Hackathon Data Definitions

1. Well ID

Unique number assigned to each well.

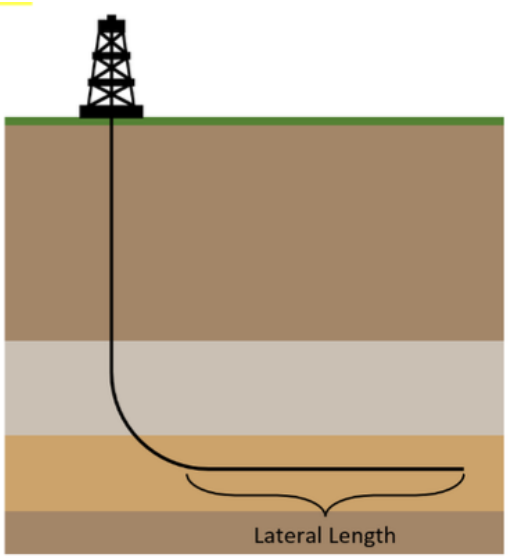
2. Avg Pump Difference
Pump difference (gal/min) is the fluid pumped into the well minus the fluid that is returning to surface. If pump difference is 0 gal/min, for every one barrel of fluid that is being pumped into the well, one barrel is returning to surface. If pump difference is positive, fluid is being lost to the formation (more fluid is being pumped into the well than is returning to surface). A pump difference reading is usually recorded for each stage, but you have been given the average reading across the entire well.

3. Area

The field is divided into smaller areas and wells in the same area are near one-another.

4. Lateral Length

Length of the lateral section of the well in feet.

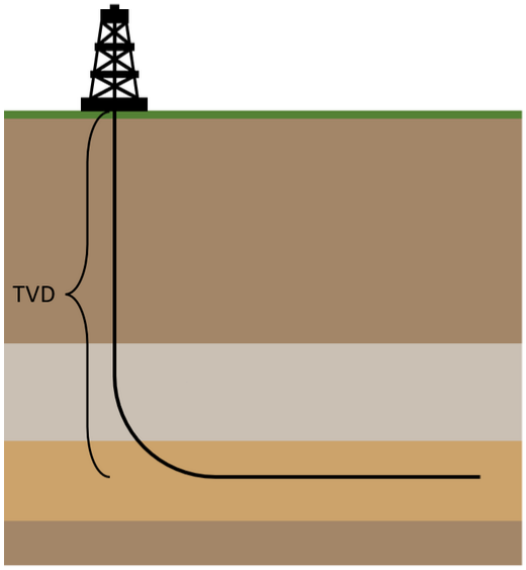


5. Fluid System

Wells can be drilled out with fluids that vary in properties such as density, viscosity, etc. A fluid system represents what type of fluid that was used to drill the well out.

6. TVD

Total Vertical Depth of the well in feet.



7. Development Strategy
This refers to how wells were placed in the reservoir. When there are multiple formations, some may be targeted while others are not. The development strategy can also describe where wells are located relative to one another (offset from one another, directly above or below one another, etc). Below is a gun barrel with examples of 3 potential development strategies.

8. DELAYED

A well is delayed if it has 2 or more parent wells with an average hypotenuse value of less than 1500ft. Parent wells are wells that POP'd more than 60 days earlier than the subject well.

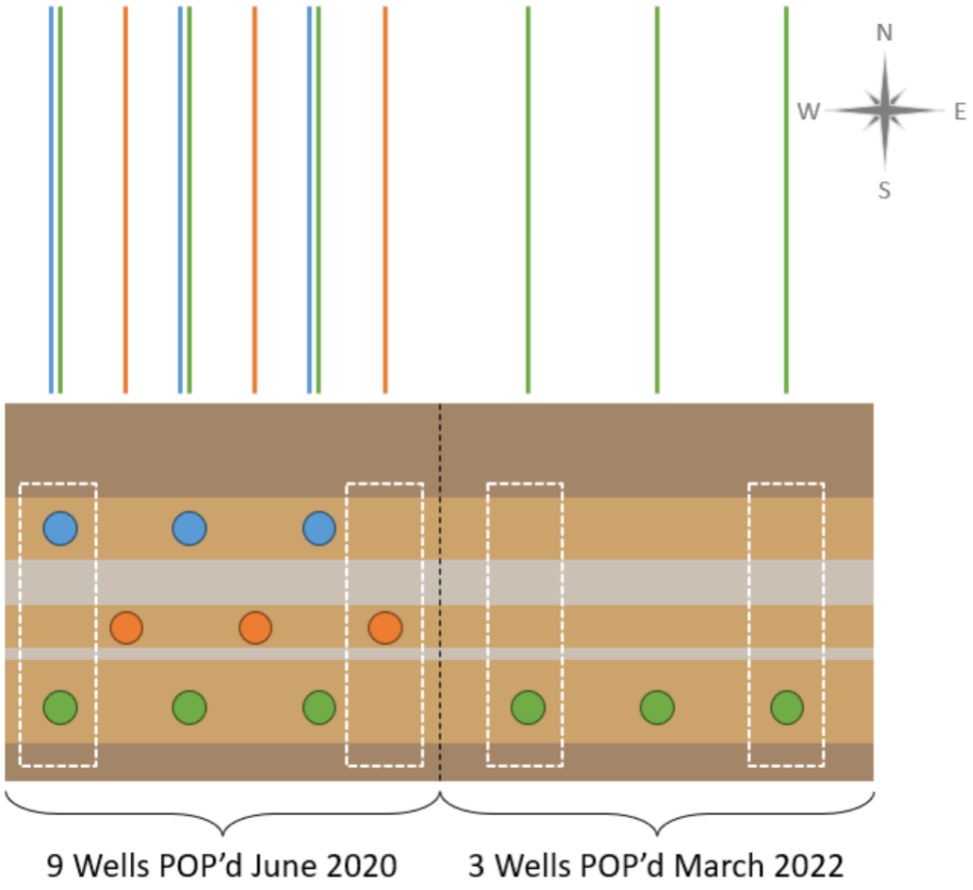
9. BOUND_CODE

This code represents whether offset wells exist near the wellbore, from a gun barrel view. The region near the wellbore is divided into 8 sections and if an offset well is present, that section is represented by a '1'. If there are no wells in a section, then it is represented by a '0'. Starting from the West and moving clockwise, the values for each section are concatenated to produce an 8-character binary code.

10. CODEV_POSITION

Within the codevelopment, the edge wells are the wells that do not have other wells on one side when viewed from above. Unlike in CODEV_FORMATION_POSITION, the formation does not matter. When wells are

stacked above one another (within 100ft map distance), like the blue and green well, they are both considered edge wells. Below is a map view and a gun barrel illustration of the same wells. In the gun barrel, the edge wells are shown in the white boxes. Note that there are two codevelopments, each with their own edge wells.



11. CODEV_FORMATION_POSITION

Within each formation in the codevelopment, the edge wells are the wells that do not have wells on one side when viewed from above. Below is a map view and a gun barrel illustration of the same wells. In the gun barrel, the edge wells are shown in the white boxes. Note that there are two codevelopments, each with their own edge wells.

12. PARENT_CODEV_1050_WELL_COUNT

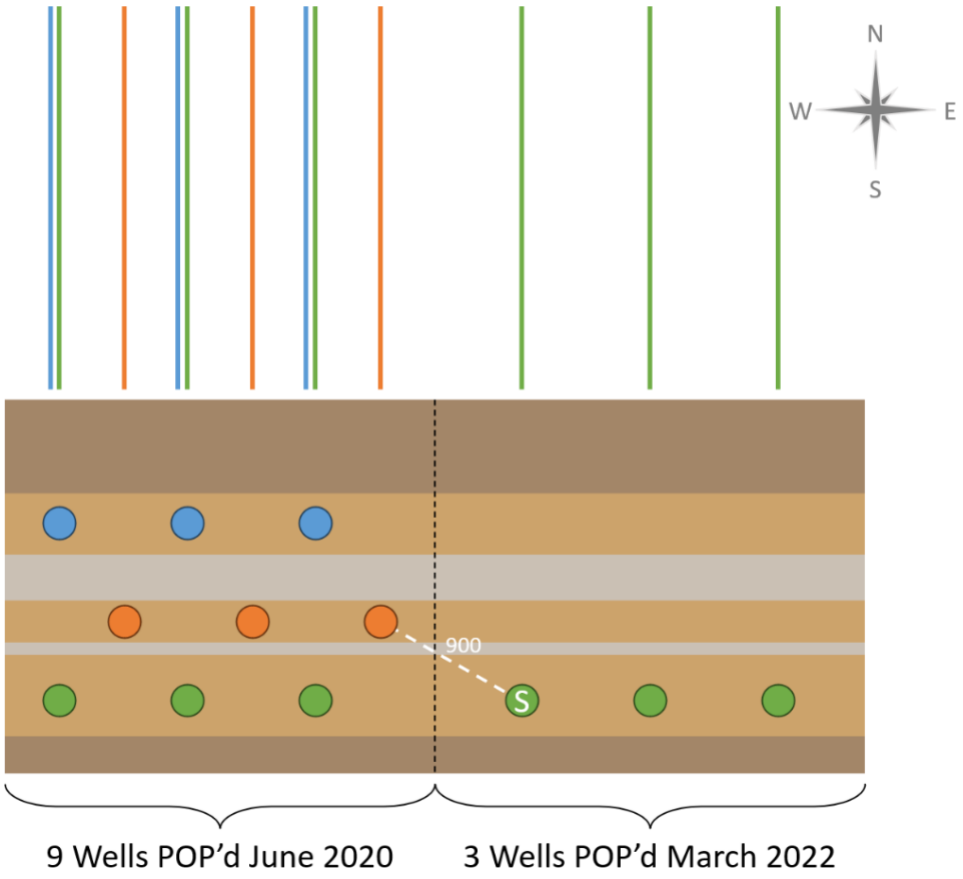
The number of wells that were either put on production (POP'd) more than 60 days before the subject well was POP'd (parent wells) or were POP'd within 60 days of the subject well (codev wells) and have a hypotenuse distance of 1050ft or less.

13. PARENT_IN_ZONE_MIN_HYPOT

The hypotenuse distance to the nearest parent well in the same formation. Note, ‘S’ is the subject well.

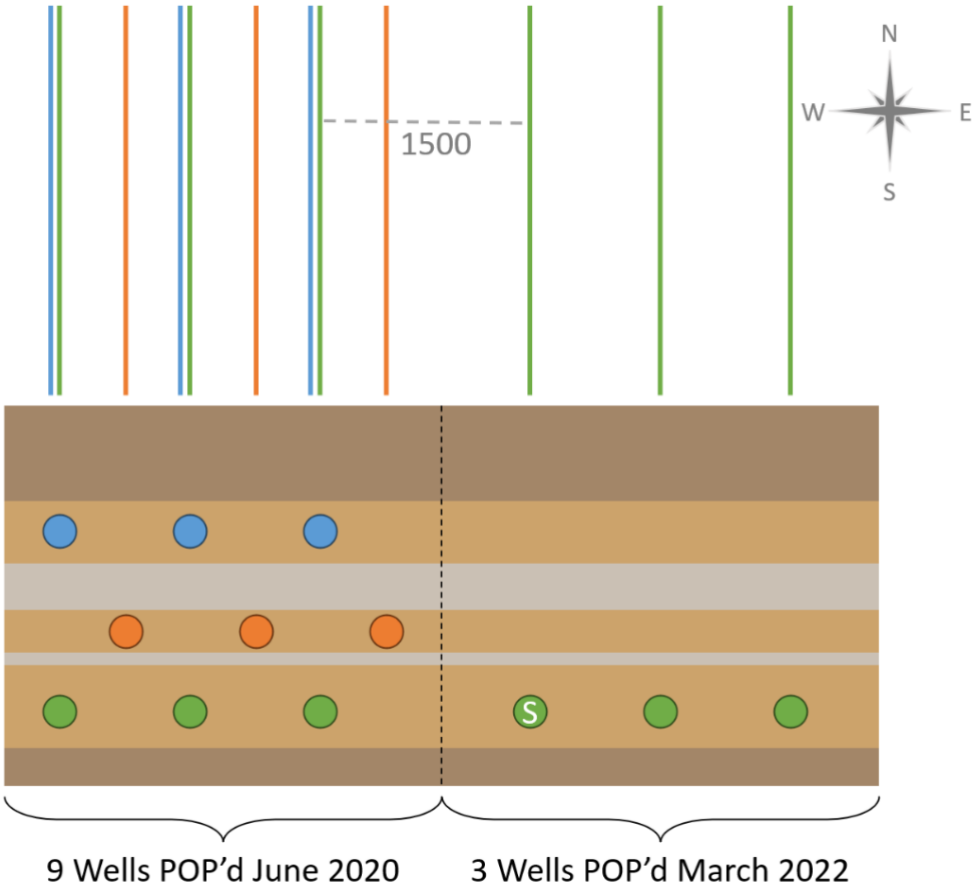
14. PARENT_OUT_ZONE_MIN_HYPOT

The hypotenuse distance to the nearest parent well in a different formation. Note, ‘S’ is the subject well.



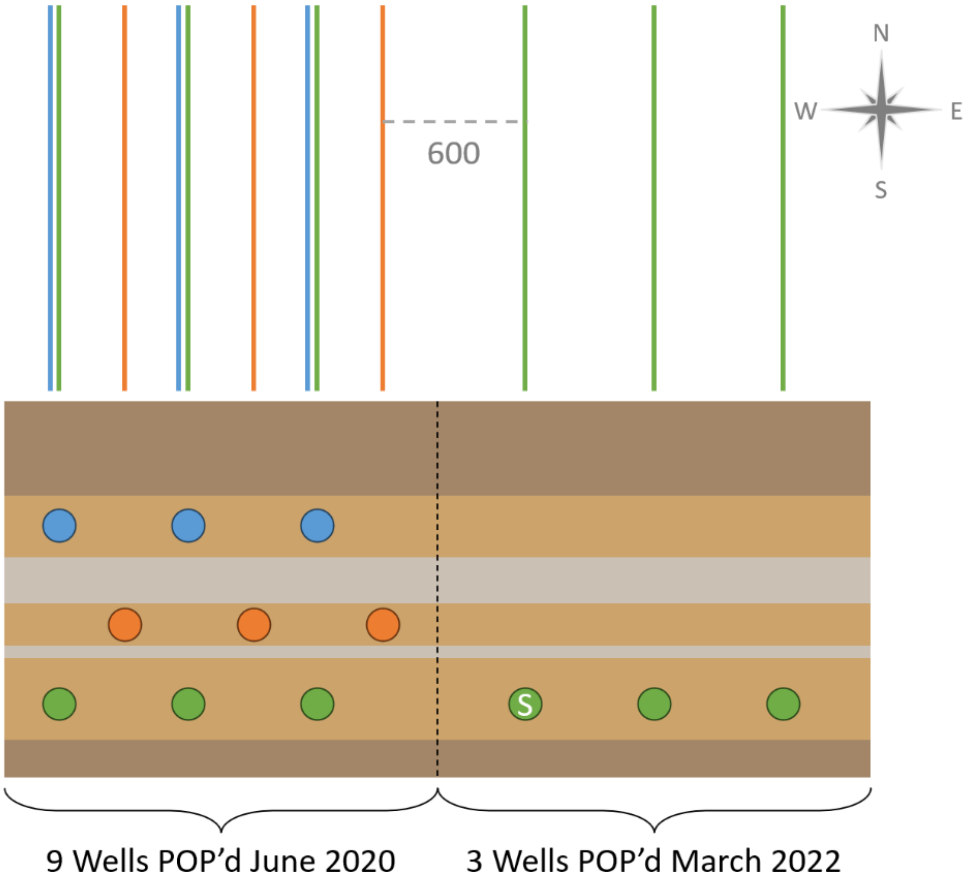
15. PARENT_IN_ZONE_MIN_MAP_DIST

The map distance to the nearest parent well in the same formation. Note, ‘S’ is the subject well.



16. PARENT_OUT_ZONE_MIN_MAP_DIST

The map distance to the nearest parent well in a different formation. Note, 'S' is the subject well.



17. PARENT_1050_AVG_WELL_AGE

Average age (in days) of the wells that were POP'd more than 60 days before the subject well was POP'd and have a hypotenuse distance of 1050ft or less.

18. PARENT_1050_MEDIAN_WELL_AGE

Median age (in days) of the wells that were POP'd more than 60 days before the subject well was POP'd and have a hypotenuse distance of 1050ft or less.

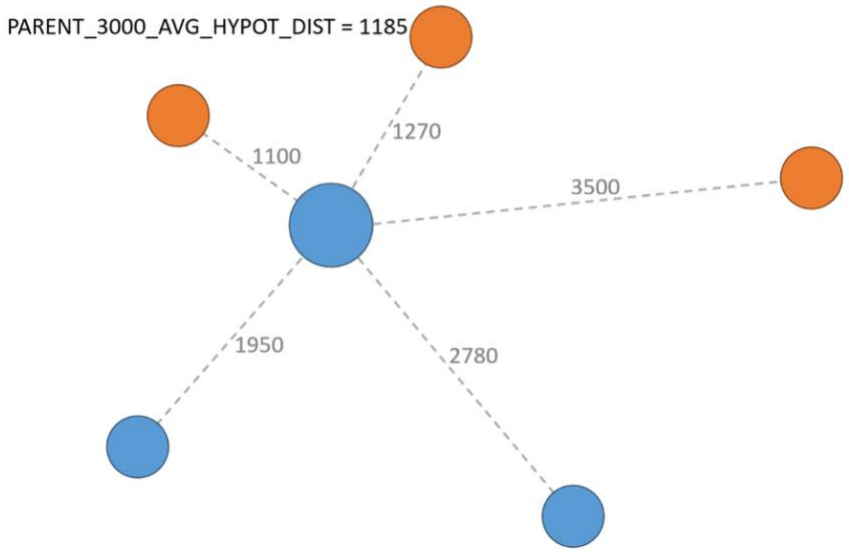
19. PARENT_1050_WELL_COUNT

The number of wells that were put on production (POP'd) more than 60 days before the subject well was POP'd and have a hypotenuse distance of 1050ft or less.

20. PARENT_3000_AVG_HYPOT_DIST

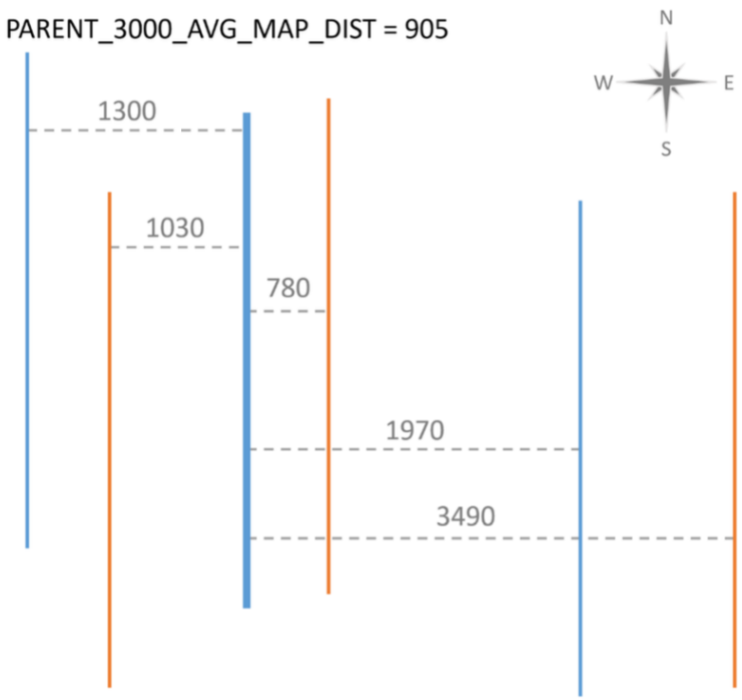
Average hypotenuse distance of the wells that were POP'd more than 60 days before the subject well and are within a 3000ft buffer around the well. In

the gun barrel below, the center blue well is the subject well, the other blue wells are codeveloped wells, and the orange wells are parent wells. Note that the furthest parent well is not considered in the average since it is more than 3000ft away from the subject well.



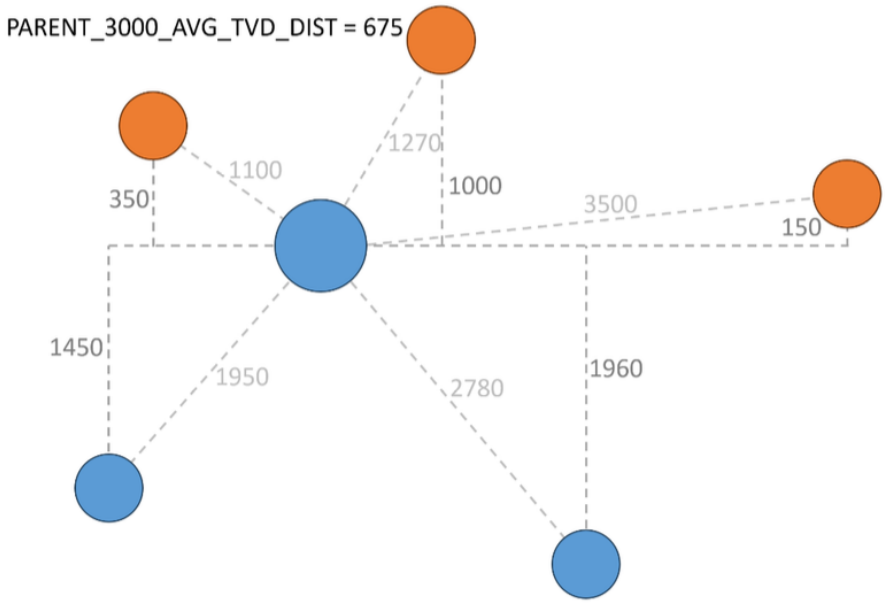
21. PARENT_3000_AVG_MAP_DIST

Average map distance of the wells that were POP'd more than 60 days before the subject well and are within a 3000ft buffer around the well. In the example below, the lateral sections are shown as if you're looking at a map. The thicker blue well is the subject well, the other blue wells are codeveloped wells, and the orange wells are parent wells. Note that the furthest parent well is not considered in the average since it is more than 3000ft away from the subject well.



22. PARENT_3000_AVG_TVD_DIST

Average TVD distance of the wells that were POP'd more than 60 days before the subject well and are within a 3000ft buffer around the well. In the gun barrel below, the thicker blue well is the subject well, the other blue wells are codeveloped wells, and the orange wells are parent wells. Note that the furthest parent well is not considered in the average since it is more than 3000ft away from the subject well.



23. PARENT_3000_AVG_WELL_AGE

Average age (in days) of the wells that were POP'd more than 60 days before the subject well was POP'd and have a hypotenuse distance of 3000ft or less.

24. PARENT_3000_MEDIAN_WELL_AGE

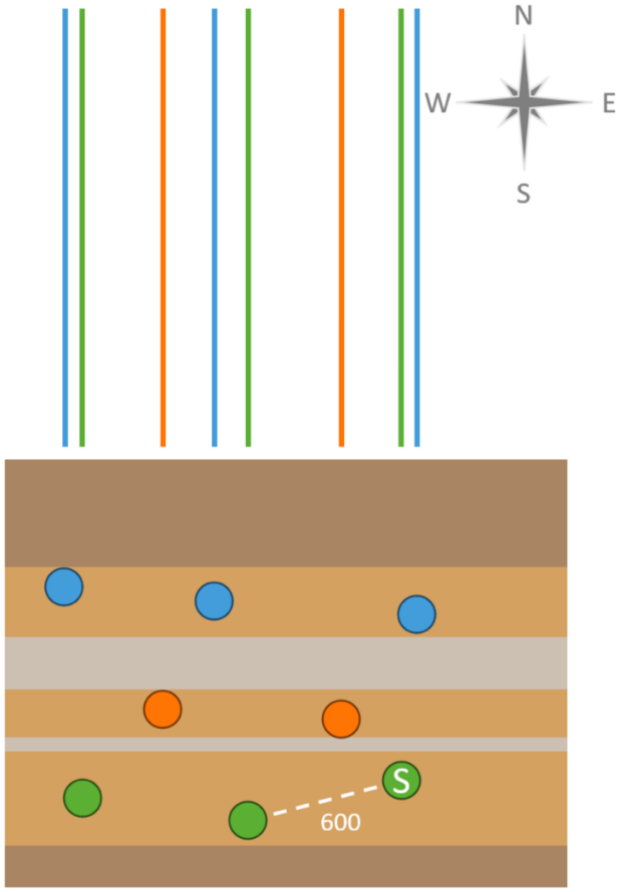
Median age (in days) of the wells that were POP'd more than 60 days before the subject well was POP'd and have a hypotenuse distance of 3000ft or less.

25. PARENT_3000_WELL_COUNT

The number of wells that were put on production (POP'd) more than 60 days before the subject well was POP'd and have a hypotenuse distance of 3000ft or less.

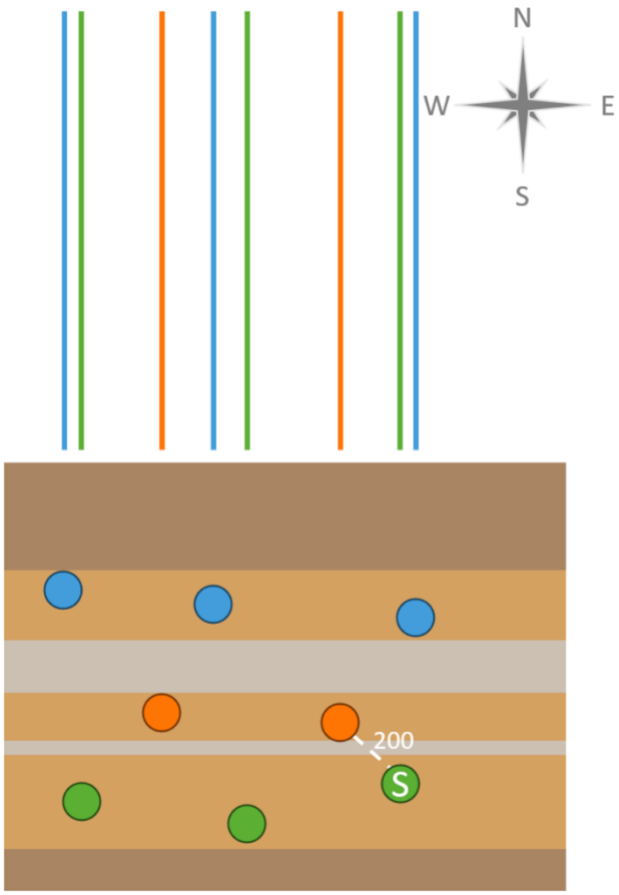
26. CODEV_IN_ZONE_MIN_HYPOT

The hypotenuse distance to the nearest well in the same formation (within the same codevelopment). Note, 'S' is the subject well.



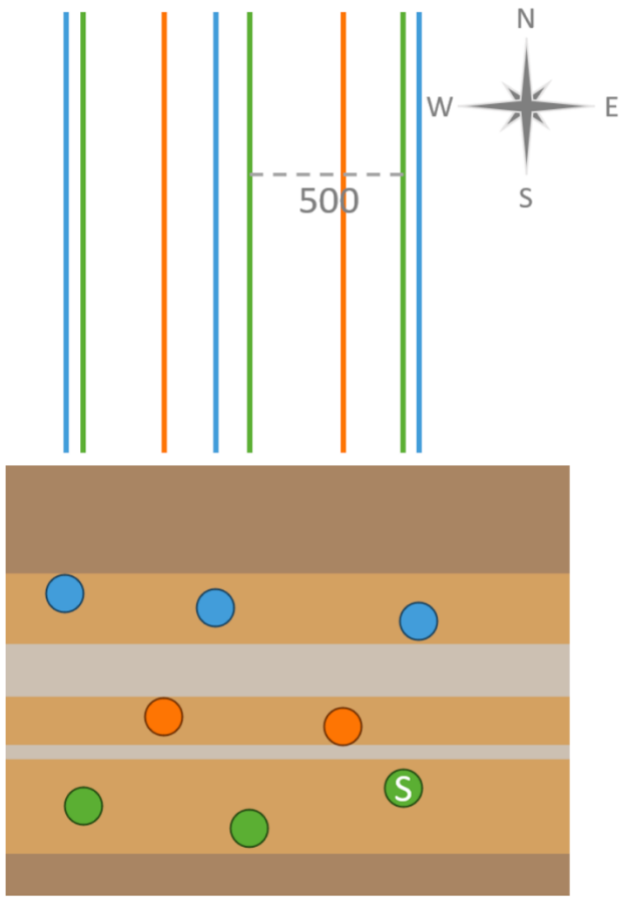
27. CODEV_OUT_ZONE_MIN_HYPOT

The hypotenuse distance to the nearest well in a different formation (within the same codevelopment). Note, ‘S’ is the subject well.



28. CODEV_IN_ZONE_MIN_MAP_DIST

The map distance to the nearest well in the same formation (within the same codevelopment). Note, ‘S’ is the subject well.



29. CODEV_1050_WELL_COUNT

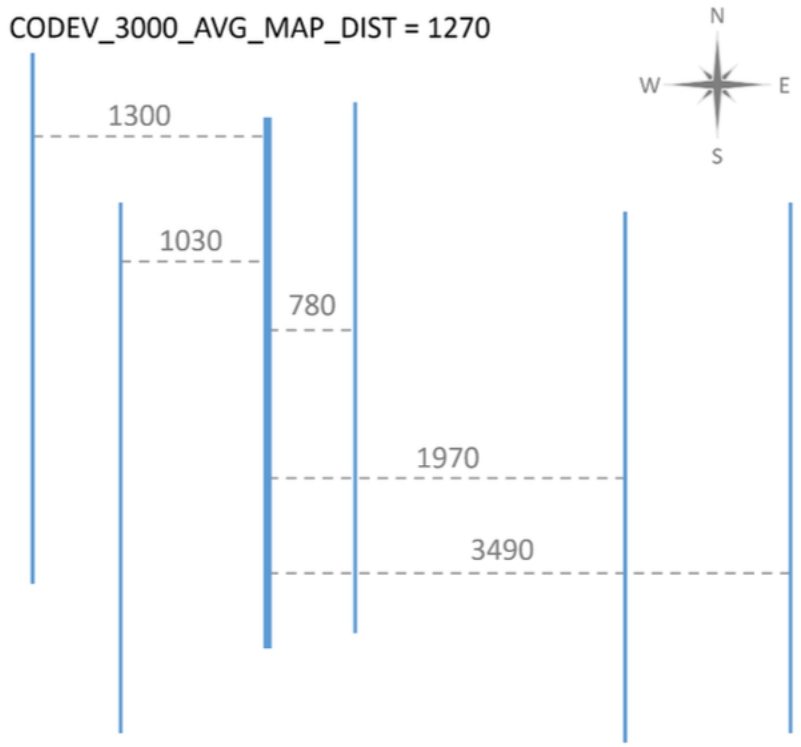
The number of wells that were put on production (POP'd) within 60 days of when the subject well was POP'd and have a hypotenuse distance of 1050ft or less.

30. CODEV_3000_AVG_HYPOT_DIST

Average hypotenuse distance of the wells that were POP'd within 60 days of the subject well and are within a 3000ft buffer around the well. Below is a gun barrel example.

31. CODEV_3000_AVG_MAP_DIST

Average map distance of the wells that were POP'd within 60 days of the subject well and are within a 3000ft buffer around the well. In the example below, the lateral sections of the wellbore are shown as if you're looking at a map.



32. CODEV_3000_AVG_TVD_DIST

Average TVD distance of the wells that were POP'd within 60 days of the subject well and are within a 3000ft buffer around the well. Below is a gun barrel example.

33. CODEV_3000_AVG_WELL_AGE

Average age (in days) of the wells that were POP'd within 60 days of the subject well and have a hypotenuse distance of 3000ft or less. If the value is positive, the average well age is older than the subject well. If the value is negative, the average well age is younger, meaning the subject well was likely one of the first wells in the development to POP.

34. CODEV_3000_MEDIAN_WELL_AGE

Median age (in days) of the wells that were POP'd within 60 days of the subject well and have a hypotenuse distance of 3000ft or less. If the value is positive, the average well age is older than the subject well. If

the value is negative, the average well age is younger, meaning the subject well was likely one of the first wells in the development to POP.

35. CODEV_3000_WELL_COUNT

The number of wells that were put on production (POP'd) within 60 days of when the subject well was POP'd and have a hypotenuse distance of 3000ft or less.

36. Pressure Gradient (psi/ft)

Average change in pressure per unit of depth. If pressure gradient and total vertical depth are multiplied, the result is the average pressure experienced at the depth of the wellbore.

37. Soak Time

Hours between the end of the stimulation phase (hydraulic frac) and the start of the drillout.

38. Avg Open Pressure

Pressure at the wellhead right before the frac pumps are turned on at the start of a stage. An open pressure is recorded for each stage in a well, but you have been given the average reading across the entire well.

39. SD Open Pressure

See Avg Open Pressure. Since the values for each stage have been averaged into one value for the well, the standard deviation (SD) of the open pressures is also included.

40. Avg Close Pressure

Pressure at the wellhead taken after the frac pumps shut down at the end of a stage. A close pressure is recorded for each stage in a well, but you have been given the average reading across the entire well.

41. SD Close Pressure

See Avg Close Pressure. Since the values for each stage have been averaged into one value for the well, the standard deviation (SD) of the close pressures is also included.