



Common DFN Model ReadMe

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& THE DFN WORKING GROUP

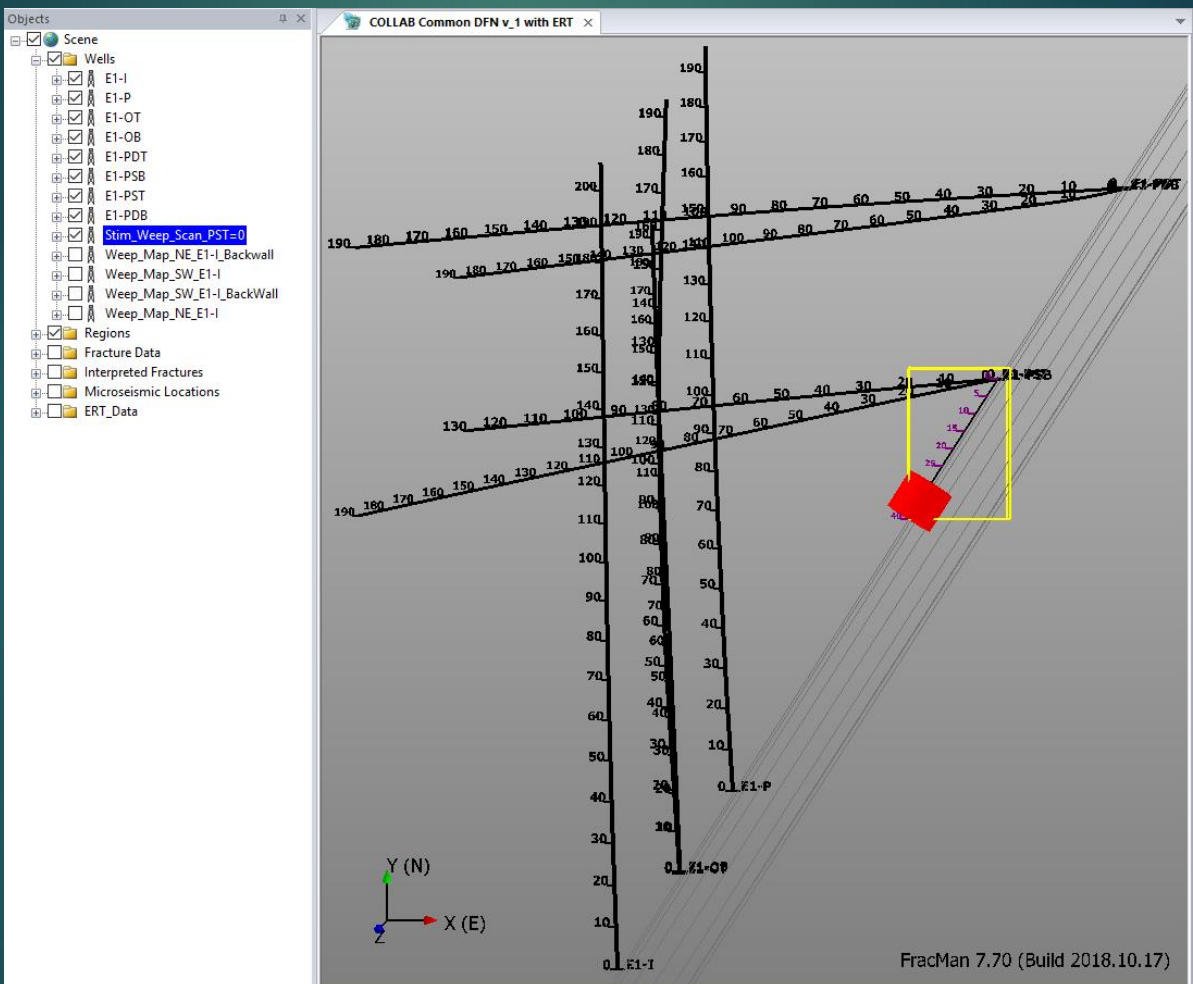


This visualization model has elements for a DFN...

BUT IT DOES NOT INDEPENDENTLY FUNCTION AS A DFN. THE INTENT HERE IS TO PROVIDE EGS COLLAB TEAM MEMBERS WITH A BASELINE, 'COMMON' FRACTURE FRAMEWORK – PRIMARILY IN TERMS OF LOCATION AND ORIENTATION. TEAM MEMBERS CAN THEN LEVERAGE THIS MODEL AND ITS COMPONENTS TO CUSTOMIZE, IMPORT, AND INTERPRET AS THEY SEE FIT. THE MODEL IS A WORK IN PROGRESS JUST AS THE EXPERIMENT IS IN PROGRESS – WE WILL KEEP IT UPDATED AS BEST WE CAN!

DRIFT, WELLS, & SCANLINES

- 4850 W Drift outlined
- Wells are labeled and annotated with depths in feet
- Scanlines were used for weep mapping along the drift, for example the weeping that was observed in the drift ~30-40 feet away from PST during the Oct/Nov 2018 injection/flow test @ 164' notch



DRIFT, WELLS, & SCANLINES

Fracture Export

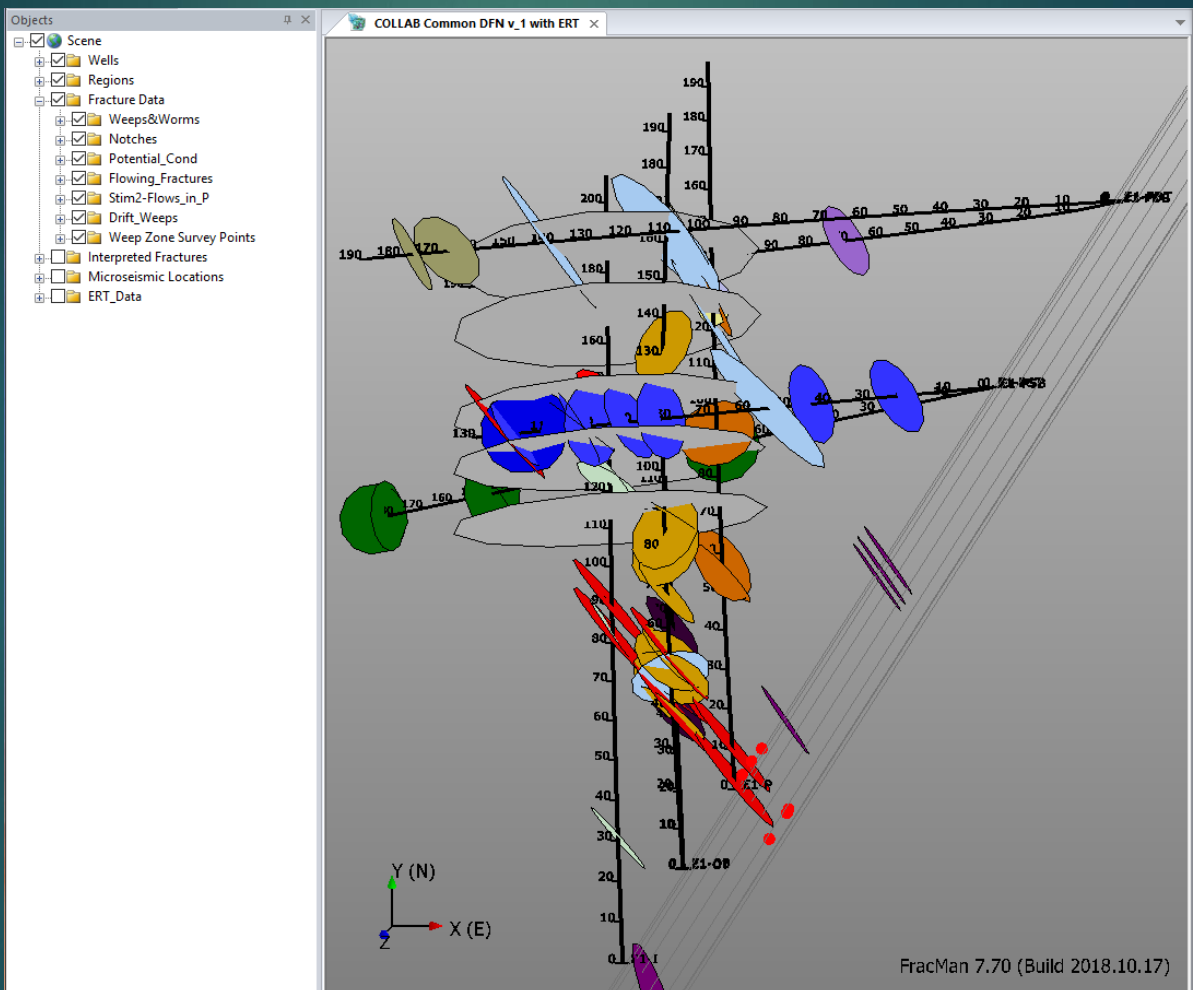
- Wells contain 'fracture log' databases that can be put into a spreadsheet, see also 'Common DFN Summary' – right click on the log and select 'View Data'
- **Note that fracture labels correspond to wells & depths (feet)**
- Many other fracture/DFN attributes also available

The screenshot displays a software interface for fracture analysis. On the left, a tree view shows a project structure with folders for 'Wells', 'Regions', 'Fracture Data', 'Weeps&Worms', 'Notches', 'Potential_Cond', 'Flowing_Fractures', 'Stim2-Flows_in_P', 'Drift_Weeps', 'Weep Zone Survey Points', 'Interpreted Fractures', 'Microseismic Locations', and 'ERT_Data'. A context menu is open over the 'Well_Fracture' folder, with 'View Data' selected. The main window shows a plot of fracture logs with depth on the y-axis (130 to 190) and distance on the x-axis (100 to 200). A yellow highlight is on a specific log. Below the plot, a table titled 'Well_Fracture_Intersection_7E1-OT_Log_1 Faces' provides detailed data for each fracture.

Z[m]	Area[m2]	EquivRadius[m]	Strike[deg]	DipAngle[deg]	Fracture_Radius[m]	Face_Radius[m]	FracSet	ParentWell
1403	706.85834	15.000000	140.00000	90.000000	15.000000	15.000000	OT-40_2	E1-OT
1085	314.15927	10.000000	130.00000	75.000000	10.000000	10.000000	OT-39_1	E1-OT
1403	1231.6300	19.799999	140.00000	90.000000	19.799999	19.799999	OT-40_2_Copy_1	E1-OT
1435	26507.188	91.855865	140.00000	90.000000	91.855865	91.855865	Weep_1	E1-OT
1430	314.15927	10.000000	114.00000	50.000000	10.000000	10.000000	OT-47_1	E1-OT
1161	314.15927	10.000000	68.000000	51.000000	10.000000	10.000000	OT-48_2	E1-OT
1217	307.90750	9.8999996	140.00000	90.000000	9.8999996	9.8999996	OT-53_1_Copy_1	E1-OT
1217	706.85834	15.000000	140.00000	90.000000	15.000000	15.000000	OT-53_1	E1-OT
1763	314.15927	10.000000	138.00000	82.000000	10.000000	10.000000	OT-53_2	E1-OT
1613	314.15927	10.000000	127.00000	60.000000	10.000000	10.000000	OT-52_1	E1-OT
1556	314.15927	10.000000	138.00000	82.000000	10.000000	10.000000	OT-68_1	E1-OT
1000	314.15927	10.000000	39.000000	41.000000	10.000000	10.000000	OT-79_2	E1-OT
1583	4417.8647	37.500000	148.00000	90.000000	37.500000	37.500000	DTS-Stim3_1	E1-OT
1807	15786.505	70.887238	135.35896	90.000000	70.887238	70.887238	Intermediate_Zone	E1-OT
1796	314.15927	10.000000	38.000000	42.000000	10.000000	10.000000	OT-84_1	E1-OT
1923	314.15927	10.000000	120.00000	84.000000	10.000000	10.000000	OT-89_2	E1-OT
1923	1231.6299	19.799999	120.00000	84.000000	19.799999	19.799999	OT-89_2_Copy_1	E1-OT
1641	5026.5483	40.000000	85.000000	80.699997	40.000000	40.000000	Notch_112	E1-OT
1885	5026.5483	40.000000	85.000000	80.699997	40.000000	40.000000	Notch_128	E1-OT
1353	5026.5483	40.000000	85.000000	80.699997	40.000000	40.000000	Notch_141	E1-OT
1716	314.15927	10.000000	28.600000	48.500000	10.000000	10.000000	OT-132_1	E1-OT
1415	5026.5483	40.000000	85.000000	80.699997	40.000000	40.000000	Notch_164	E1-OT
1523	3848.4512	35.000000	66.181442	81.000000	35.000000	35.000000	Stim2_1	E1-OT
1177	9700.5527	55.567814	139.89999	88.712021	55.567814	55.567814	Tracer_Connection_Drift_1	E1-OT
1792	5026.5483	40.000000	85.000000	80.699997	40.000000	40.000000	Notch_183	E1-OT
1177	9700.5527	55.567814	139.89999	88.712021	55.567814	55.567814	Tracer_Connection_Drift_2	E1-OT
1124	7862.8491	50.028217	150.06540	90.000000	50.028217	50.028217	OT-P Connector	E1-OT
1053	1401.3212	21.119999	136.53999	78.750000	21.119999	21.119999	OT-161_2_Copy_1	E1-OT
1053	1256.6370	20.000000	136.53999	78.750000	20.000000	20.000000	OT-161_2	E1-OT
1136	1231.6300	19.800001	147.00000	88.000000	19.800001	19.800001	PDT-107_1_Copy_1	E1-OT

FRACTURE DATA

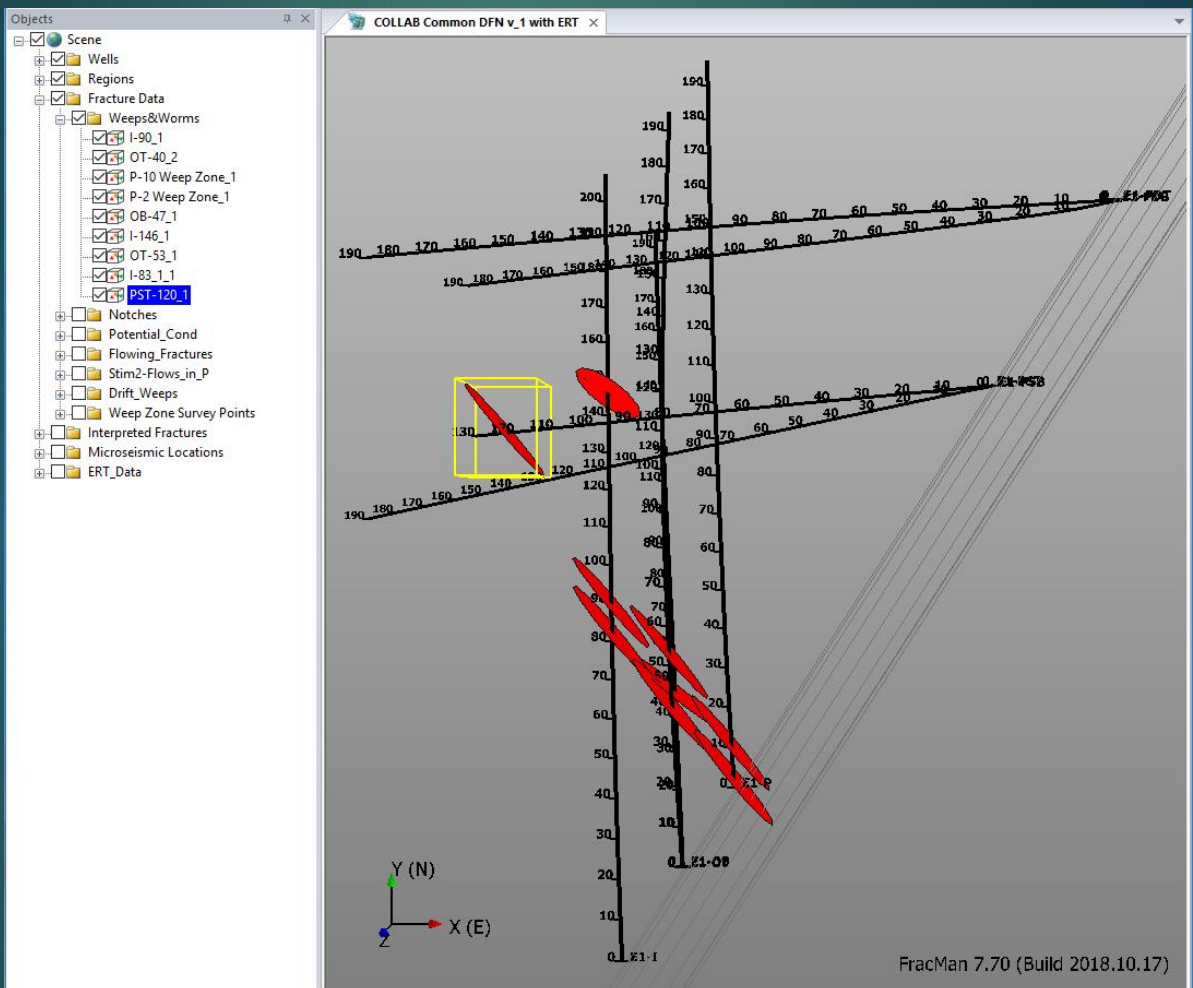
Features in this group have been 'ground-truthed'. These were identified by examining the drift, the core, and downhole camera footage.



FRACTURE DATA

Weeps & Worms

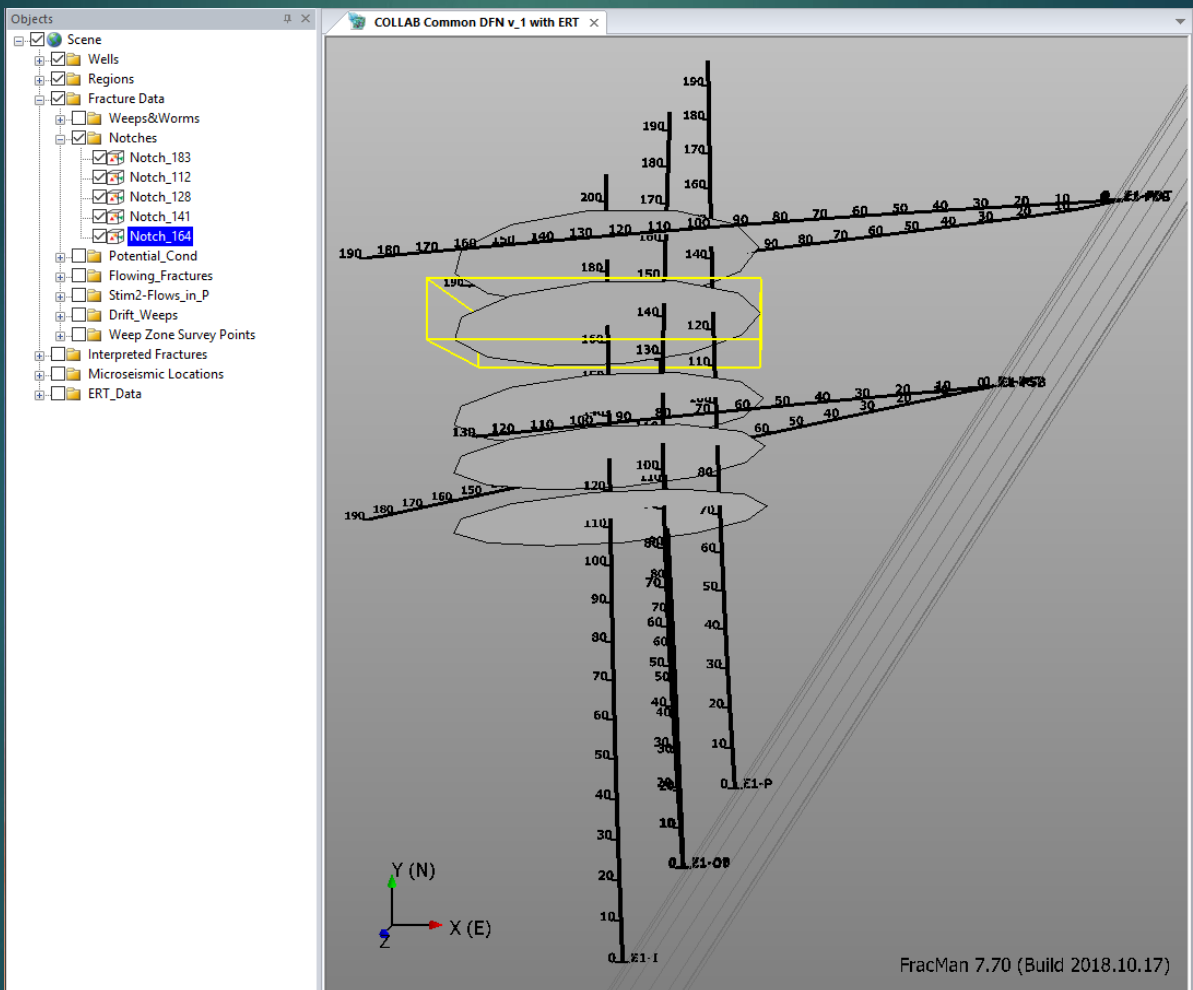
- Primarily weep Zone on Drift at E1-P Collar
- Zones of high fracture intensity, breccia, dissolution
- Bounds not oriented in general, set at pole 50,0
- Zone in PST uncertain in orientation



FRACTURE DATA

Notches

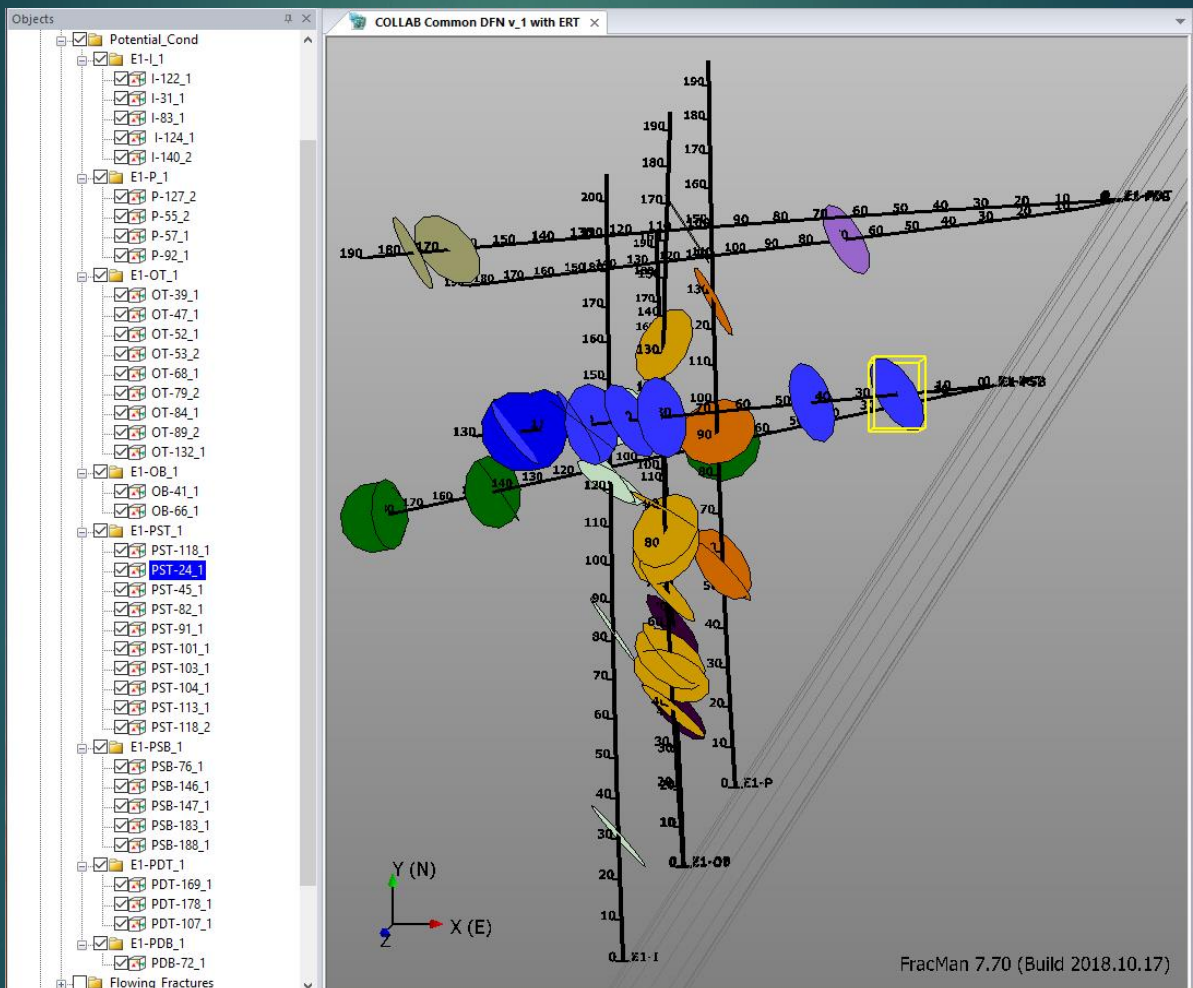
- Displayed as 'penny cracks'
- Depth registered to optical televiewer
- Normal to KISMET σ_{Hmin} (pole 355,9.3)



FRACTURE DATA

Potential Conductors

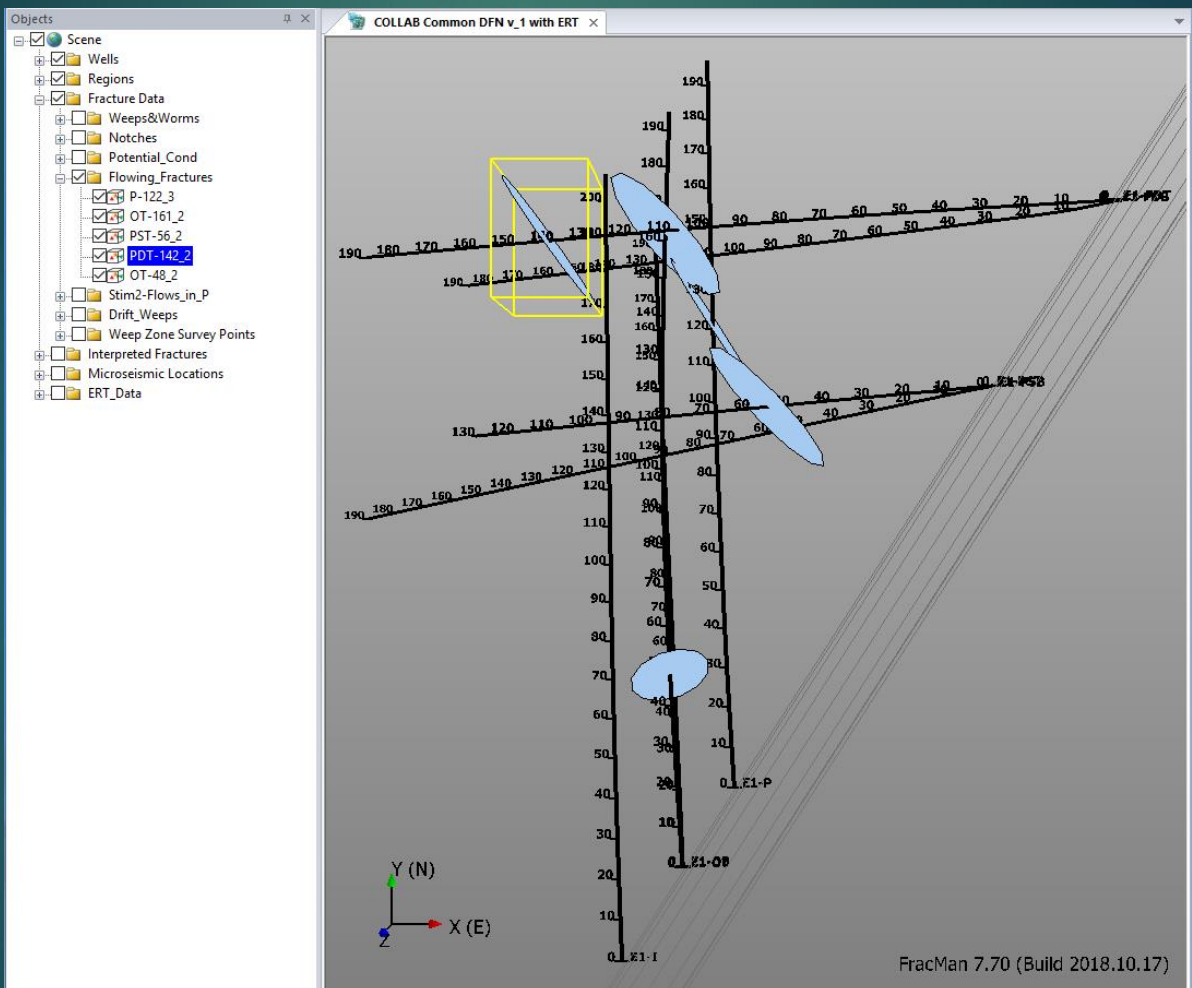
- Identified during Sep 2018 core review
 - Single-well intersections – extents not constrained
- Color-coded by well intersection



FRACTURE DATA

Flowing Fractures

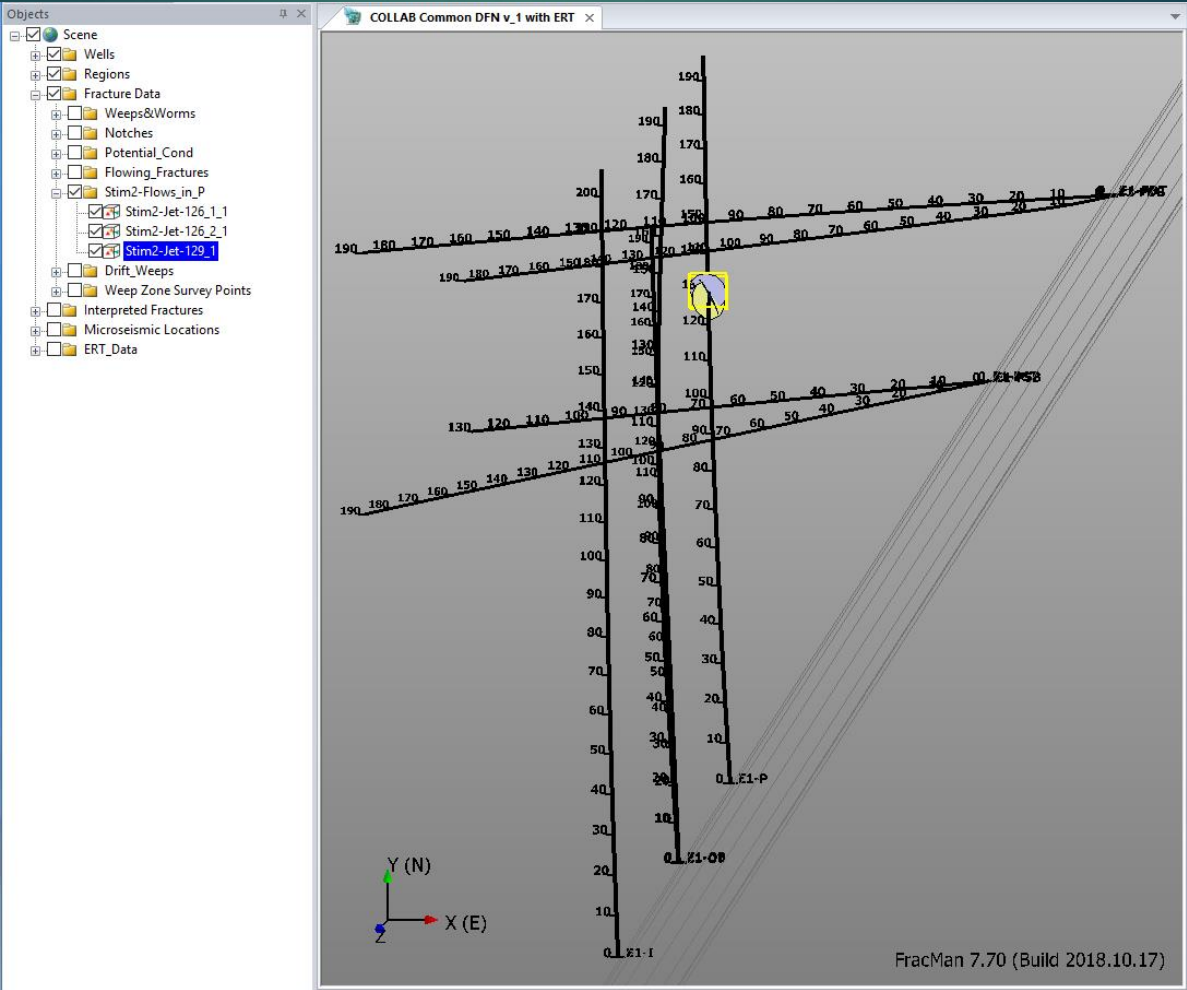
- Identified during Feb 2018 flow testing w/ downhole camera
 - P-122 & OT-161 showed connection
 - PDT-142 showed connection when flowed into E1-I, but flow into E1-PDT did not reveal connection to E1-I
 - OT-48 & PST-56 were free-flowing fractures – no discernable connection to other wells



FRACTURE DATA

'Stim 2' Flows in P

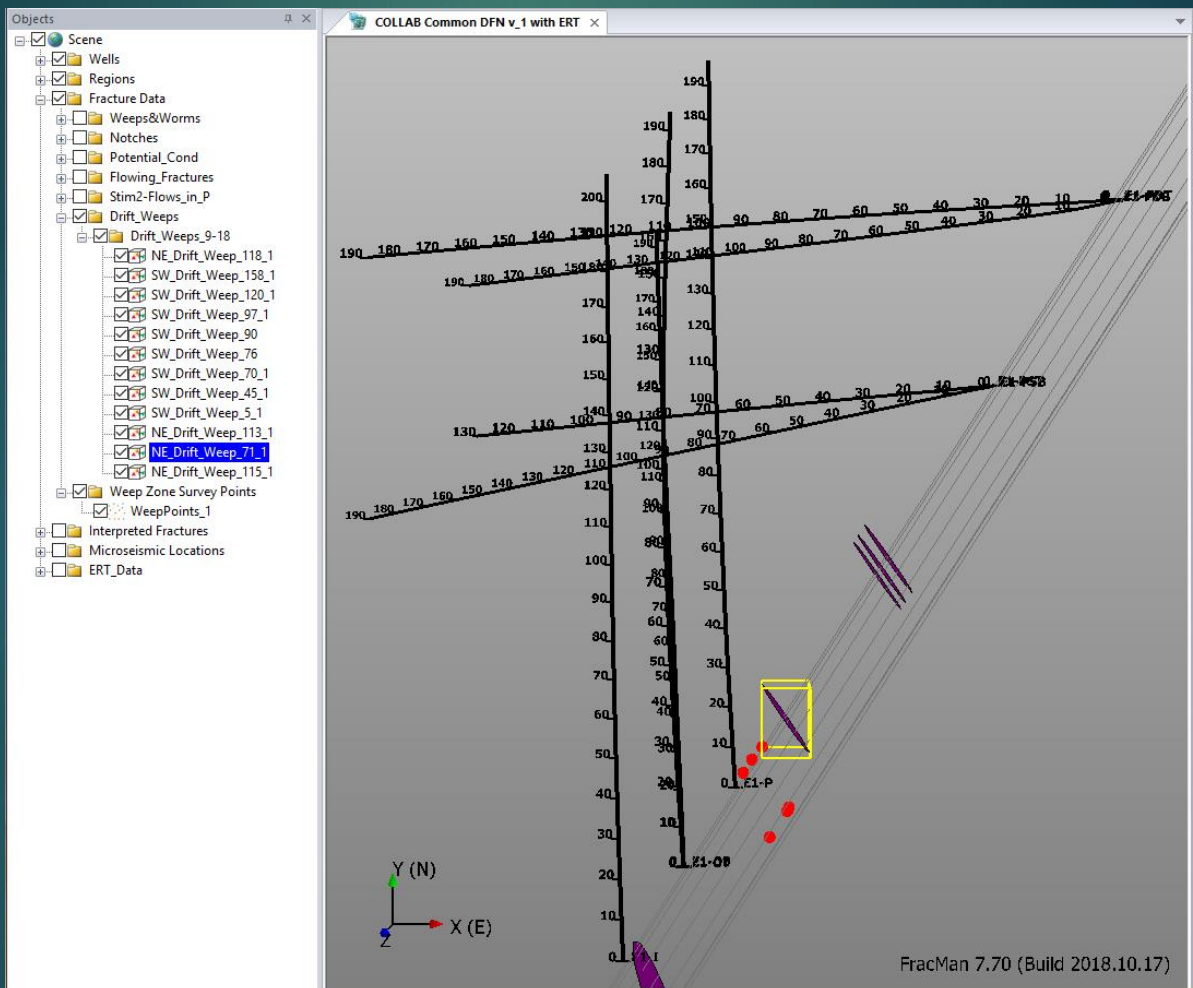
- Identified during May 2018 injection at Notch 164 in E1-I – jet flows observed via downhole camera in E1-P



FRACTURE DATA

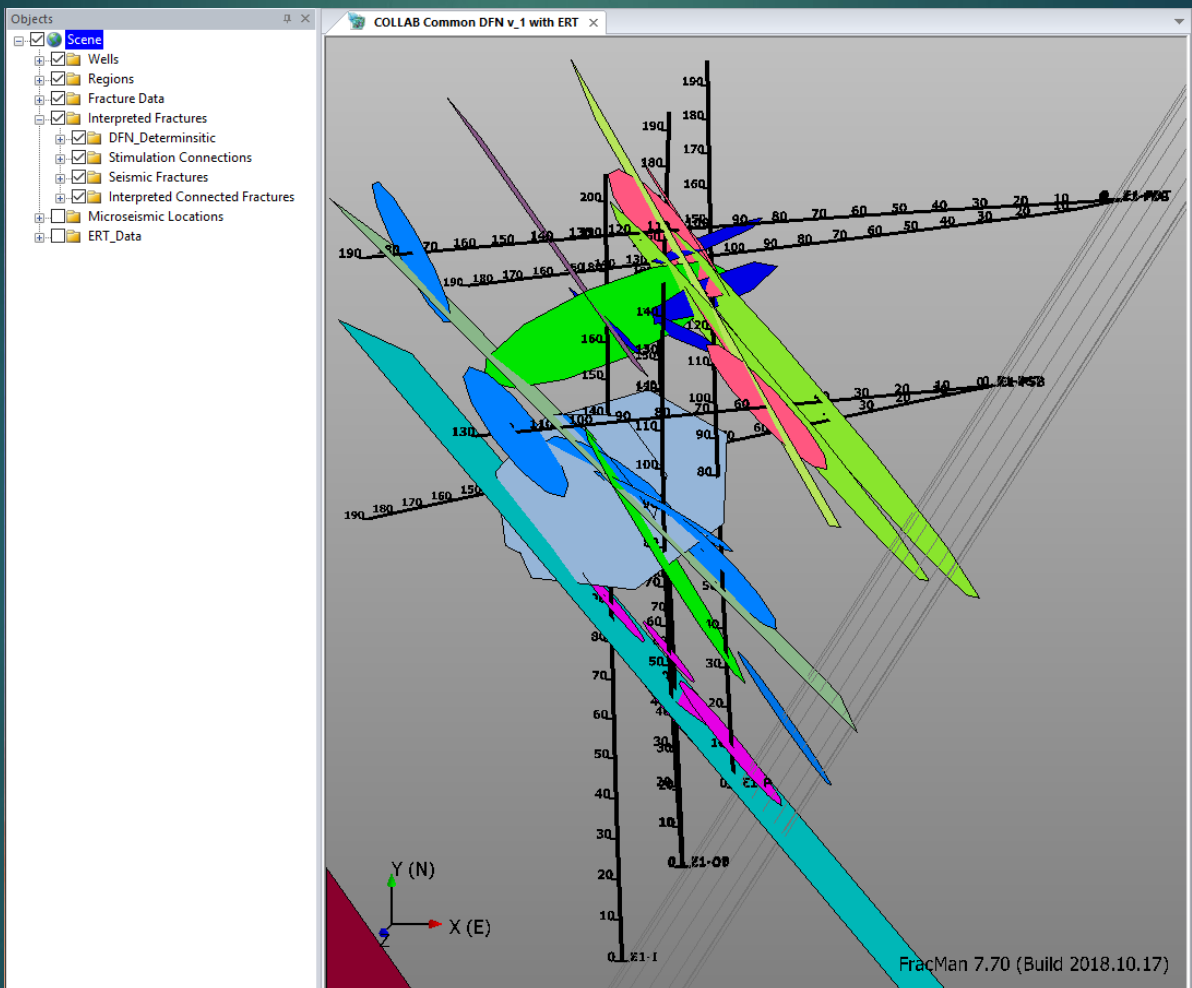
Drift Weeps

- Mapping of seeps and encrustations on drift Sep 2018
- Uncertain: 10' radius. One drift wall, encrustations only up to ~ 3';
- Likely: 20' radius. Two walls, higher encrustations, possible drips
- Certain: 40' radius, two walls and crown, observable seepage
- Orientation from Bill R's notes. If none, Pole = (55,0)
- Points are surveyed edges of Main Weep Zone



INTERPRETED FRACTURES

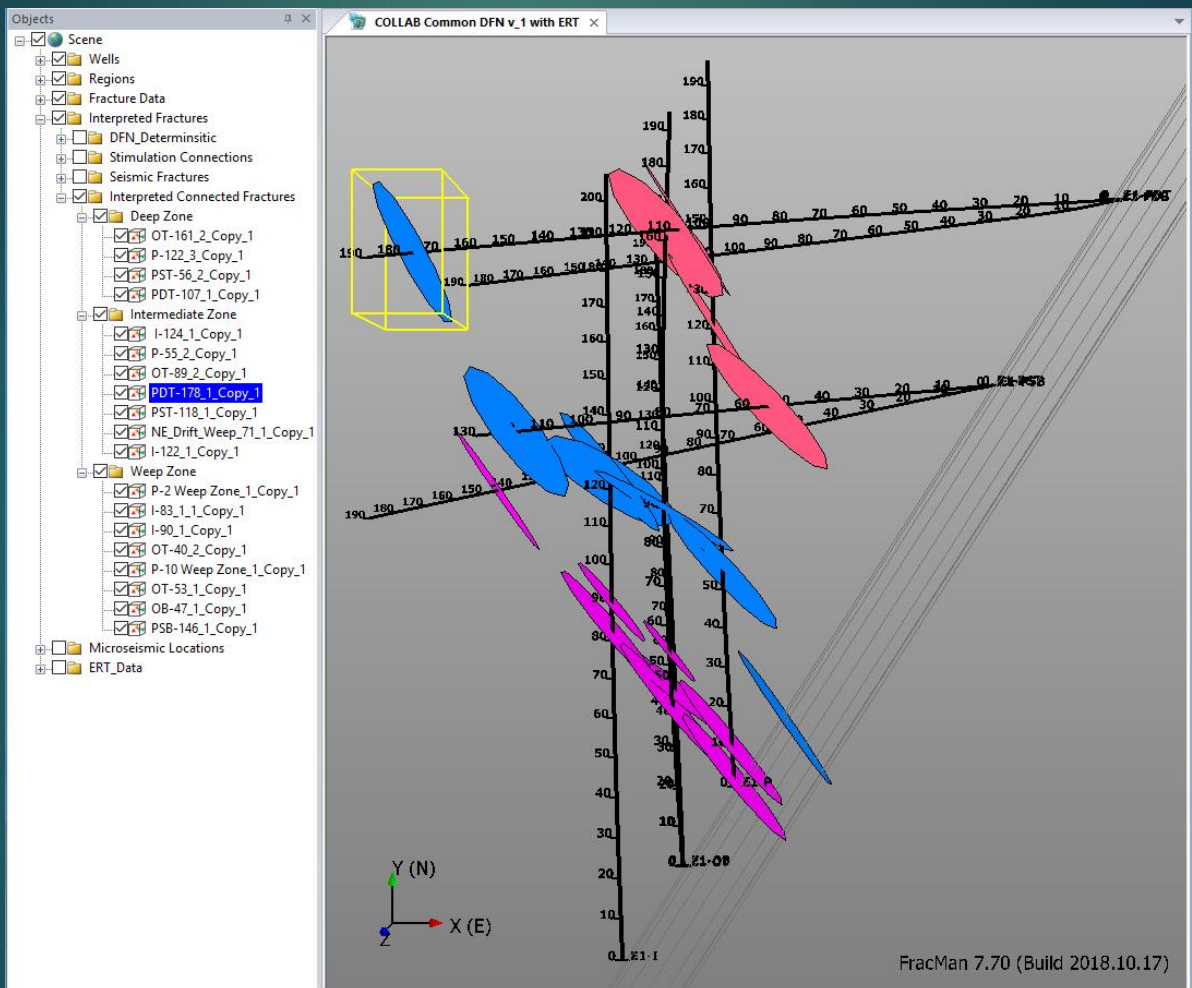
Features in this category are inferred from geophysical data, hypothesized from stim/flow observations, and grouped/extrapolated by possible but not necessarily verified connectivity.



INTERPRETED FRACTURES

Interpreted Fracture Zones

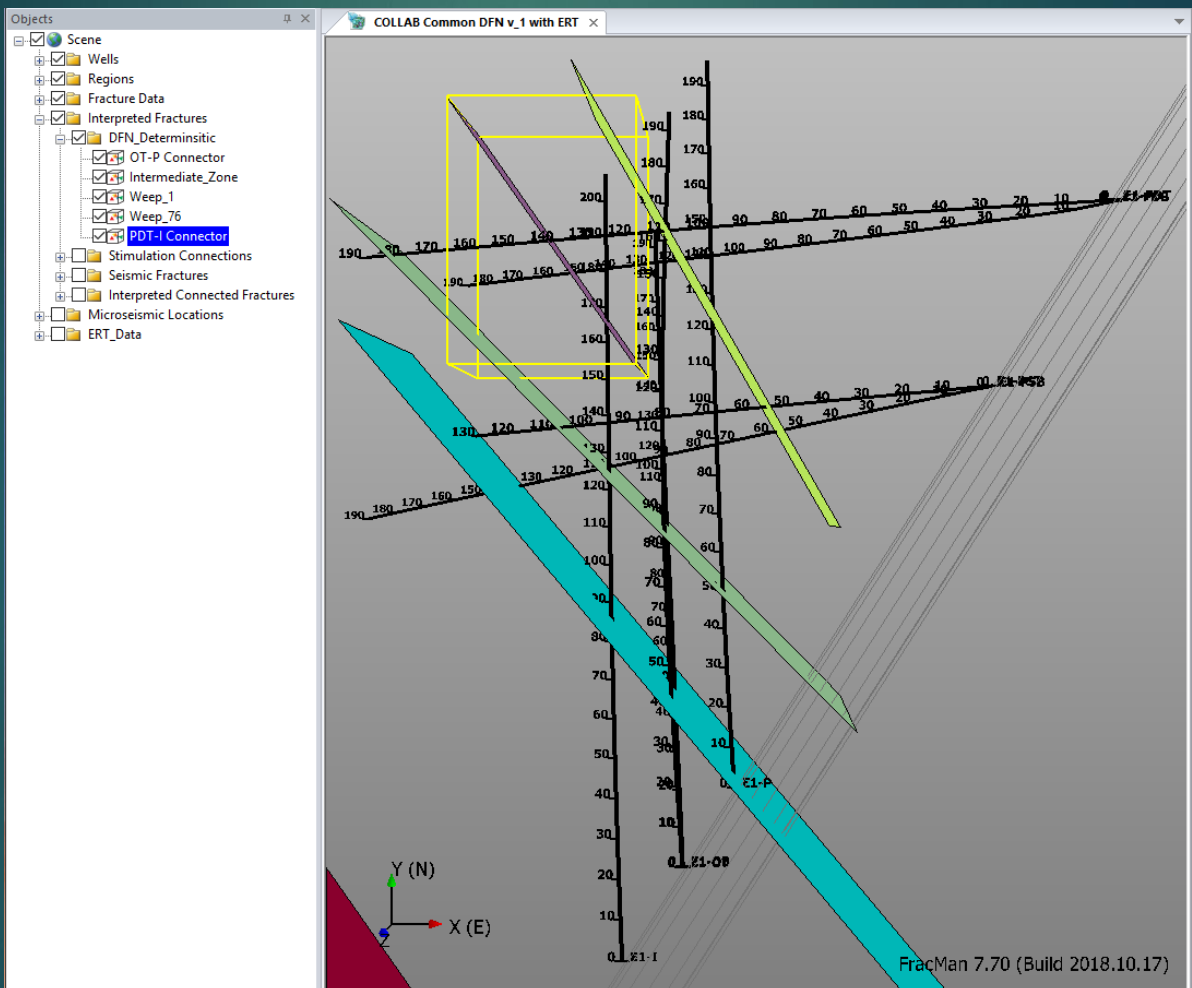
- Three 'main zones' of inferred connectivity – weep, intermediate, deep
 - Weep = weep zone from drift and 'weeps & worms' alignment
 - Intermediate = inferred from fracture alignment
 - Deep = OT-P connector and inferred fracture alignment



INTERPRETED FRACTURES

Deterministic DFN Planes

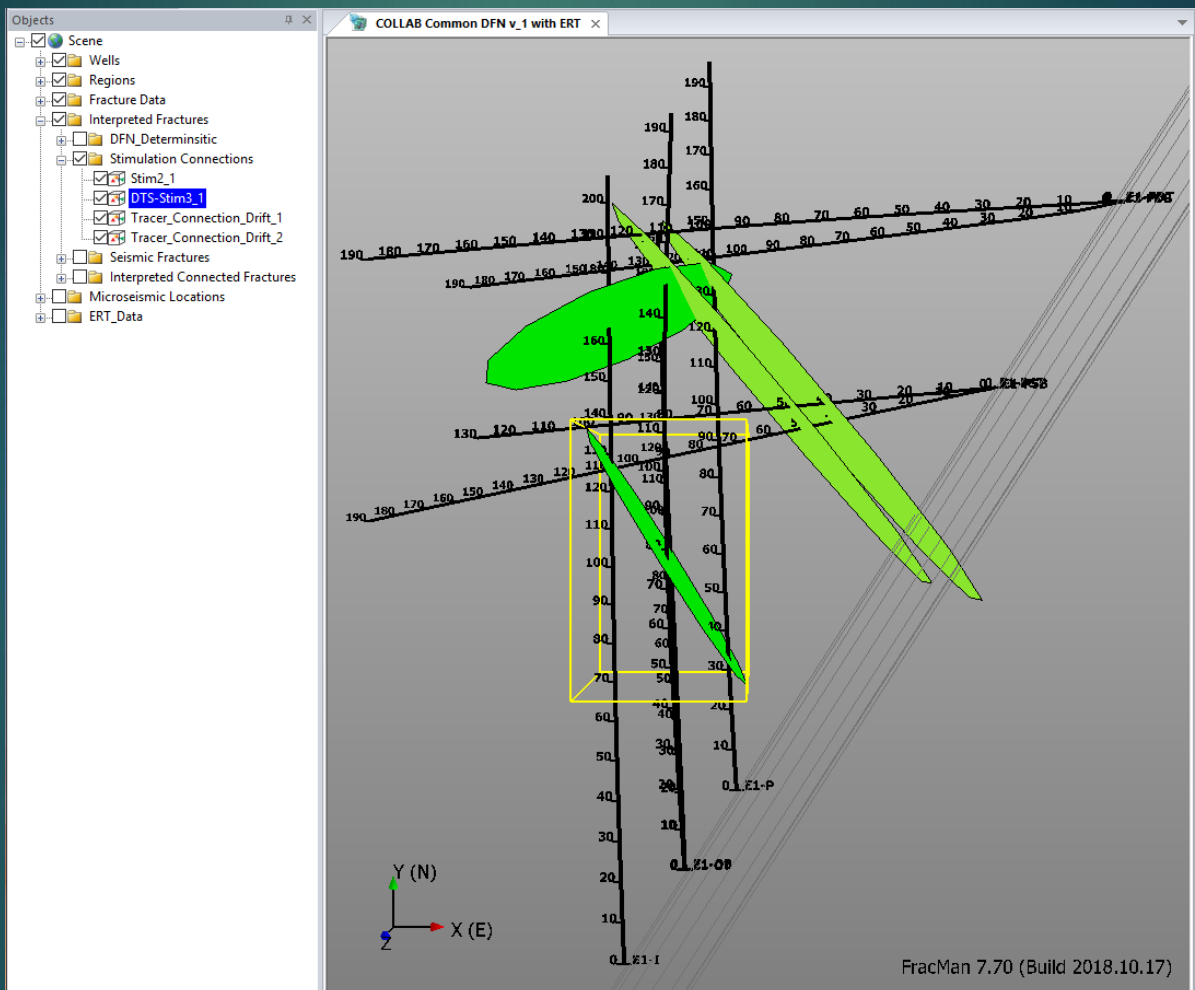
- Fit to interpreted zones of possible/likely connectivity
 - OT-P connector and other fractures in that approx. alignment
 - Hypothesized intermediate fracture zone
 - Weep_1 = weep zone from drift and 'weeps & worms'
 - Weep_76 = weep zone identified towards Gov's corner
 - PDT-I connector extrapolated from PDT frac that flowed from I



INTERPRETED FRACTURES

Stimulation Connections

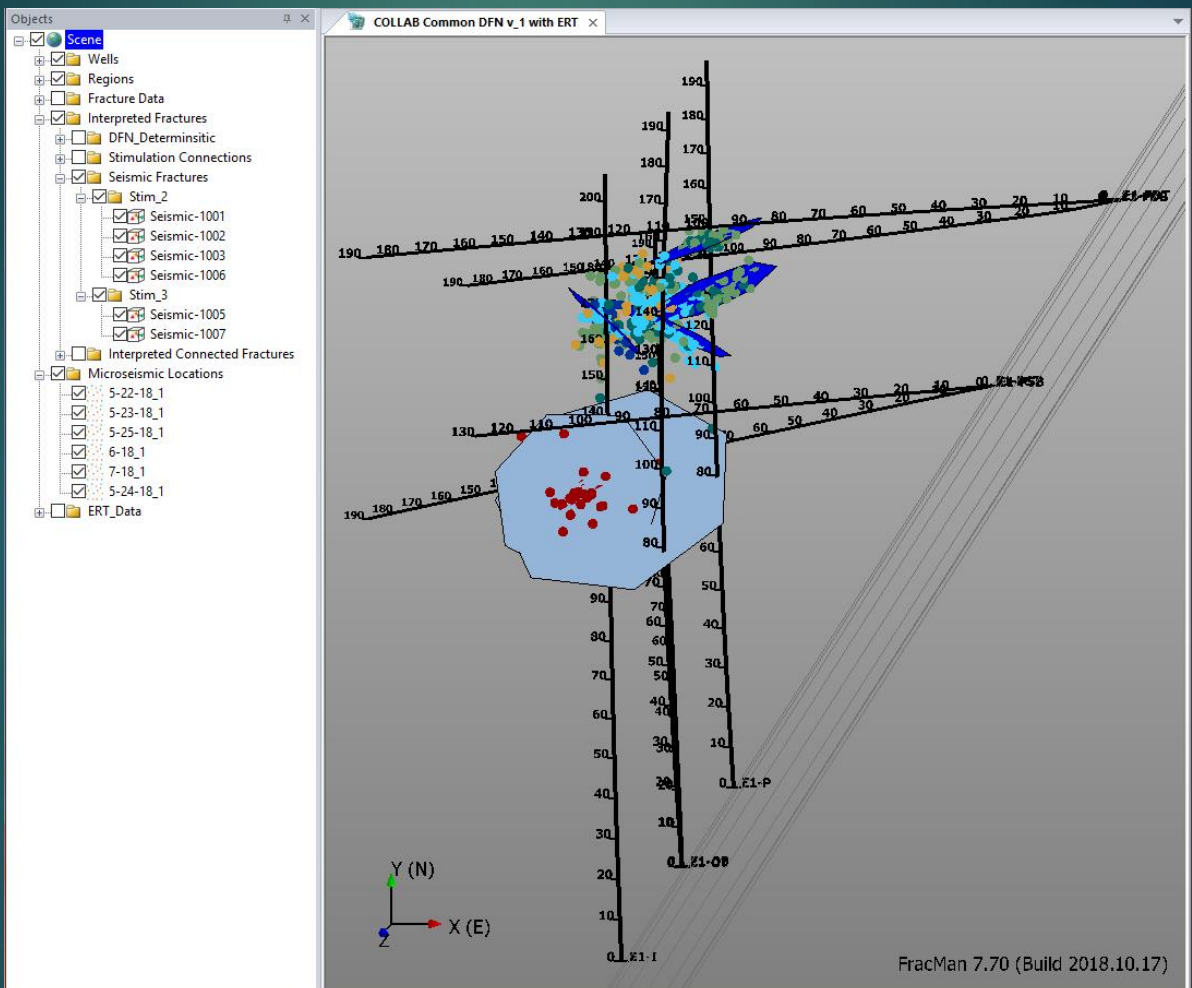
- Connections inferred from stim/flow testing
 - Stim 2 = injection at 164' notch and apparent intersection w/ E1-P
 - DTS Stim 3 = injection at 128' notch and apparent intersection w/ E1-OT
 - Tracer Connections = injection at 164' notch and apparent drift intersection



INTERPRETED FRACTURES

Seismic Fractures

- Interpreted fracture plane fits to hypocenter point clouds
- Note dates of hypocenter clouds (Mo-Dy-Yr)



GEOPHYSICAL VISUALS

Electrical Resistivity Tomo

- From ERT baseline characterization phase
- Point clouds in 'slice zones' for examination
- Right-click to visualize conductivity
- For visualization/interpretation use

