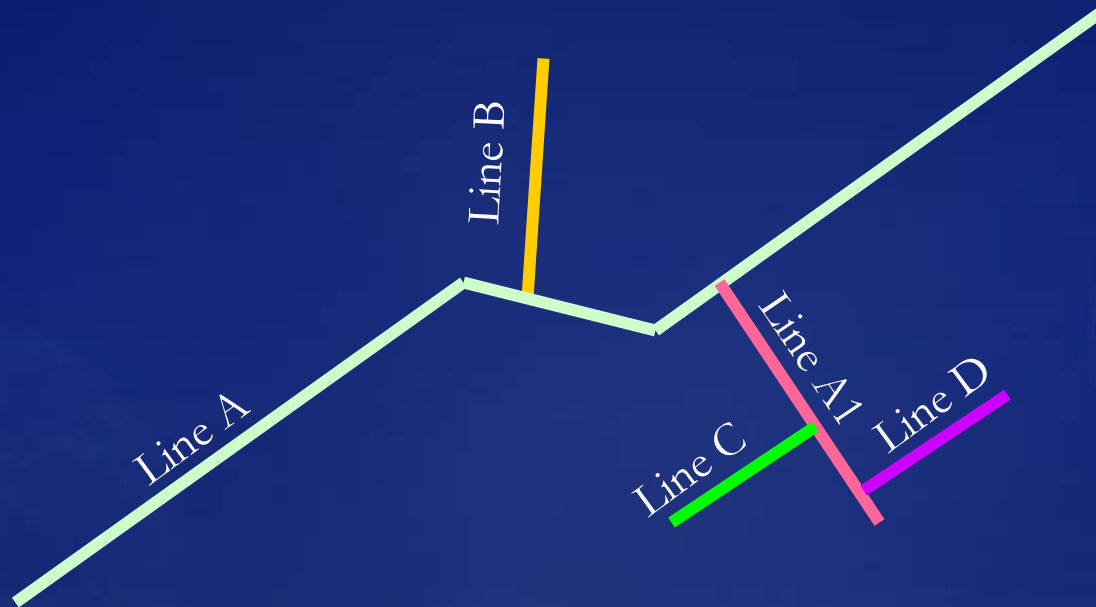
Definitions

Line

- an organizational grouping of routes
- usually follows business naming convention for lines



Lines - Example



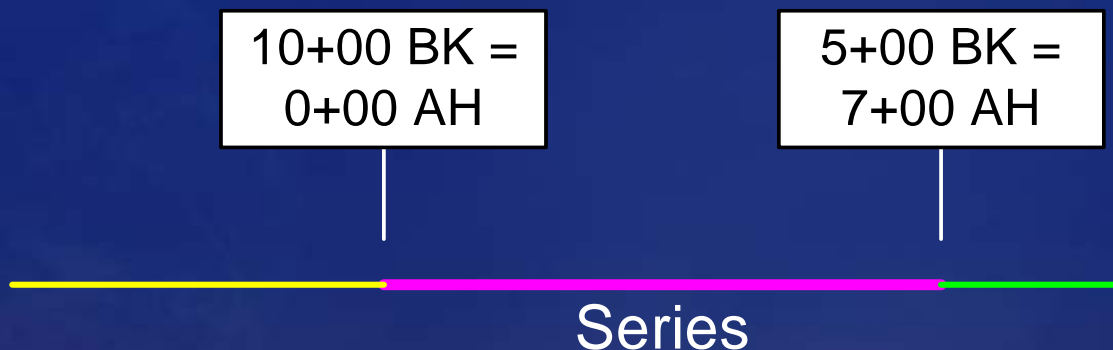
Line Table

<i>Line</i>			
<u>Line_ID</u>	<u>NUMBER(16)</u>	<u><pk></u>	<u>not null</u>
Designator	VARCHAR2(10)		not null
Description	VARCHAR2(254)		null
Type_CL	VARCHAR2(16)	<fk2>	not null
Product_Type_SCL	VARCHAR2(16)	<fk3>	null
Product_Subtype_SCL	VARCHAR2(16)	<fk3>	null
Operating_Status_CL	VARCHAR2(16)	<fk1>	null
System_Type_CL	VARCHAR2(16)	<fk4>	not null
Interstate_LF	CHAR(1)		null

Definitions

Series

- a continuous range of engineering stationing
- change series on a new route or at a station equation
- allows database to handle station equations





Series Table

Series			
<u>Series_ID</u>	NUMBER(16)	<pk>	<u>not null</u>
Description	VARCHAR2(254)		null
Line_ID	NUMBER(16)		not null
Series	NUMBER(16)		not null
Station_Begin	NUMBER(10,2)		not null
Station_End	NUMBER(10,2)		not null
Ascending	INTEGER		null
Route_ID	NUMBER(16)	<fk1>	null
Previous_Series_ID	NUMBER(16)	<fk2>	null
Create_Date	DATE		null
PODS_User	VARCHAR2(20)		null
Current_Indicator_LF	CHAR(1)		null
Effective_From_Date	DATE		not null
Effective_To_Date	DATE		null
Original_Series_ID	NUMBER(16)		null

Pipeline Stationing - Example

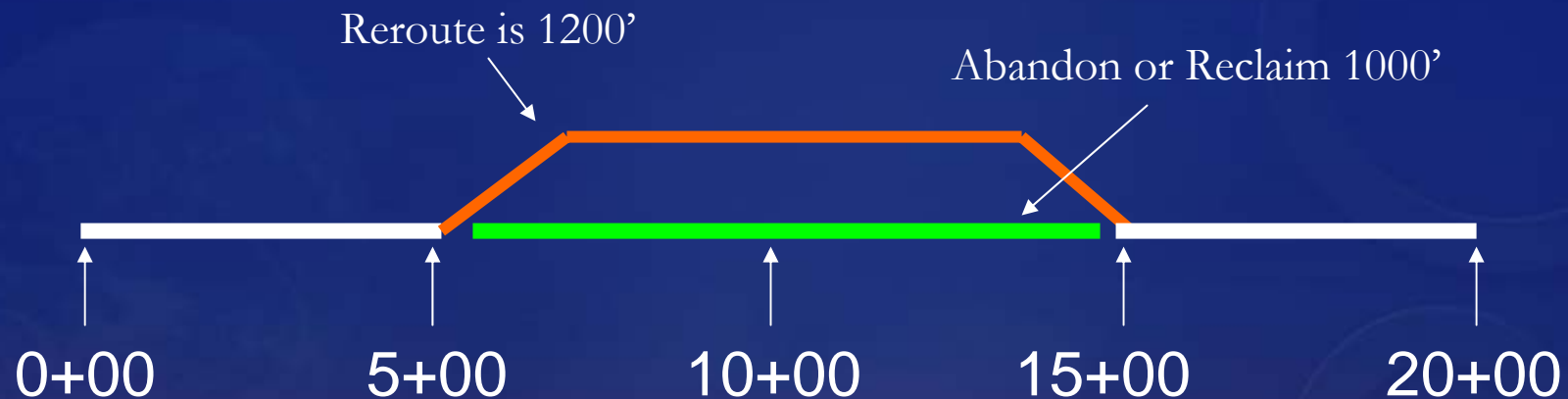
New (Orange) pipe is inserted in a reroute. In this example, the reroute is 200' longer than the original pipe. The original pipe is assigned Series 100.

	Line	Route	Series	Stationing	Measures
	AB	1	100	0+00 to 20+00 (Active pipe)	0 to 2000
	AB	(new)	(new)	0+00 to 12+00 (1200 foot reroute pipe)	



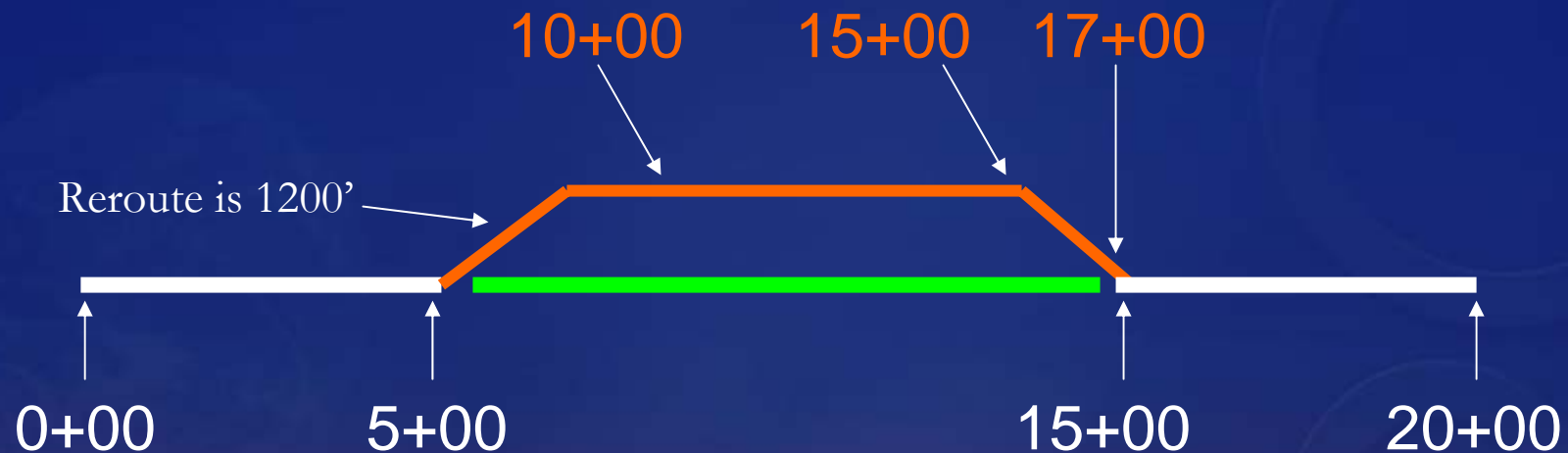
Pipeline Stationing - Example

The original pipe is abandoned or reclaimed. The length of the original pipe was 1000 feet. The length of the reroute is 1200 feet. In the next slide we will adjust stationing for the reroute.



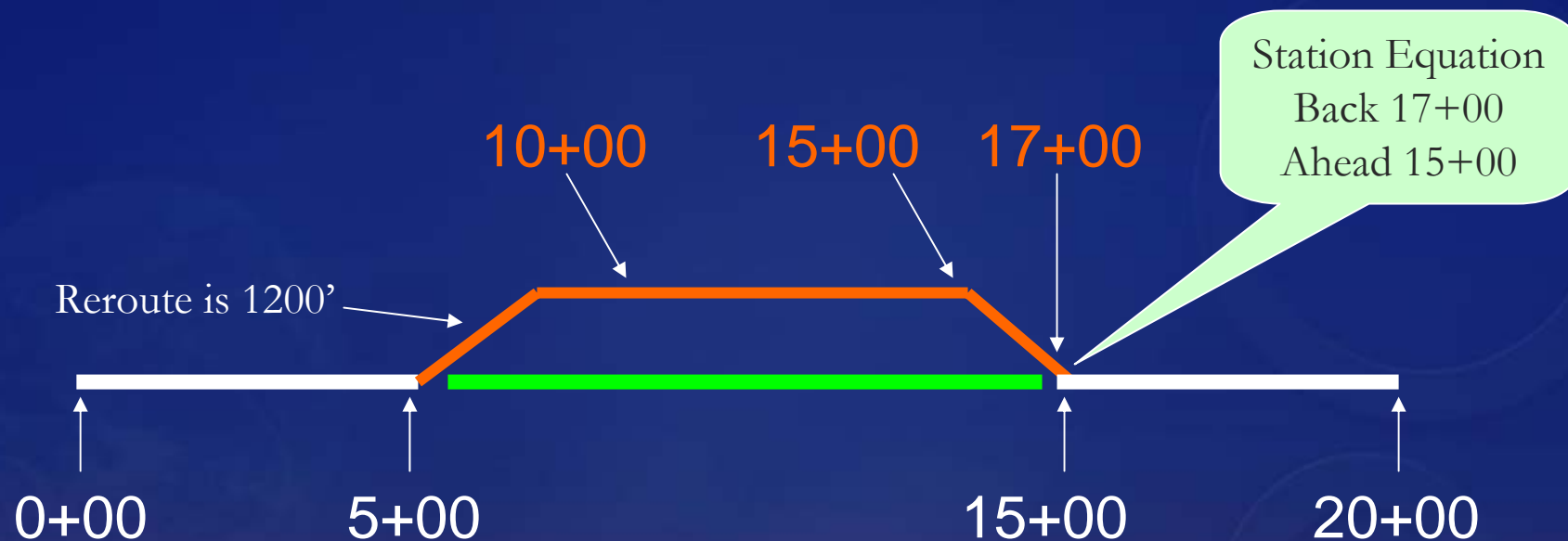
Pipeline Stationing - Example

The reroute stationing continues from the original survey. The upstream tie-in for the Reroute is at 5+00. The downstream tie-in for the reroute is 17+00 (back) and 15+00 (ahead). The stationing downstream of the reroute is not affected.



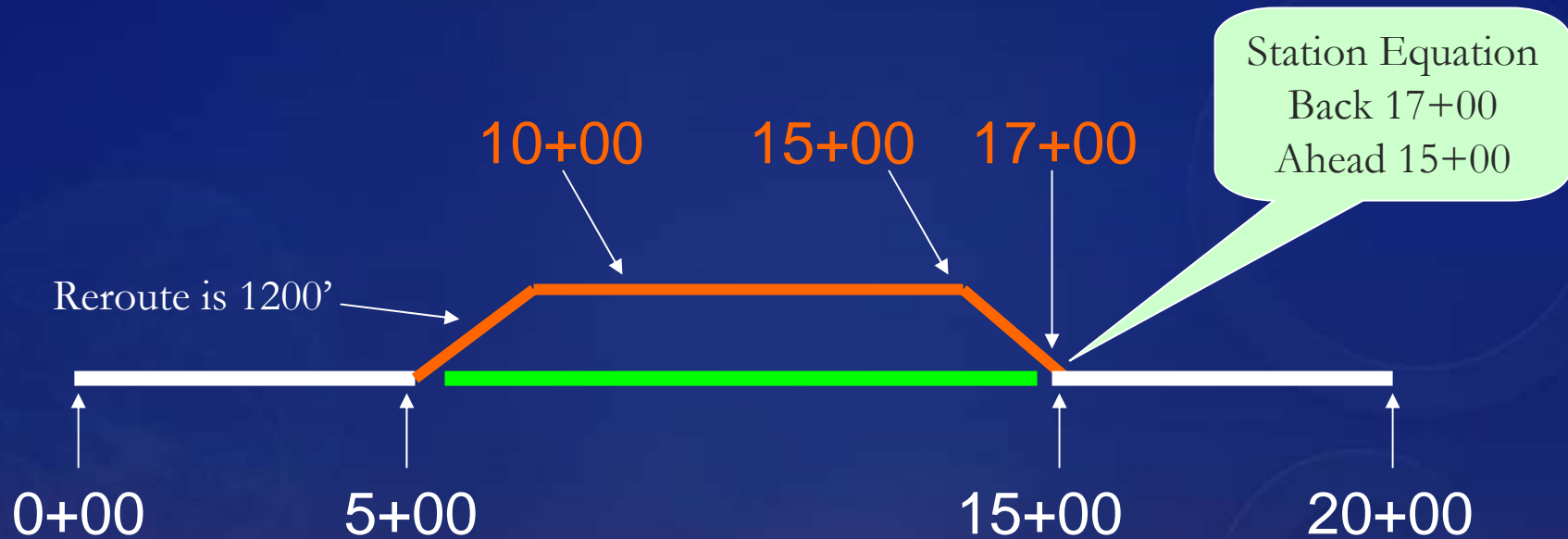
Pipeline Stationing - Example

“Station equations” are used to equate stationing between two adjacent pipeline surveys.






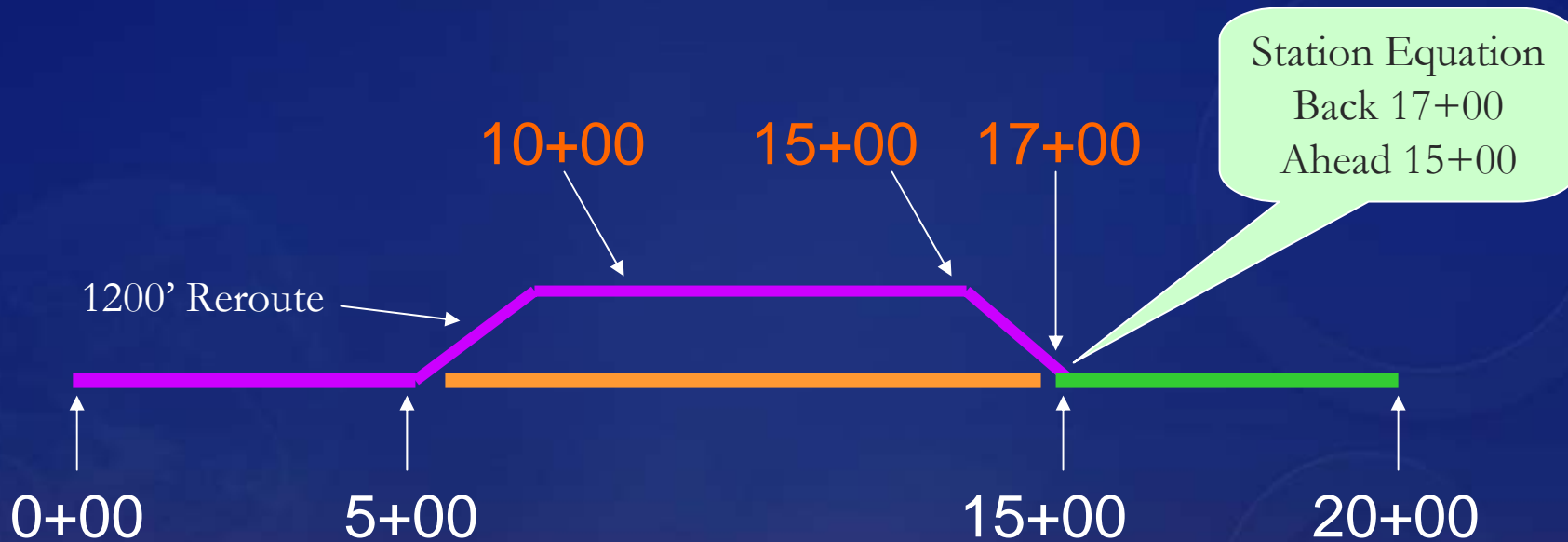
Pipeline Stationing - Example

Series is used to track continuous stationing. Here one Series starts at 0+00 and ends at 17+00. Another Series starts at 15+00 and ends at 20+00.



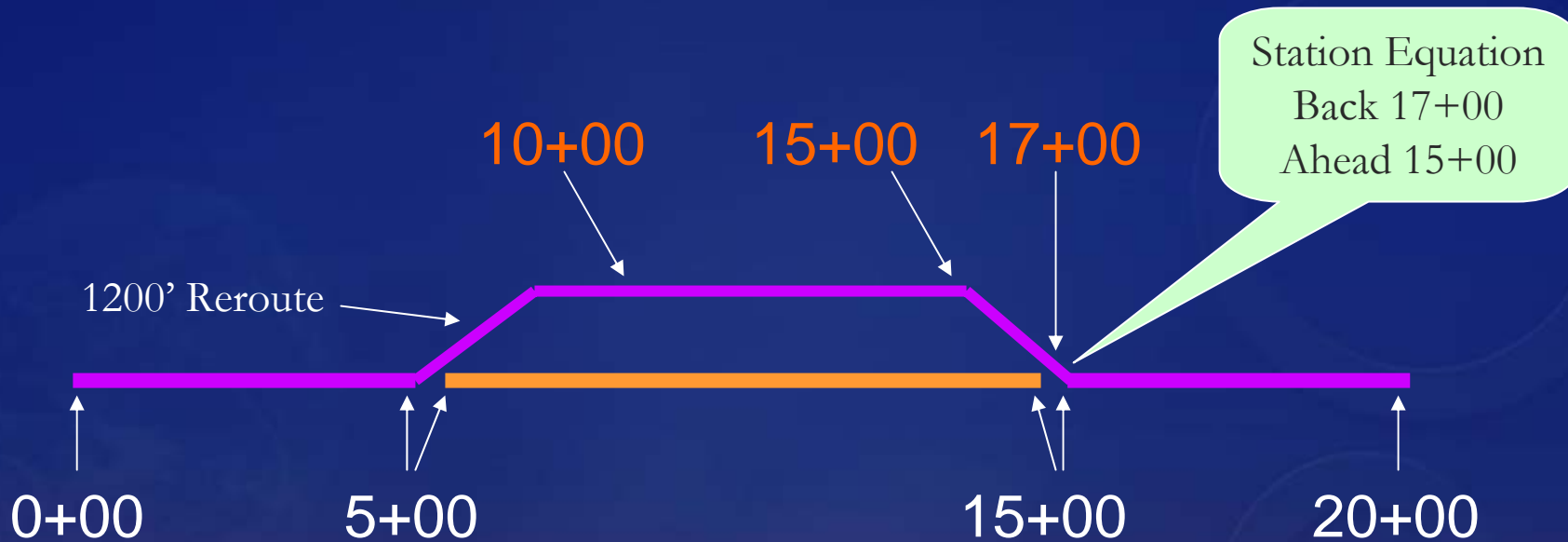
Pipeline Stationing - Series

	Line	Route	Series	Stationing	Measures
	AB	1	100	0+00 to 17+00 (Active pipe)	0 to 1700
	AB	1	200	15+00 to 20+00 (Active pipe)	1700 to 2200
	AB	2	9000	5+00 to 15+00 (Abandoned pipe)	0 to 1000



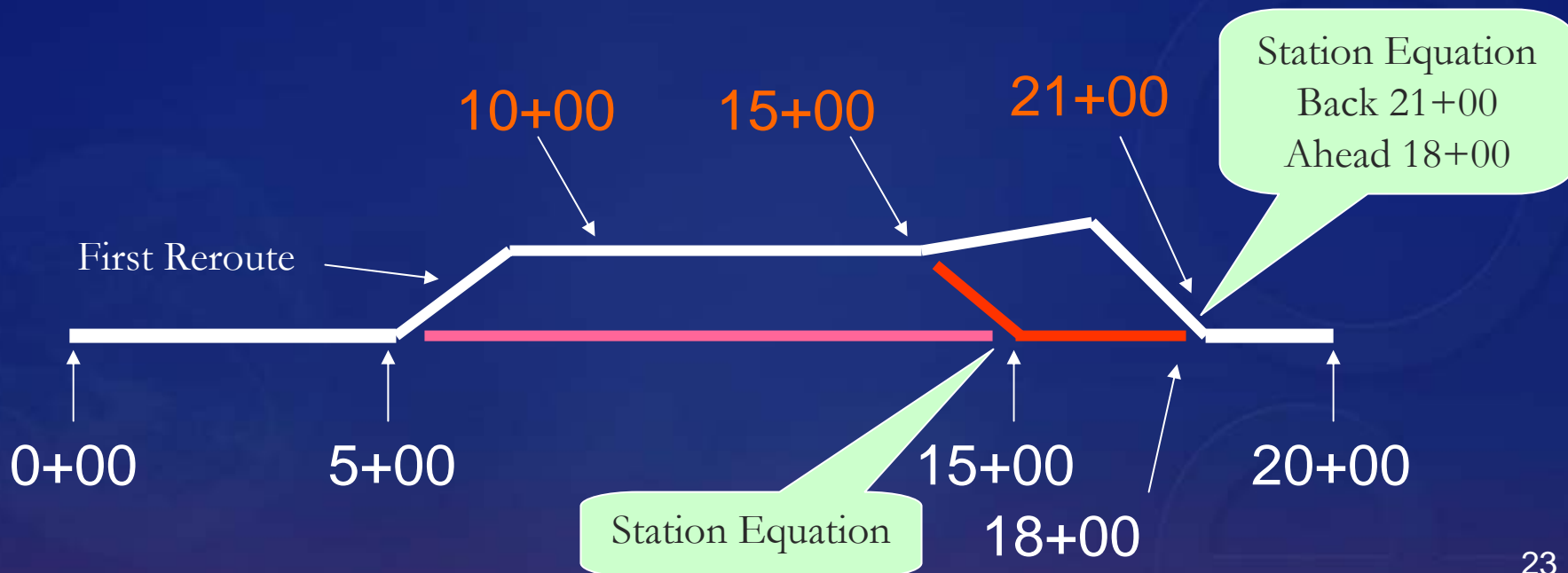
Pipeline Stationing - Route

	Line	Route	Series	Stationing	Measures
	AB	1	100	0+00 to 17+00 (Active pipe)	0 to 1700
	AB	1	200	15+00 to 20+00 (Active pipe)	1700 to 2200
	AB	2	9000	5+00 to 15+00 (Abandoned pipe)	0 to 1000



A More Complex Example

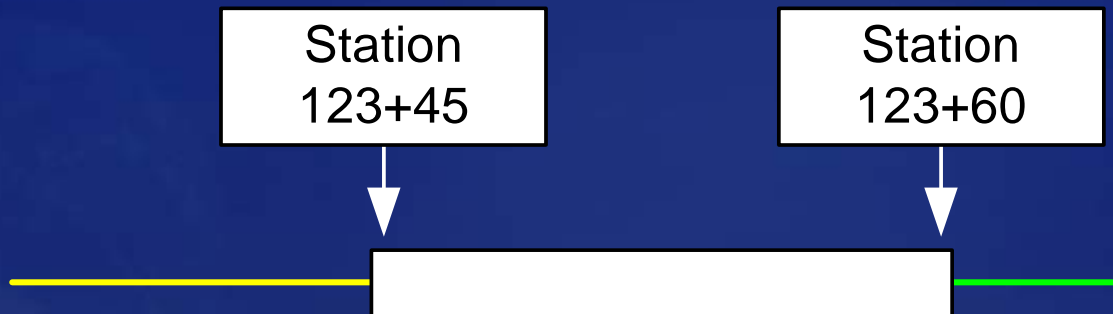
	Line	Route	Series	Stationing	Measures
	AB	1	100	0+00 to 21+00 (Active pipe)	0 to 2100
	AB	1	200	18+00 to 20+00 (Active pipe)	2100 to 2300
	AB	2	9000	5+00 to 15+00 (Abandoned pipe)	0 to 1000
	AB	3	9100	15+00 to 17+00 (Abandoned pipe)	0 to 200
	AB	3	9200	15+00 to 18+00 (Abandoned pipe)	200 to 300



Definitions

Station Point

- a unique point on the pipeline where something of interest happens – unique by Line, Series, Station
- Examples: Pipe change, coating change, crossing, etc.



Station Points

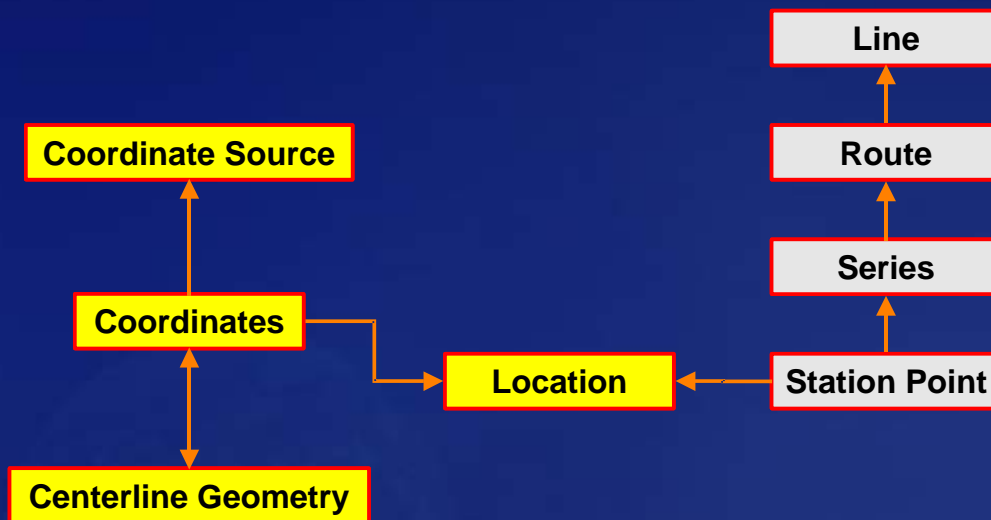
<u>SP ID</u>	<u>Series / Station</u>	<u>Milepost</u>	<u>Measure</u>
192	100 100+00	1.8939	10000
281	100 140+00	2.6515	14000
172	100 175+00	3.3143	17500
102	100 185+00 (BK)	3.5037	18500
311	200 175+00 (AH)	3.5037	18500
182	200 185+00	3.6931	19500
151	200 200+00	3.9772	21000



Station Point Table

Station_Point			
<u>Station_ID</u>	NUMBER(16)	<pk>	not null
Line_ID	NUMBER(16)	<fk4>	null
Series	NUMBER(16)		not null
Station	NUMBER(10,2)		not null
Series_ID	NUMBER(16)	<fk1>	not null
Location_ID	NUMBER(16)	<fk2>	not null
Route_ID	NUMBER(16)	<fk3>	not null
Measure	NUMBER(12,2)		not null

Design Concepts – Coordinates and Geometries



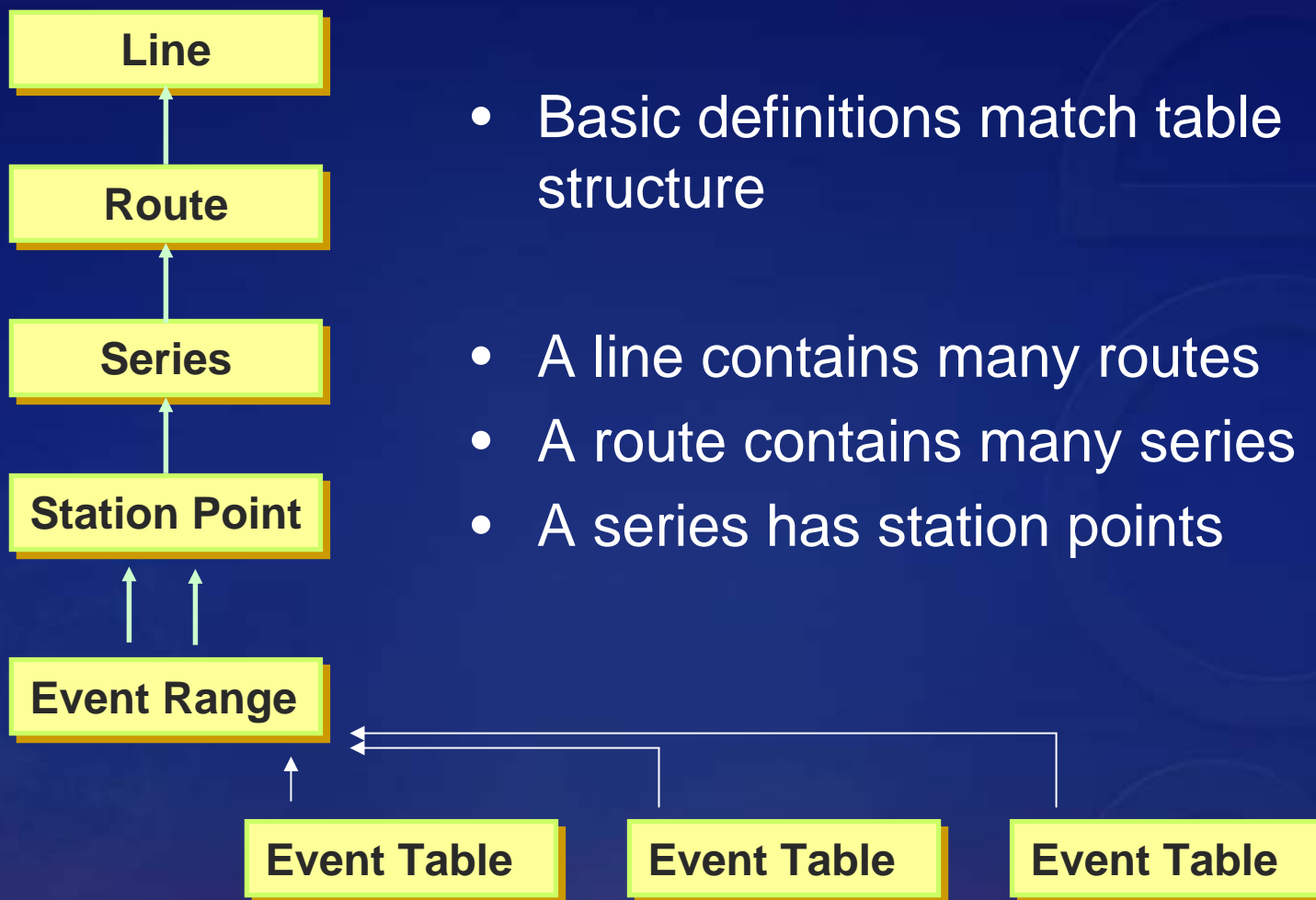
Location – station points with known coordinates

Coordinates – global coordinate warehouse

Geometry – collection of coordinates for a specific spatial representation (geometry)

Coordinate Source – meta data (how collected, coordinate system)

Design Concepts - Core Tables



- Basic definitions match table structure
- A line contains many routes
- A route contains many series
- A series has station points

Definitions

Event Range

- Identifies a single Point or Linear Event with a begin and end Station Point
- Every record in any PODS event table has an Event_Range record
- Begin and End Station Points must be on the same Route
- Begin Station Point must have lower measure (upstream) from End Station Point

Understanding Measures

- Route and Measure uniquely identify positions on the pipeline
- Measures are “Continuous Stationing”
 - Measures are a set of continuous values that start at 0 for the beginning of each route.
 - The measure is calculated based on the series definitions and station values. This accounts for station equations.
- The measure at the end of the route shows the total length of the route
- PODS uses two linear referencing schemes
 - Line/Series/Station – typically used by users
 - Route/Measure – typically used by applications

Definitions

Event

- A collection of attributes that are known about the pipe, its operation or its surroundings (i.e.: pipe material, coating, weights, foreign crossings, etc.)
- Data for each 'Event' is stored in a separate table
- Each Event has a begin and end Station_Point
- Point events have the same begin and end Station_Point
- Each Event Type has a Feature_Table record

Event_Range Table

<i>Event_Range</i>			
<u>Event_ID</u>	NUMBER(16)	<pk>	<u>not null</u>
Feature_ID	VARCHAR2(4)	<fk1>	not null
Previous_Event_ID	NUMBER(16)	<fk2>	null
Station_ID_Begin	NUMBER(16)	<fk3>	not null
Station_ID_End	NUMBER(16)	<fk4>	not null
Length	NUMBER(16)		null
Slack_Length	NUMBER(16)		null
PODS_User	VARCHAR2(20)		null
Create_Date	DATE		null
Original_Event_ID	NUMBER(16)		null
Effective_From_Date	DATE		null
Effective_To_Date	DATE		null
Current_Indicator_LF	CHAR(1)		null

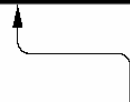
Event Tables

<i>Pipe_Segment</i>				
<u>Event_ID</u>	<u>NUMBER(16)</u>	<u><pk,fk1></u>	<u>not null</u>	
Pipe_Manufacturer_GCL	VARCHAR2(16)	<fk2>	null	
Date_Manufactured	DATE		null	
Pipe_Mill_Location_GCL	VARCHAR2(16)	<fk3>	null	
Mill_Test_Pressure	NUMBER(5)		null	
Pipe_Material_GCL	VARCHAR2(16)	<fk4>	null	
Pipe_Specification_GCL	VARCHAR2(16)	<fk6>	null	
Pipe_Grade_GCL	VARCHAR2(16)	<fk5>	null	
SMYS_GCL	NUMBER(6)	<fk11>	null	
Nominal_Diameter_GCL	NUMBER(8,4)	<fk9>	not null	
Nominal_Wall_Thickness_GCL	NUMBER(6,4)	<fk8>	not null	
Pipe_Long_Seam_GCL	VARCHAR2(16)	<fk10>	null	
Date_Installed	DATE		null	
Description	VARCHAR2(50)		null	
Source_GCL	VARCHAR2(16)	<fk7>	null	
Comments	VARCHAR2(255)		null	

Event Tables

Valve			
Event_ID	NUMBER(16)	<pk, fk1>	not null
Valve_Identifier	VARCHAR2(16)		not null
Name	VARCHAR2(50)		null
Nominal_Diameter_Inlet_GCL	NUMBER(8,4)	<fk7>	not null
Nominal_Diameter_Outlet_GCL	NUMBER(8,4)	<fk6>	not null
Type_CL	VARCHAR2(16)	<fk4>	null
Serial_Number	VARCHAR2(32)		null
Model	VARCHAR2(32)		null
Manufacturer_CL	VARCHAR2(16)	<fk2>	null
Date_Manufactured	DATE		null
Specification_CL	VARCHAR2(16)	<fk3>	null
Mill_Test_Pressure	NUMBER(5)		null
Nominal_Pressure_Rating	NUMBER(5)		null
Nominal_Pressure_Rating_Inlet	NUMBER(5)		null
Nominal_Pressure_Rating_Outlet	NUMBER(5)		null
Date_Installed	DATE		null
Function_CL	VARCHAR2(16)	<fk9>	null
Joint_Type_CL	VARCHAR2(16)	<fk8>	null
Material_CL	VARCHAR2(16)	<fk10>	null
Description	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk5>	null
Comments	VARCHAR2(255)		null

Valve_Operator			
Event_ID	NUMBER(16)	<pk, fk1>	not null
Type_SCL	VARCHAR2(16)	<fk2>	not null
Subtype_SCL	VARCHAR2(16)	<fk2>	null
Serial_Number	VARCHAR2(32)		null
Manufacturer_CL	VARCHAR2(16)	<fk3>	null
Date_Manufactured	DATE		null
Description	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk4>	null
Comments	VARCHAR2(255)		null



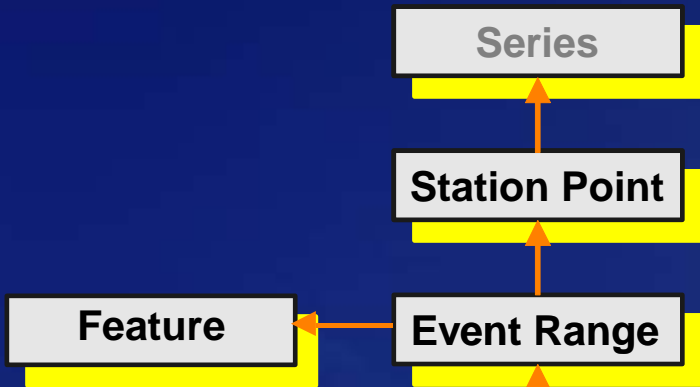
Design Concepts -- Events

- The EVENT_RANGE table has a length column. This is populated by the formula:
$$\{\text{end measure} - \text{begin measure}\}.$$
- The length column can be used to help determine if you have measure issues or events defined incorrectly. For example, you should not have entities with a length less than zero.
- Events can also be off-line objects (tanks, pump_stations ...)

Design Concepts -- Events

- A collection of attributes that are known about the pipe or its surroundings (i.e.: pipe material, coating, weights, foreign crossings, etc.)
- Data for each 'Event' is stored in a separate table
- Each Event has a begin and end Station_Point
- Point events have the same begin and end Station_Point
- Each Event has a Feature_ID which corresponds to a FEATURE_TABLE record.
- The end station of a linear object may not always be greater than the start station. This is dependent on the series ascending field definition.

Design Concepts – Events



- Event attributes defined via Event Range
- Event Range defined via Station Points
- Feature identifies target database table



PIPELINE OPEN DATA STANDARD

Pipeline Open Data Standard Model Workshop

**A PODS Implementation Forum
Part III**

Jay Williams, Senior Analyst / Team Lead, ConocoPhillips

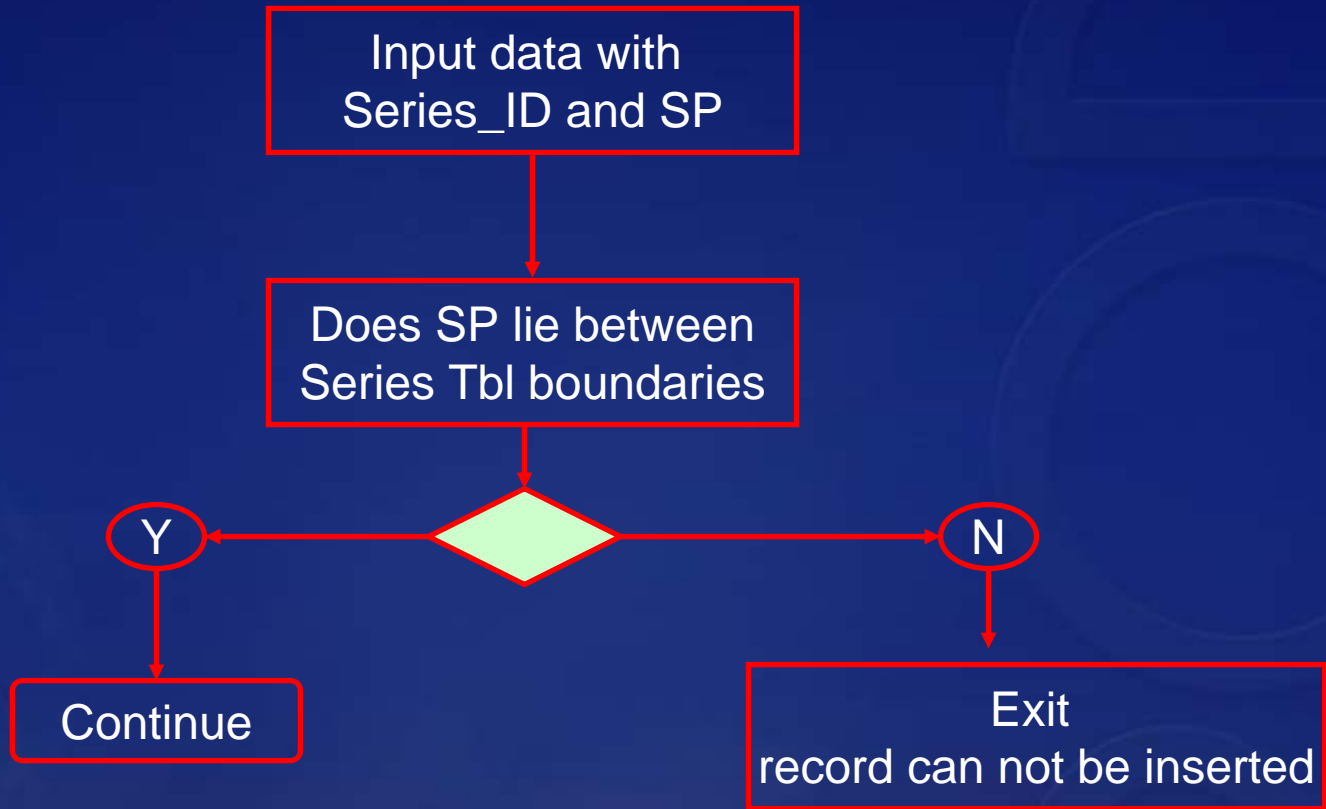
ConocoPhillips History With The PODS Model

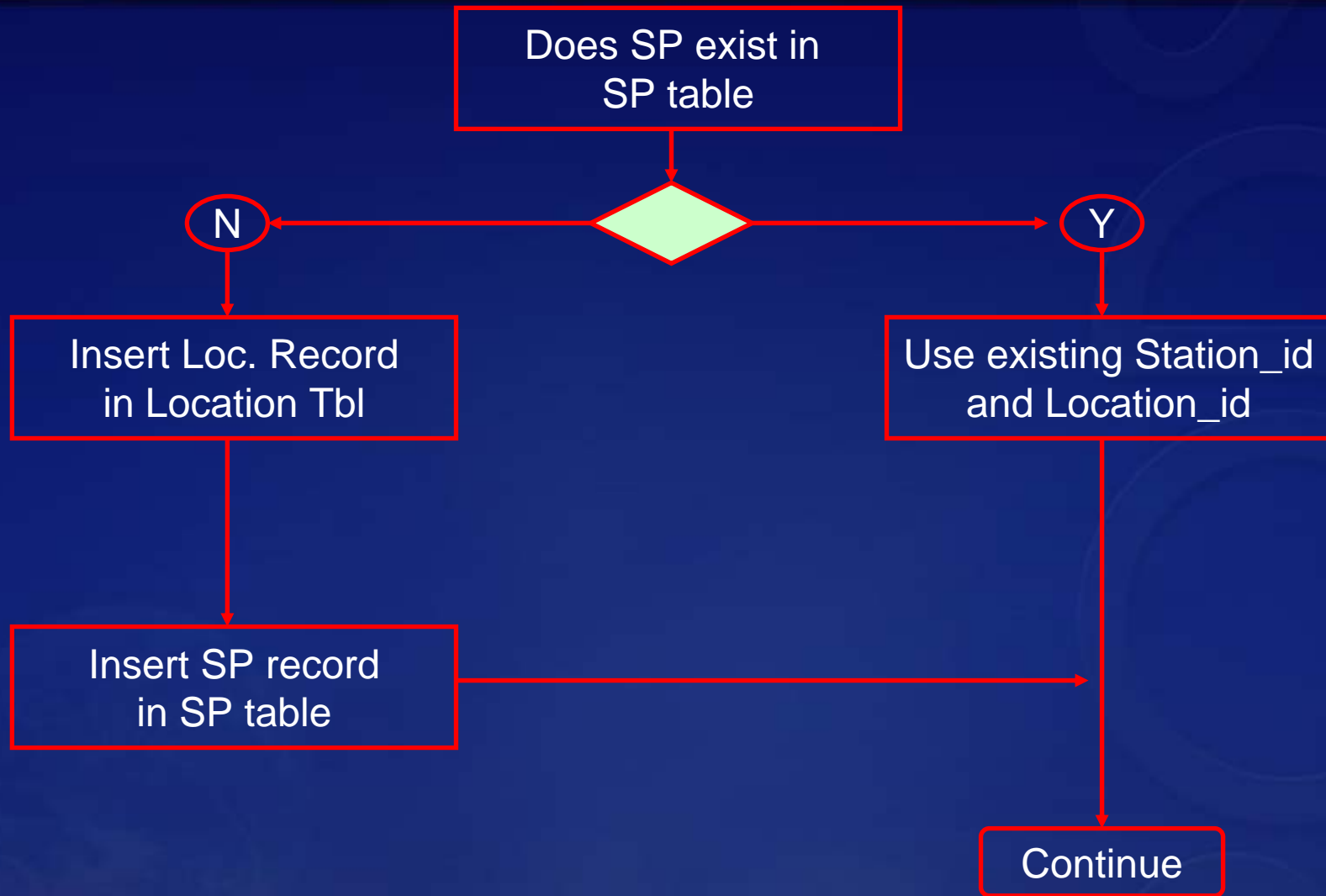
- Started a pilot project in mid 2001.
- PODS is the relational DB central repository for many P&T departments.
- The COP PODS models is on an oracle DB and spatialized with ESRI ArcSDE.
- ConocoPhillips is currently on version 4.0.
- Conversion from PODS 3.2 to 4.0 took 6-8 weeks.
- At the present time we have about 13000 miles of pipeline data stored.
- COP is a multi-vendor shop with proprietary software also.

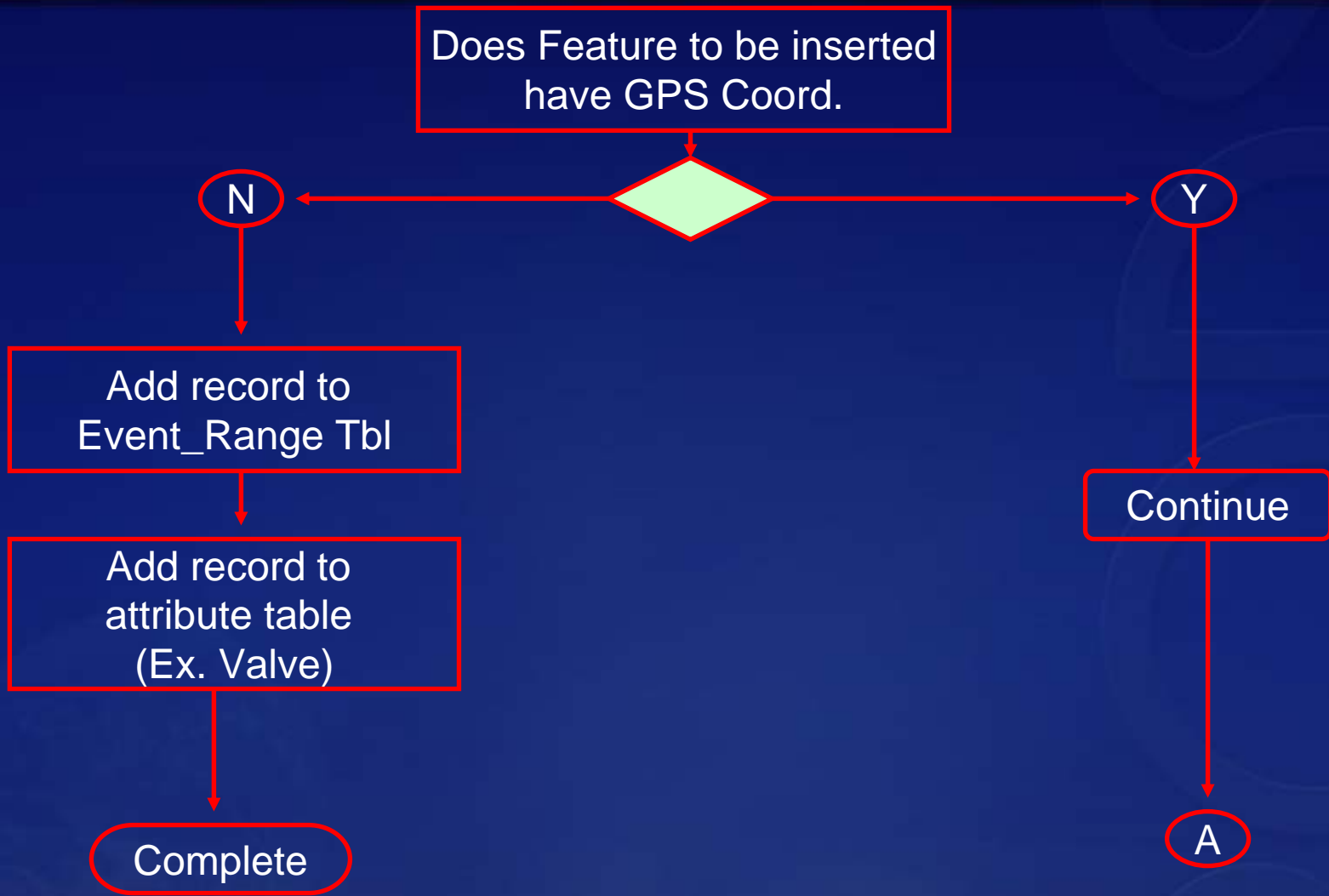
Agenda

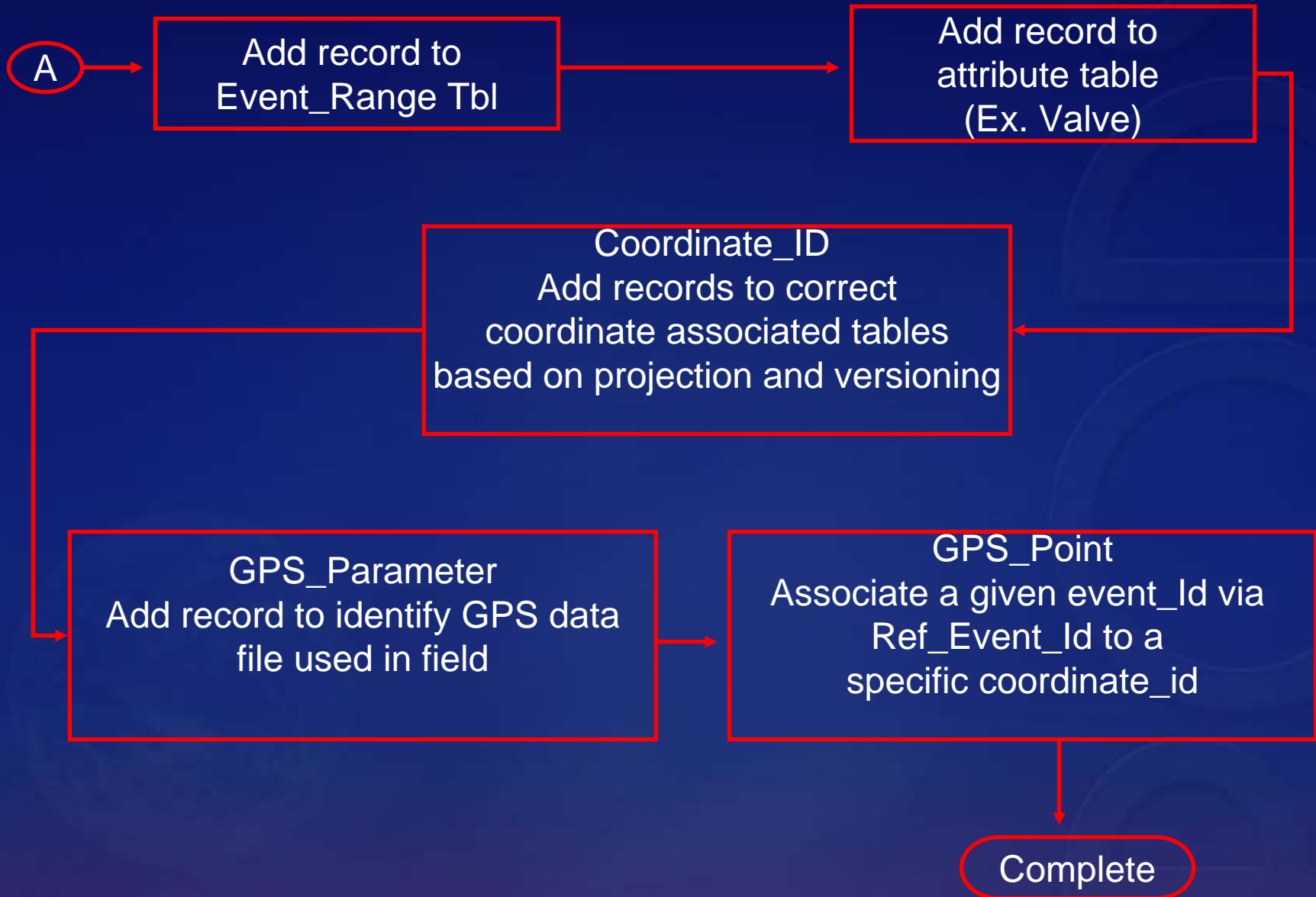
- Work flow process for inserting a record.
- Short look at an inline history record.
- The Work Order Submodel / Implementation
- Q&A Period

Basic concept for inserting a record into a PODS DB model









Example Inline History record in Event_Range Tbl

FEATURE_ID	PREVIOUS_EVENT_ID	PODS_USER	CREATE_DATE	EVENT_ID	ORIGINAL_EVENT_ID	EFFECTIVE_FROM_DATE	EFFECTIVE_TO_DATE	CURRENT_INDICATOR_LF
ECOА	2217068	MIKEJS	6/14/2006 14:04	2218399	121091	8/17/2002 10:14		Y
ECOА	2168774	MIKEJS	6/2/2006 14:25	2217068	121091	8/17/2002 10:14	6/14/2006 14:34	N
ECOА	121091	SHEPASD	3/30/2006 9:25	2168774	121091	8/17/2002 10:14	6/2/2006 14:39	N
ECOА		CONOCO	8/17/2002 10:14	121091	121091	8/17/2002 10:14	3/30/2006 9:32	N

- The above example shows how inline history is tracked in the Event_Range Tbl
- This slide only covers “inline” history. Another method of storing history is “offline” history. A working group is being formed to document both approaches and come up with a process to migrate between both approaches (or agree on one common approach to history).

PODS WORK ORDER Submodel

- This particular submodel requires a standalone application for implementation.
- The relationship between MAINTENANCE and Work_Order can be 1 to many.
- A standalone application is necessary to create the connection between a Maint_Event and an attribute Event_Id.

WORK ORDER Submodel

<i>Work_Order</i>			
Work_Order_ID	NUMBER(16)	<pk,ak>	not null
Work_Order_GUID	CHAR(38)	<ak>	null
Work_Order_Number	VARCHAR2(32)		not null
Company_GCL	VARCHAR2(16)	<fk3>	not null
Type_CL	VARCHAR2(16)	<fk2>	not null
Description	VARCHAR2(254)		null
AFE	VARCHAR2(16)		null
Starting_Date	DATE		null
Ending_Date	DATE		null
Ordered_Date	DATE		null
Planned_Start_Date	DATE		null
Planned_End_Date	DATE		null
Vendor_Company_GCL	VARCHAR2(16)	<fk4>	null
Vendor_Work_Number	VARCHAR2(32)		null
Source_GCL	VARCHAR2(16)	<fk1>	null
Comments	VARCHAR2(255)		null

<i>Maintenance</i>			
Maint_ID	NUMBER(16)	<pk,ak>	not null
Maint_GUID	CHAR(38)	<ak>	null
Event_ID	NUMBER(16)	<fk2,fk5>	null
Event_GUID	CHAR(38)	<fk5>	null
Type_CL	VARCHAR2(16)	<fk4>	not null
Maint_Date	DATE		null
Maint_Cost	NUMBER(8,2)		null
Remediation_Cost	NUMBER(8,2)		null
Work_Order_ID	NUMBER(16)	<fk1,fk6>	null
Work_Order_GUID	CHAR(38)	<fk6>	null
Description	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk3>	null
Comments	VARCHAR2(255)		null

<i>Maintenance_Event</i>			
Maint_ID	NUMBER(16)	<pk,fk2,fk3>	not null
Event_ID	NUMBER(16)	<pk,fk1,fk4>	not null
Event_GUID	CHAR(38)	<fk4>	null
Maint_GUID	CHAR(38)	<fk3>	null

The PODS Technical Committee would like to thank everyone for attending and open the floor to Questions.

Thanks again....



PIPELINE OPEN DATA STANDARD

The Model

Part II – The Submodels

John Chioles, Programmer / Business Analyst, Chevron

Chevron PODS Implementation Notes

- Started implementation in 2002
- Business groups supported: GIS, Asset Integrity & Reliability, Risk, Field Teams, Engineering, and others
- PODS v3.2.1 w/ extensions, Oracle, spatialized with ESRI ArcSDE layers
- Multi-vendor environment and custom applications
- Integrated with other asset data stores

Objectives

- Overview of selected sub-models
- Features & Events
- Graphic and tabular examples

Pipeline Facilities

Pipe_Segment, Pipe_Join
External_Coating
Internal_Coating
Valve
Casing, Vent_Pipe
Launcher_Receiver
Closure
Elbow, Pipe_Bend
Flange
Reducer
Tap, Tee, Branch_Connect
Drip, Drip_Riser
River_Weight, Concrete_Slab

- *Fundamental or core pipeline assets*
- *Common physical attributes – date installed, diameter, manufacturer, pressure rating*
- *Typically a high-priority category for initial implementation – requested often by various business users*

Pipe_Segment			
Event_ID	NUMBER(16)	<pk, fk1, fk12>	not null
Event_GUID	CHAR(38)	<fk12>	null
Manufacturer_CL	VARCHAR2(16)	<fk2>	null
Date_Manufactured	DATE		null
Pipe_Mill_Location_GCL	VARCHAR2(16)	<fk3>	null
Mill_Test_Pressure	NUMBER(5)		null
Material_CL	VARCHAR2(16)	<fk4>	null
Pipe_Specification_GCL	VARCHAR2(16)	<fk5>	null
Pipe_Grade_GCL			
SMYS_GCL			
Nominal_Diameter_GCL			
Nominal_Wall_Thicknes			
Pipe_Long_Seam_GCL			
Date_Installed			
Description			
Source_GCL			
Comments			

External_Coating			
Event_ID	NUMBER(16)	<pk, fk1, fk8>	not null
Event_GUID	CHAR(38)	<fk8>	null
Type_SCL	VARCHAR2(16)	<fk2>	not null
Subtype_SCL			
Coating_Material_GCL			
Coating_Manufacturer_GCL			
Product_Name			
Coating_Applicator_GCL			
Where_Coating_Applied			
Date_Applied			
Description			
Source_GCL			
Comments			

Tap			
Event_ID	NUMBER(16)	<pk, fk1, fk8>	not null
Event_GUID	CHAR(38)	<fk8>	null
Type_CL	VARCHAR2(16)	<fk2>	not null
Nominal_Diameter_GCL	NUMBER(8,4)	<fk7>	null
Manufacturer_CL	VARCHAR2(16)	<fk3>	null
Tap_Method_GCL	VARCHAR2(16)	<fk5>	null
Specification_CL	VARCHAR2(16)	<fk4>	null
Nominal_Pressure_Rating	NUMBER(5)		null
Mill_Test_Pressure	NUMBER(5)		null
Date_Manufactured	DATE		null
Date_Installed	DATE		null
Description	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk6>	null
Comments	VARCHAR2(255)		null

Overview of sub-models

Geographic Features

Road
 Foreign_Line_Crossing
 Railroad
 Land_Use
 Right_of_Way
 Waterway

 Sheet_Note
 Routing_Note
 Geographic_Entity

- Not physical features of the pipeline
- Crossings or common features over wide geographic areas

Foreign_Line_Crossing			
Event_ID	NUMBER(16)	<pk,fk1,fk9>	not null
Event_GUID	CHAR(38)	<fk9>	null
Type_CL	VARCHAR2(16)	<fk8>	not null
Owner_CL	VARCHAR2(16)	<fk3>	null
Line_Clearance	NUMBER(4,1)		null
Material_CL	VARCHAR2(16)	<fk2>	null
Foreign_Diameter	NUMBER(6,3)		null
Crossing_Date	DATE		null
Intersection_Angle	NUMBER(3)		null
Source_Number	VARCHAR2(16)		null
Scaled_GCL	VARCHAR2(16)	<fk6>	null
Direction_GCL	VARCHAR2(16)	<fk7>	null
Width	NUMBER(4)		null

Road			
Event_ID	NUMBER(16)	<pk,fk1,fk9>	not null
Event_GUID	CHAR(38)	<fk9>	null
Type_CL	VARCHAR2(16)	<fk4>	not null
Surface_CL	VARCHAR2(16)	<fk2>	null
Intersection_Angle	NUMBER(3)		null
Source_Number	VARCHAR2(16)		null
Scaled_GCL	VARCHAR2(16)	<fk6>	null
Direction_GCL	VARCHAR2(16)	<fk7>	null
Width	NUMBER(4)		null
Geographic_Entity_ID	NUMBER(16)		null
Geographic_Entity_GUID	CHAR(38)		null
Description	VARCHAR2(50)		null
Line_Below_Ground_LF	VARCHAR2(1)		null
Crossing_Below_Ground	VARCHAR2(1)		null
Crossing_Below_Line	VARCHAR2(1)		null
Foreign_Bond_LF	VARCHAR2(1)		null
Source_GCL	VARCHAR2(16)		null
Comments	VARCHAR2(255)		null

Right_of_Way			
Event_ID	NUMBER(16)	<pk,fk1,fk5>	not null
Event_GUID	CHAR(38)	<fk5>	null
Type_CL	VARCHAR2(16)	<fk2>	not null
Parcel_Number	VARCHAR2(32)		null
Owner_Name	VARCHAR2(150)		null
Property_Width	NUMBER(10)		null
Easement_Width	NUMBER(10)		null
Address	VARCHAR2(255)		null
Geographic_Entity_ID	NUMBER(16)	<fk4,fk6>	null
Geographic_Entity_GUID	CHAR(38)	<fk6>	null
Description	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk3>	null
Comments	VARCHAR2(255)		null

Overview of sub-models

U.S. Regulatory Compliance

NPMS_Route
HCA_CA_Segment
DOT_Class
MAOP_Rating
Test_Pressure
Grandfather_Pressure
Leak_History, LH_Event
Depth_of_Cover
Odorant_Range

- *Critical data for regulatory compliance*

Test_Pressure			
Event_ID	NUMBER(16)	<pk,fk1,fk6>	not null
Event_GUID	CHAR(38)	<fk6>	null
Test_Type_CL	VARCHAR2(16)	<fk2>	not null
Test_Date	DATE		null
Test_Medium_CL	VARCHAR2(16)	<fk3>	not null
Test_Pressure	NUMBER(5)		not null
Duration_Hours	NUMBER(3)		null
Test_Station	NUMBER(10,1)		null
Test_Station_Elev	NUMBER(5)		null
Max_Elevation	NUMBER(5)		null
Min_Elevation	NUMBER(5)		null
Test_Distance	NUMBER(9,1)		null
Min_Pressure	NUMBER(5)		null
Max_Pressure	NUMBER(5)		null
Description	VARCHAR2(50)		null
Reason_CL	VARCHAR2(16)	<fk5>	null
Report_Number	VARCHAR2(15)		null
Source_GCL	VARCHAR2(16)	<fk4>	null
Comments			

Leak_History_Event			
Leak_ID	NUMBER(16)	<pk,fk1,fk2>	not null
Event_ID	NUMBER(16)	<pk,fk3,fk4>	not null
Leak_GUID	CHAR(38)	<fk2>	null
Event_GUID	CHAR(38)		

Leak_History			
Leak_ID	NUMBER(16)	<pk,ak>	not null
Leak_GUID	CHAR(38)	<ak>	null
Event_ID	NUMBER(16)	<fk1,fk6>	not null
Event_GUID	CHAR(38)	<fk6>	null
Leak_Date	DATE		null
Telephonic_Report_Date	DATE		null
NRC_Report_Number	NUMBER(6)		null
Environmental_Remediation_Cost	NUMBER(8,2)		null
City	VARCHAR2(50)		null
State_GCL	VARCHAR2(16)	<fk5>	null
Zip	NUMBER(6)		null
Leak_Report_Date	DATE		null
Product_Type_GCL	VARCHAR2(16)	<fk3>	null
Product_Subtype_GCL	VARCHAR2(16)	<fk3>	null
Volume_Lost	NUMBER(16)		null
Primary_Cause_CL	VARCHAR2(16)	<fk2>	not null
Lost_Product_Cost	NUMBER(8,2)		null
Business_Interruption_Cost	NUMBER(8,2)		null
Description	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk4>	null
Comments	VARCHAR2(255)		null

NPMS_Route			
Route_ID	NUMBER(16)	<pk,fk1,fk2>	not null
Route_GUID	CHAR(38)	<fk2>	null
OPS_ID	NUMBER(5)		null
Quality_CD_CL	CHAR(1)	<fk3>	null
Revision_CD_CL	CHAR(1)	<fk4>	null
Date_Last_Submitted	DATE		null
Meta_Name	CHAR(12)		null

Overview of sub-models

Event Reports / Comments

Comments
Report
Report_Cross_Ref
External_Document

- Can relate any other feature to a one or more comments or reports
- Flexible design for relating documents to events and reports

Comments			
Comments_ID	NUMBER(16)	<pk,ak,fk4>	not null
Comments_GUID	CHAR(38)	<ak,fk4>	null
Table_ID	VARCHAR2(16)	<fk3>	null
ID	NUMBER(16)		null
GUID	CHAR(38)		null
Comments	VARCHAR2(2000)		null
Comment_Date	DATE		null
Comment_By	VARCHAR2(50)		null
Source_GCL	VARCHAR2(16)	<fk2>	null
Original_Comments_ID	NUMBER(16)		null
Original_Comments_GUID	CHAR(38)		null
Effective_To_Date	DATE		null
Effective_From_Date	DATE		not null
Current_Indicator_LF	CHAR(1)		not null
PODS_User	VARCHAR2(20)		null
Create_Date	DATE		null
Previous_Comments_ID	NUMBER(16)	<fk1>	null
Previous_Comments_GUID	CHAR(38)		null

Report_Cross_Ref			
Report_Cross_Ref_ID	NUMBER(16)	<pk,ak>	not null
Report_Cross_Ref_GUID	CHAR(38)	<ak>	null
Report_ID	NUMBER(16)	<fk2,fk6>	not null
Report_GUID	CHAR(38)	<fk6>	null
Table_ID	VARCHAR2(16)	<fk4>	not null
ID	NUMBER(16)		null
GUID	CHAR(38)		null
Report_Cross_Ref_Status_CL	VARCHAR2(16)	<fk3>	null
Original_Report_Cross_Ref_ID	NUMBER(16)		null
Original_Report_Cross_Ref_GUID	CHAR(38)		null
Effective_To_Date	DATE		null
Effective_From_Date	DATE		not null
Current_Indicator_LF	CHAR(1)		not null
PODS_User	VARCHAR2(20)		null
Create_Date	DATE		null
Previous_Report_Cross_Ref_ID	NUMBER(16)	<fk1,fk5>	null
Previous_Report_Cross_Ref_GUID	CHAR(38)	<fk5>	null

Report			
Report_ID	NUMBER(16)	<pk,ak>	not null
Report_GUID	CHAR(38)	<ak>	null
Name	VARCHAR2(20)		null
Report_Date	DATE		null
Type_CL	VARCHAR2(16)	<fk2>	null
Remark	VARCHAR2(240)		null
Umbrella_Report_ID	NUMBER(16)	<fk1>	null
Status_CL	VARCHAR2(16)	<fk3>	null

External_Document			
External_Document_ID	NUMBER(16)	<pk,ak>	not null
External_Document_GUID	CHAR(38)	<ak>	null
Filepath	VARCHAR2(80)		null
Filename	VARCHAR2(18)		null
Report_ID	NUMBER(16)	<fk1,fk2>	not null
Report_GUID	CHAR(38)	<fk2>	null

Overview of sub-models

Features & Events (1)- How they relate

Feature_Table

FEATURE_ID	TYPE_CL	CATEGORY_CL	DESCRIPTION	TABLE_NAME	GAP_RULE_CL	OVERLAP_RULE_CL
PSEG	CLINEAR	PIPEFACILITY	Pipe Segment	PIPE_SEGMENT	N	N

Event_Range

EVENT_ID	EVENT_GUID	FEATURE_ID	PREVIOUS_EVENT_ID	STATION_ID_BEGIN	STATION_ID_END	STATION_GUID_BEGIN	STATION_GUID_END	PODS_USER	CREATE_DATE	ORIGINAL_EVENT_ID	EFFECTIVE_FROM_DATE	EFFECTIVE_TO_DATE	CURRENT_INDICATOR_LF
1001	{35429502}	PSEG	997	200	202	{354295023}	{37899502}	MIKEM	5/19/2002	995	4/19/2002	NULL	Y

Feature Table: PIPE_SEGMENT

EVENT_ID	EVENT_GUID	MANUFACTURER_CL	DATE_MANUFACTURED	PIPE_MILL_LOCATION_GCL	MILL_TEST_PRESSURE	MATERIAL_CL	PIPE_SPECIFICATION_GCL	PIPE_GRADE_GCL	SMYS_GCL	NOMINAL_DIAMETER_GCL	NOMINAL_WALL_THICKNESS_GCL	PIPE_LONG_SEAM_GCL	DATE_INSTALLED
1001	{35429502}	USSTEEL		PITTS	NULL	STEEL	API5L	B	X42	6	0.375	ERWH	10/31/1978

Features & Events (2)- How they relate

Event_Range

EVENT_ID	EVENT_GUID	FEATURE_ID	PREVIOUS_EVENT_ID	STATION_ID_BEGIN	STATION_ID_END	STATION_GUID_BEGIN	STATION_GUID_END	PODS_USER	CREATE_DATE	ORIGINAL_EVENT_ID	EFFECTIVE_FROM_DATE	EFFECTIVE_TO_DATE	CURRENT_INDICATOR_LF
1001	{35429502}	PSEG	997	200	202	{354295023}	{37899502}	MIKEM	5/19/2002	995	4/19/2002	NULL	Y

PIPE_SEGMENT event along route

Begin_Station_Id = 200

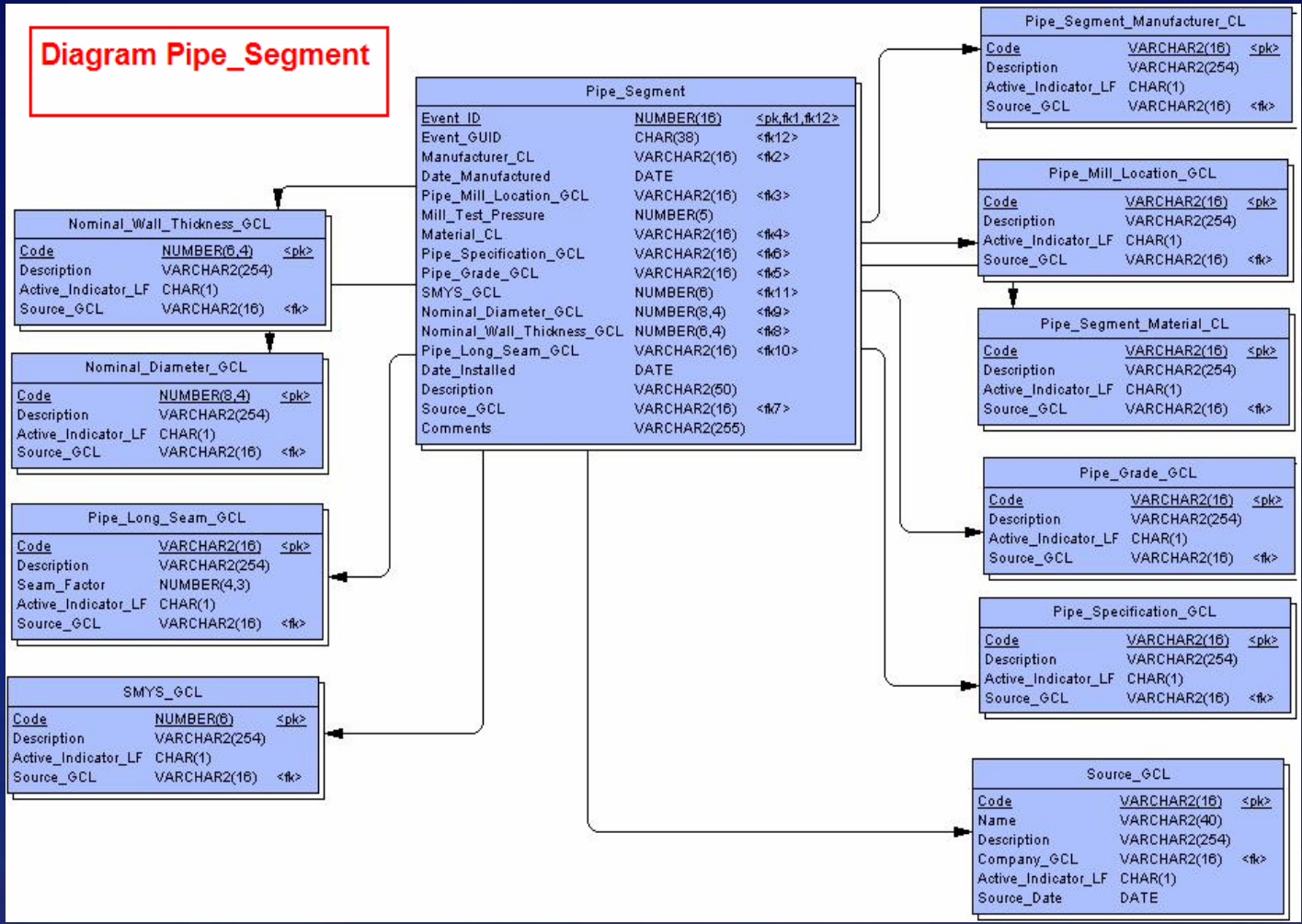
End_Station_Id = 202

Station_Point

STATION_ID	STATION
200	0
202	1500

• Station_Point - stores engineering station value

Features & Events (3) – Decoding code values





PIPELINE OPEN DATA STANDARD

Part II - Questions