Sub-Terra Heritage Resource Investigations
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To: Evan Davis
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Subject: Vina sub-basin Monitoring Wells
cc: Eddy Teasdale

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Purpose

The purpose of this project was to provide a stratigraphic context for the screened intervals in the monitoring wells in the Vina groundwater sub-basin. The information can be used to help guide the location and screen intervals for future monitoring well sites.

Executive Summary

A total of 75 screened intervals are placed in a stratigraphic context within the Vina sub-basin; 48 wells are single completion wells (although 7 wells have no screen information) and 8 wells have multiple completions. As deliverables, we provide a spreadsheet and GIS shapefile with borehole information and interpreted stratigraphic interval of screens with corresponding depths.

We used the stratigraphic framework developed for the Vina sub-basin Groundwater Sustainability Plan (GSP). This framework includes the time-equivalent Pliocene-aged Tuscan and Tehama formations overlain by Quaternary formations. From oldest to youngest, we place the screened intervals within the following units: Lower Tuscan (LT), Upper Tuscan/Tehama 2 (UTT2), Upper Tuscan/Tehama 1 (UTT1), Quaternary 2 (Q2) and Quaternary 1 (Q1). The two Quaternary units represent zones of distinct AEM response rather than formal Quaternary formation names. Although the western area contains all 5 stratigraphic intervals, the southeastern area south of Chico combines UTT2 and LT into a single unit (UTT2/LT). We also used over 460 additional boreholes and two vintages of Airborne Electromagnetic (AEM) data profiles from the Department of Water Resources (DWR) W07 region and the Stanford Groundwater Aquifer Project (GAP) pilot survey to guide interpretations. Most of the screened intervals cross stratigraphic boundaries leaving very few monitoring wells that target a single stratigraphic unit. This information can be used to guide wellbore construction for future monitoring wells.

Background

Luhdorff & Scalmanini Consulting Engineers, Inc. (LSCE), was contracted by Vina sub-basin Groundwater Sustainability Agency (GSA) to be responsible for supporting the effort to site multi-completion and interconnected surface water wells under the Vina sub-basin GSA Master Agreement. LSCE then sub-contracted with Sub-Terra Heritage Resource Investigations and Geophysical Imaging Partners to provide stratigraphic context for the existing monitoring wells.

The Vina sub-basin lies in the eastern central portion of the Sacramento Groundwater Basin. The

northern boundary is the Butte-Tehama County line, the western boundary is the Butte-Glenn County line, the southern boundary is a combination of the property boundaries owned by the M&T Ranch, the service area boundaries of RD 2106 and Western Canal Water District, and the eastern boundary is the edge of the alluvium as defined by DWR Bulletin 118 Update 2003. It is bounded by the following sub-basins: Los Molinos to the north; Corning to the west; and Butte to the south (Geosyntec, Vina sub-basin GSP, 2023).

The main aquifer units of the latest non-marine basin fill in the Sacramento Valley consist of Pliocene and younger deposits. Recognizing two main stratigraphic units will help delineate hydrogeologic units: (a) Pliocene-aged units and (b) overlying Quaternary-aged units. Two Pliocene-aged units interfinger in the center of the study area: the Tuscan Formation in the east, and the Tehama Formation in the west (Ingersoll et al., 2016). The Tuscan Formation is a series of volcanic mudflow and streamflow deposits sourced from the ancestral volcanoes in the Sierra/Cascades that produced a complex network of westward flowing channels containing reworked volcanic sand and gravel sediments (Lydon, 1968). The Tehama Formation is composed of generally eastward-flowing coalescing rivers and alluvial fans sourced from the Coast Ranges to the west (CDWR, 2014).

It is important to realize the Tuscan and Tehama Formations interfinger within individual layers and in the upper portions it is often not possible to know which formation is being represented; those layers are called Upper Tuscan/Tehama (UTT1 and UTT2). However, the lower portion of the Tuscan Formation (Lower Tuscan: LT) is readily noticeable with no lower Tehama represented in the sub-basin.

During the Quaternary, pulses of accelerated uplift in both the Coast Ranges and Sierra/Cascades created multiple incisions in the foothills with successive fluvial fills that transitioned to more alluvial environments along the valley floor where they interfinger with the Sacramento River system; the various Quaternary units consist of the Red Bluff, Riverbank, and Modesto formations. However, this study does not use these formation names but rather utilizes Q1 and Q2 to delineate the Quaternary units as represented by AEM responses.

Methods

In addition to the WO7 DWR AEM profile data, this study also uses the results from the Stanford GAP pilot study conducted in the Corning, Colusa, and Vina sub-basins (https://mapwater.stanford.edu/) using data acquired in 2018. The GAP study calibrated AEM data to 152 existing resistivity logs to provide approximately 800 km of resistivity profiles (see Kang et al., 2021 for detailed methods). In addition, this study also utilizes point-count information from 4 wells in order to place well intervals into their appropriate stratigraphic formation based on sediment composition (e.g. Ingersoll et al., 2016; Greene and Hoover, 2014; Davis, 2023).

We used the software GeoScene3D (I-GIS) to place the monitoring wells, borehole data, geologic map, and AEM profile data, along with other geographic data in a software mapping platform. All well data are publicly available (except for 6 Cal Water Service wells in Chico) at the DWR website under Area WO7 (https://data.cnra.ca.gov/dataset/aem) and the DWR SGMA Data Portal (https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#currentconditions). Well data from the monitoring wells were also provided by LSCE.

Results and Interpretations

The deliverables include a spreadsheet and shapefile that includes the following information for each screened interval:

1) Basic well data: spreadsheet columns A through AM.
2) Geologic unit with the corresponding screen interval in feet below ground surface (bgs): LT, UTT2, UTT1, UTT2/LT (in the southeastern study area), Q2 and Q1.
3) Confidence: confidence on geologic units from high to low: 1, 2
4) Aquifer zone considering geologic unit as well as depth. In most cases, the following applies: shallow (Q1, Q2), shallow-intermediate (Q1, Q2 and UTT1), intermediate (UTT1 or UTT2), intermediate-deep (UTT2/LT, or UTT2), deep (UTT2/LT or LT), shallow-intermediate-deep (all zones).
5) Notes on UTT (Upper Tuscan or Tehama) is the confidence on whether the interval represents the Tuscan or the Tehama formation. Some notes include possible Laguna Formation.
6) Other comments on screen placement.

The Lower Tuscan (LT) layer is mostly coarse-grained material that thickens to the west to 500 to 600 feet thick. The overlying UTT2 layer is 200 to 500 feet thick and is fine-grained dominated with intermittent coarse-grained dominated channels. UTT1 is mostly a coarse-grained dominated unit 100 to 200 feet thick. The UTT1 and UTT2 units thin and pinch out to the west under the city of Chico due to an erosional surface that places the overlaying Quaternary units above the LT in the eastern portion of Chico (See Davis, 2023, for a detailed cross-section describing this stratigraphic relationship). In addition, both the UTT1 and UTT2 combine with the Lower Teep
uscan in the southeastern portion of the study area, south of Chico. Q2 is mostly fine dominated (~50 feet thick) that has rare occurrences of coarse-grained dominated material. Q1 is 50 to 100 feet thick and consists of mostly coarse-grained dominated sediment with small zones of fine-grained dominated material. Finally, there is an interpreted ancient valley that formed during the time of Tuscan deposition that filled with coarse-grained dominated material in the vicinity of Butte Creek. This valley fill was then buried by UTT1, Q2, and Q1 sediments.

Conclusion/Recommendations

Based on 75 screened intervals from 48 single-completion wells and 8 multi-completion wells within the Vina sub-basin monitoring network, we place each screened interval into one or more the following stratigraphic intervals, from oldest to youngest: Lower Tuscan (LT), UTT2 (Upper Tuscan/Tehama 2), a combined UTT2/LT in the southeastern portion of the study area, UTT1 (Upper Tuscan/Tehama 1), Quaternary 2 (Q2) and Quaternary 1 (Q1).

Most of the interpretations are based on incomplete descriptions of sediment by non-geologists from well completion reports. The interpretations from this report could be improved with additional drilling along with accurate descriptions made by geologists at the well-site. In addition, we highly recommend drill cuttings be made available to analyze the composition to better place the sediments in their respective formations based on criteria from Greene and Hoover (2014).

References

California Department of Water Resources (CDWR), 2014, Geology of the northern Sacramento Valley. Sacramento, CA: California Department of Water Resources.

Davis, E., 2023, A Petrographic Analysis and Analog Outcrop Investigation to Refine the Stratigraphy of the Tuscan Aquifer System, northern Sacramento Valley, California; [M.S. Thesis] California State University, Chico. 103 p.

Greene, T. J., & Hoover, K., 2014, Hydrostratigraphy and pump-test analysis of the lower Tuscan/Tehama Aquifer, Northern Sacramento Valley, CA. Center for Water and the Environment.

Ingersoll, R. V., Steinpress, M. G., & Spangler, D., 2016, Application of actualistic sand petrofacies in hydrogeology: An example from the northern Sacramento Valley, California, USA. GSA Bulletin, 128 (3–4), p. 661–668.

Kang, S., Knight, R., Greene, T., Buck, C., & Fogg, G., 2021, Exploring the model space of airborne electromagnetic data to delineate largescale structure and heterogeneity within an aquifer system. Water Resources Research, 57, e2021WR029699. https://doi.org/10.1029/2021WR029699

Lydon, P. A., 1968, Geology and Lahars of the Tuscan Formation, Northern California. In R. R. Coats, R. L. Hay, & C. A. Anderson (Eds.), Studies in volcanology (Vol. 116, p. 0). Geological Society of America. https://doi.org/10.1130/mem116-p441

Attachments

Spreadsheet of well data from monitoring wells
GIS shapefile with well data from monitoring wells

CASGEM_STATE_WELL_I	CASGEM_STATION_ID	SITE_CODE	LOCAL_WELL_DESIGNATION
20N01E02H003M	36584	396158N1218221W001	BMO 20N01E02H003M
20N02E06Q001M	16142	396127N1217883W001	BMO 20N02E06Q001M
20N02E08C001M	52537	396069N1217736W002	
20N02E08H003M	24483	396064N1217695W001	BMO 20N02E08H003M
20N02E09G001M	36585	396154N1217391W001	BMO 20N02E09G001M
20N02E09L001M	33461	396066N1217586W001	BMO 20N02E09L001M
20N02E24C001M	35608	395812N1217026W001	BMO 20N02E24C001M
20N02E24C002M	17160	395812N1217026W002	BMO 20N02E24C002M
20N02E24C003M	17161	395812N1217026W003	BMO 20N02E24C003M
20N03E31M001M	24260	395446N1216873W001	BMO 20N03E31M001M
20N03E33L001M	16799	395435N1216466W001	BMO 20N03E33L001M
21N01E10B003M	19254	396963N1218486W001	BMO 21N01E10B003M
21N01E12D001M	19255	396932N1218231W001	21N01E12D001M
21N01E12K001M	35538	396892N1218121W001	21N01E12K001M
21N01E13F001M	19256	396769N1218157W001	21N01E13F001M
21N01E13L002M	48987	396735N1218144W001	BMO 21N01E13L002M
21N01E13L003M	48988	396735N1218144W002	BMO 21N01E13L003M
21N01E13L004M	48989	396735N1218144W003	BMO 21N01E13L004M
21N01E14Q002M	19257	396691N1218298W001	21N01E14Q002M
21N01E21C001M	35539	396654N1218780W001	21N01E21C001M
21N01E25K001M	39934	396420N1218128W001	BMO 21N01E25K001M
21N01E26K001M	19728	396454N1218313W001	BMO 21N01E26K001M
21N01E27B001M	19729	396528N1218526W001	21N01E27B001M
21N01E27D001M	19730	396511N1218607W001	BMO 21N01E27D001M
21N01E28F001M	19731	396490N1218726W001	21N01E28F001M
21N02E18C001M	24664	396820N1217970W001	BMO 21N02E18C001M
21N02E18C002M	24665	396820N1217970W002	BMO 21N02E18C002M
21N02E18C003M	24440	396820N1217970W003	BMO 21N02E18C003M
21N02E20P001M	34916	396568N1217818W001	BMO 21N02E20P001M
21N02E26E003M	24491	396468N1217263W001	BMO 21N02E26E003M
21N02E26E004M	24492	396468N1217263W002	BMO 21N02E26E004M
21N02E26E005M	24493	396468N1217263W003	BMO 21N02E26E005M
21N02E26E006M	38355	396468N1217263W004	BMO 21N02E26E006M
21N02E30L001M	34917	396422N1217994W001	BMO 21N02E30L001M
21N02E32E001M	24484	396339N1217845W001	21N03E22C001M
21N03E22C001M	21243	396653N1216299W001	BMO 21N03E22C001M
21N03E29J003M	24485	396454N1216588W001	BMO 21N03E29J003M
21N03E32B001M	34927	396396N1216634W001	BMO 21N03E32B001M
22N01E09B001M	23712	397818N1218718W001	BMO 22N01E09B001M
22N01E16H001M	N/A	CWSCH02	Station 27-01
22N01E20K001M	19214	397445N1218905W001	BMO 22N01E20K001M
22N01E23K003M	N/A	CWSCH04	Station 34-01
22N01E28J001M	19345	397317N1218649W001	BMO 22N01E28J001M

CWSCH07	N/A		CWSCH07	Station 65-01
22N01E28J003M		19346	397317N1218649W002	BMO 22N01E28J003M
22N01E28J005M		19347	397317N1218649W003	BMO 22N01E28J005M
22N01E34G001M	N/A		CWSCH06	Station 46-01
22N01W05M001M		34472	397871N1220100W001	22N01W05M001M
22N02E18J001M		19888	397619N1217891W001	22N02E18J001M
22N02E18N001M	N/A		CWSCH03	Station 33-01
22N02E30C002M		36586	397383N1217982W001	BMO 22N02E30C002M
22N02E31Q001M	N/A		CWSCH05	Station 41-01
23N01E07H001M		52536	398648N1219049W002	23N01E07H001M
23N01E29P002M		40172	398133N1218913W001	BMO 23N01E29P002M
23N01E33A001M		23713	398097N1218630W001	BMO 23N01E33A001M
23N01W03H002M		48993	398782N1219570W001	BMO 23N01W03H002M
23N01W03H003M		48994	398782N1219570W002	BMO 23N01W03H003M
23N01W03H004M		48995	398782N1219570W003	BMO 23N01W03H004M
23N01W09E001M		36616	398651N1219930W001	23N01W09E001M
23N01W10E001M		36972	398640N1219723W001	BMO 23N01W10E001M
23N01W10M001M		23980	398619N1219746W001	BMO 23N01W10M001M
23N01W14R002M		36617	398411N1219399W001	23N01W14R002M
23N01W16E001M		25770	398501N1219934W001	23N01W16E001M
23N01W25G001M		37858	398223N1219276W001	BMO 23N01W25G001M
23N01W27L001M		22055	398180N1219669W001	BMO 23N01W27L001M
23N01W28M002M		24454	398188N1219912W001	BMO 23N01W28M002M
23N01W28M003M		24453	398188N1219912W002	BMO 23N01W28M003M
23N01W28M004M		24455	398188N1219912W003	BMO 23N01W28M004M
23N01W28M005M		38185	398188N1219912W004	BMO 23N01W28M005M
23N01W31M001M		24709	398028N1220294W001	BMO 23N01W31M001M
23N01W31M002M		24710	398028N1220294W002	BMO 23N01W31M002M
23N01W31M003M		24711	398028N1220294W003	BMO 23N01W31M003M
23N01W31M004M		24712	398028N1220294W004	BMO 23N01W31M004M
23N01W36P001M		22056	397972N1219297W001	BMO 23N01W36P001M
23N02W25C001M		22058	398222N1220401W001	BMO 23N02W25C001M

CASGEM_STATION_USE_DESC	TOTAL_DEPTH_FT	OverallPerfTop	OverallPerfBottom	LATITUDE
Observation	201	70	180	39.615756
Irrigation	383	10	44	39.6127
Irrigation	660	330	660	39.6069
Residential	187	120	187	39.6064
Observation	202	130	179.6	39.615459
Irrigation	710	460	710	39.6066
Observation	155	124	134	39.5812
Observation	390	336	377	39.5812
Observation	520	484	505	39.5812
Observation	201	130	179.6	39.5446
Other	101	13	101	39.543571
Irrigation	525	320	403	39.6963
Irrigation	600	50	600	39.693224
Irrigation	465	116	465	39.6892
Irrigation	515	93	515	39.676848
Observation	771	735	760	39.67348
Observation	574	540	560	39.67348
Observation	353	240	340	39.67348
Irrigation	290	128	290	39.6691
Irrigation	565	240	508	39.665471
Residential	93			39.642
Irrigation	462	406	422	39.6454
Irrigation	517	24	517	39.6528
Residential	112			39.6511
Irrigation	173	18.4	173	39.649
Observation	914	770	880	39.682
Observation	701	360	620	39.682
Observation	240	130	200	39.682
Irrigation	238	100	238	39.6568
Observation	660	610	620	39.6468
Observation	518	400	484	39.6468
Observation	315	265	290	39.6468
Observation	179	105	150	39.6468
Residential	317	100	317	39.6422
Irrigation	184	62	184	39.633834
Residential	123	70	123	39.665335
Residential	513	120	350	39.6454
Irrigation	57	13	57	39.639578
Residential	156	84	156	39.7818
Municipal & Industrial	Need to Request from	396	647	39.76205
Residential	110			39.7445
Municipal & Industrial	Need to Request from	608	698	39.744529
Observation	660	460	559	39.731678

Municipal & Industrial	Need to Request from	240	540	39.731859
Observation	320	200	279	39.731678
Observation	948	740	800	39.731678
Municipal & Industrial	Need to Request from	200	450	39.720669
Irrigation	200			39.787113
Residential	180	94	180	39.7619
Municipal & Industrial	Need to Request from	480	728	39.75681
Observation	203	130.8	190.5	39.738274
Municipal & Industrial	Need to Request from	105	430	39.71182
Residential	195	115	195	39.864821
Irrigation	265			39.813318
Irrigation	506	53	506	39.809696
Observation	553	510	540	39.878215
Observation	351	320	340	39.878215
Observation	115	70	100	39.878215
Irrigation	110			39.8651
Irrigation	668	600	668	39.864
Observation	220	90	200	39.861936
Irrigation	183	90	183	39.841052
Irrigation	365	97	365	39.8501
Irrigation	660	160	660	39.8223
Residential	102	65	102	39.818
Observation	1044	791	1021	39.818773
Observation	696	640	670	39.818773
Observation	217	120	165	39.818773
Observation	72	30	50	39.818773
Observation	1200	969	1030	39.8028
Observation	616	545	600	39.8028
Observation	245	140	201	39.8028
Observation	106	65.5	75.5	39.8028
Residential	165			39.7972
Irrigation	243			39.8222

LONGITUDE	ELEVATION	COMPLETION_RPT_NBR	
-121.822158	132.34		782029
-121.7883	137.63	USGS 2456	
-121.77358	134	E0263129	
-121.7695	132.33		705843
-121.73913	151.16		782038
-121.7586	139.33		1055
-121.7026	160.07		783862
-121.7026	160.07		783862
-121.7026	160.07		783862
-121.6873	135.34		782043
-121.646667	151.33		
-121.8486	170.33		13929
-121.823132	187.33		2676
-121.8121	189.33		48510
-121.81567	177.33		126426
-121.8144	179.85	e0136335C	
-121.8144	179.85	e0136335B	
-121.8144	179.85	e0136335A	
-121.8298	167.13		265035
-121.878004	133.34		65964
-121.8128	154.33		211789
-121.8313	152.84		76269
-121.8526	149.34		
-121.8607	143.34		
-121.8726	142.35		
-121.797	191.4	E0113763A	
-121.797	191.4	E0113763C	
-121.797	191.4	E0113763B	
-121.7818	168.13		141490
-121.7263	184.58	E062957D	
-121.7263	184.58	E062957C	
-121.7263	184.58	E062957B	
-121.7263	184.58	E062957A	
-121.7994	159.33		2926
-121.784466	157.33		211714
-121.629965	382.37	114311X	
-121.6588	274.34		124543
-121.663376	238.43		
-121.8718	178.33		89182
-121.86512	Need to Request	Need to Request from Cal Water	
-121.8905	167.84		
-121.831819	Need to Request	Need to Request from Cal Water	
-121.864995	181.2	USBR	

-121.78685	Need to Request	Need to Request from Cal Water	
-121.864995	180.62	USBR	
-121.864995	181.22	USBR	
-121.848129	Need to Request	Need to Request from Cal Water	
-122.010001	151.48		
-121.7891	279.34		92449
-121.802639	Need to Request	Need to Request from Cal Water	
-121.798157	243.63		782044
-121.796239	Need to Request	Need to Request from Cal Water	
-121.904936	282		393242
-121.891331	205.34		265103
-121.863054	252.34		4060
-121.95712	216.88	e0136941	
-121.95712	216.88	e0136941	
-121.95712	216.88	e0136941	
-121.993	183.39		
-121.972374	189.38		42600
-121.974546	187.38		782040
-121.939919	191.36		215535
-121.9934	172.38		68717
-121.9276	180.35		513092
-121.9669	162.37		57350
-121.991188	161.4	E0085239	
-121.991188	161.4	E0085239	
-121.991188	161.4	E0085239	
-121.991188	161.4	E0085239	
-122.0294	157.14	E074369	
-122.0294	157.14	E074369	
-122.0294	157.14	E074369	
-122.0294	157.14	E074369	
-121.9297	162.75		
-122.0401	157.4		

ADDL_COMMENTS
Durham Dayton SIU

Cased to 120' assume open hole below; effective screen interval 120' to 187'
NEVER drive on airstrip!!!
Esquon SIU
Cherokee SIU
Cherokee SIU
Cherokee SIU
Cherokee
Cherokee SIU: Well Construction is from video (poor quality)
BMO DURHAM DAYTONWell completed to 525'.
Open Hole 150' to 600'.
Open Hole 116' to 465'.
Open Hole 204' to 515'.
Durham/Dayton SIU
Durham/Dayton SIU
Durham/Dayton SIU
Open Hole 128' to 290'.

BMO DURHAM DAYTONEnter measurement in spreadsheet on pump house wall.
BMO DURHAM DAYTON
Construction from well video (2/24/2014); 25' of casing (of which .3' sticks above groundsurface); open hole below (1
BMO DURHAM DAYTON
Open Hole from 18.4 to 172.6
Durham/Dayton SIU
Durham/Dayton SIU
Durham/Dayton SIU
BMO ESQUONCased to 100'; open hole below
PENTZ
PENTZ
PENTZ
PENTZ
Durham/Dayton SIUCased to 100'; open hole below
Open hole from 92' to BOH
Cherokee SIU. Open Hole 70' to 123'.This well is associated with the Sacramento Valley - East Butte subbasin even th
Well completed to 356'
Cherokee SIUunused well; cased to ~13' open hole to BOH (video)
BMO VINAOpen Hole 84' to 156'

BMO VINA

Chico Urban SIU BMO

Chico Urban SIU
Chico Urban SIU

Cased to 94'; open hole below

Test hole to 203'Chico Urban Area SIU

BMO VINALeave measurement on card in mailbox.
Vina SIU BMO wellCased to 53'; open hole below (video)
Vina SIU
Vina SIU
Vina SIU

BMO VINA. The WCR is a deepning log for this well; original WCR #42596. The original open hole section of 232' to 55
Vina SIU
Open Hole 90' to 183'
Assume open hole (260' to 365')
BMO VINA. Put any card in slot to open automatic gate, or walk over wall and press Exit button.
BMO VINAOpen Hole 65' to 102'
Vina SIUTUSCAN FORMATION
Vina SIUTUSCAN FORMATION
Vina SIUQUATERNARY DEPOSITS
Vina SIUQUATERNARY DEPOSITS
Vina SIU
Vina SIU
Vina SIU
Vina SIU
BMO VINA
BMO VINAEasiest to drive north west of slough, then back south on east side to well.

StateWellNumber	Township	T dir	Range	R dir
20N01E02H003M	20	N	1	E
20N02E06Q001M	20	N	2	E
20N02E08C001M	20	N	2	E
20N02E08H003M	20	N	2	E
20N02E09G001M	20	N	2	E
20N02E09L001M	20	N	2	E
20N02E24C001M	20	N	2	E
20N02E24C002M	20	N	2	E
20N02E24C003M	20	N	2	E
20N03E31M001M	20	N	3	E
20N03E33L001M	20	WCR Unavailable	WCR Unavailable	WCR Unavailable
21N01E10B003M	21	N	1	E
21N01E12D001M	21	N	1	E
21N01E12K001M	21	N	1	E
21N01E13F001M	21	N	1	E
21N01E13L002M	21	N	1	E
21N01E13L003M	21	N	1	E
21N01E13L004M	21	N	1	E
21N01E14Q002M	21	N	1	E
21N01E21C001M	21	N	1	E
21N01E25K001M	21	N	1	E
21N01E26K001M	21	N	1	E
21N01E27B001M	21	WCR Unavailable	WCR Unavailable	WCR Unavailable
21N01E27D001M	21	WCR Unavailable	WCR Unavailable	WCR Unavailable
21N01E28F001M	21	WCR Unavailable	WCR Unavailable	WCR Unavailable
21N02E18C001M	21	N	2	E
21N02E18C002M	21	N	2	E
21N02E18C003M	21	N	2	E
21N02E20P001M	21	N	2	E
21N02E26E003M	21	N	2	E
21N02E26E004M	21	N	2	E
21N02E26E005M	21	N	2	E
21N02E26E006M	21	N	2	E
21N02E30L001M	21	N	2	E
21N02E32E001M	21	N	2	E
21N03E22C001M	21	N	3	E
21N03E29J003M	21	N	3	E
21N03E32B001M	21	WCR Unavailable	WCR Unavailable	WCR Unavailable
22N01E09B001M	22	N	1	E
22N01E16H001M	22	#N/A	#N/A	#N/A
22N01E20K001M	22	WCR Unavailable	WCR Unavailable	WCR Unavailable
22N01E23K003M	22	#N/A	#N/A	#N/A
22N01E28J001M	22	N	1	E

22N01E28J001M	22		#N/A		#N/A			#N/A
22N01E28J003M	22	N				1	E	
22N01E28J005M	22	N				1	E	
22N01E34G001M	22		#N/A		#N/A			#N/A
22N01W05M001M	22	WCR	Unavailable	WCR	Unavailable		WCR	Unavailable
22N02E18J001M	22	N				2	E	
22N02E18N001M	22		#N/A		#N/A			#N/A
22N02E30C002M	22	N				2	E	
22N02E31Q001M	22		#N/A		#N/A			#N/A
23N01E07H001M	23	N				1	E	
23N01E29P002M	23	N				1	E	
23N01E33A001M	23	N				1	E	
23N01W03H002M	23	N				1	W	
23N01W03H003M	23	N				1	W	
23N01W03H004M	23	N				1	W	
23N01W09E001M	23	WCR	Unavailable	WCR	Unavailable		WCR	Unavailable
23N01W10E001M	23	N				1	W	
23N01W10M001M	23	N				1	W	
23N01W14R002M	23	N				1	W	
23N01W16E001M	23	N				1	W	
23N01W25G001M	23	N				1	W	
23N01W27L001M	23	N				1	W	
23N01W28M002M	23	N				1	W	
23N01W28M003M	23	N				1	W	
23N01W28M004M	23	N				1	W	
23N01W28M005M	23	N				1	W	
23N01W31M001M	23	N				1	W	
23N01W31M002M	23	N				1	W	
23N01W31M003M	23	N				1	W	
23N01W31M004M	23	N				1	W	
23N01W36P001M	23	WCR	Unavailable	WCR	Unavailable		WCR	Unavailable
23N02W25C001M	23	WCR	Unavailable	WCR	Unavailable		WCR	Unavailable

Section	Top_Perf	Bottom_Perf	Intervals	Top_1	Bottom_1
2	70	180	2	70	80
6	10	383	2	10	44
8	300	660	1	300	660
8	120	187	1	120	187
9	130	179.6	0	130	140
9	Unknown	710	Unknown	Unavailable	Unavailable
24	124	134	1	124	134
24	336	377	2	336	346
24	484	505	1	484	505
31	130	179.6	2	130	140
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava
10	320	403	3	320	360
12	50	150	4	50	74
12	116	465	1	116	465
13	93	515	2	93	204
17	735	760	1	735	760
17	540	560	1	540	560
17	240	340	1	240	340
14	0	20	1	0	20
21	240	508	2	240	300
25	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
26	406	422	1	406	422
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava
18	770	880	4	770	780
18	360	620	3	360	370
18	130	200	3	130	140
20	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
26	610	620	1	610	620
26	400	484	3	400	410
26	265	290	2	265	275
26	105	150	2	105	115
30	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
32	62	92	1	62	92
22	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
29	120	350	4	120	160
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava
9	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
#N/A	#N/A	#N/A	3	396	420
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava
#N/A	#N/A	#N/A	3	608	614
28	460	640	1	460	640

#N/A	#N/A	#N/A		1	240	540
28	24	400		1	24	70
28	740	800		1	740	800
#N/A	#N/A	#N/A		1	200	450
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava	
18	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	
#N/A	#N/A	#N/A		2	480	526
30	70.8	190.5		2	70.8	80.8
#N/A	#N/A	#N/A		3	105	205
7	115	195		1	115	195
29	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	
33	53	506		1	53	506
3	510	540		1	510	540
3	320	340		1	320	340
3	70	100		1	70	100
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava	
10	600	668		1	600	668
10	90	200		2	30	100
14	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	
16	97	256		3	97	112
25	160	660		3	160	200
28	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	
28	791	1021		4	791	801
28	640	670		2	640	650
28	120	165		2	120	130
28	30	50		1	30	50
31	969	1030		2	969	979
31	545	600		2	545	555
31	140	201		2	140	150
31	65.5	75.5		1	65.5	75.5
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava	
WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unavailable	WCR Unava	WCR Unava	

Top_2	Bottom_2	Top_3	Bottom_3	Top_4	Bottom_4	Top_5	Bottom_5	Top_6
170	180	NA	NA	NA	NA	NA	NA	NA
68	383	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
169.6	179.6	NA	NA	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA	NA	NA	NA	NA
367	377	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
169.6	179.6	NA	NA	NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
367	407	383	403	NA	NA	NA	NA	NA
74	83	83	95	95	150	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
210	515	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
448	508	NA	NA	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
800	810	830	840	870	880	NA	NA	NA
480	500	610	620	NA	NA	NA	NA	NA
160	170	190	200	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA	NA	NA	NA	NA
430	440	474	484	NA	NA	NA	NA	NA
280	290	NA	NA	NA	NA	NA	NA	NA
140	150	NA	NA	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
180	240	260	270	286	350	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
557	576	634	647	NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
622	636	650	698	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA

NA	NA	NA	NA	NA	NA	NA	NA	NA
200	275	350	400	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
561	728	NA	NA	NA	NA	NA	NA	NA
180.5	190.5	NA	NA	NA	NA	NA	NA	NA
300	345	410	430	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
NA	NA	NA	NA	NA	NA	NA	NA	NA
190	200	NA	NA	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
131	151	244	256	NA	NA	NA	NA	NA
320	340	520	660	NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
881	891	951	961	1011	1021	NA	NA	NA
660	670	NA	NA	NA	NA	NA	NA	NA
155	165	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
1020	1030	NA	NA	NA	NA	NA	NA	NA
590	600	NA	NA	NA	NA	NA	NA	NA
191	201	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava

Bottom_6	Top_7	Bottom_7	Top_8	Bottom_8
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA

NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava
WCR Unava	WCR Unava	WCR Unava	WCR Unava	WCR Unava

Special Notes_2019 (WCR Table)

Cased to 68 feet, assume open hole below. Effective screen interval 10 to 44 and 68 t

WCR lacks screened interval; Info from CASGEM database. WCR indicates questional

Well log 1055 for deepened well. Screened intervals Uncertain.

WCR Unavailable

Screened interval uncertain. CASGEM database indicates Open Hole 150-600'
WCR lacks screened interval; Info from CASGEM database. Typo on WCR regarding Fil
Cased to 210 ft. Open hole 210' to 515'

Diameter is 14'' then necks down to 12'' then 10''

WCR Unavailable
WCR Unavailable
WCR Unavailable

Unavailable

Unavailable

Unavailable

WCR Unavailable
Unavailable

WCR Unavailable

Typo in DWR Database for Bottom Perf?

Slight difference with DWR database for Bottom Perf

WCR Unavailable
Unavailable

Unavailable
WCR unreadable. Info from CASGEM/DWR spreadsheet. Video logged

WCR Unavailable
WCR lacks screened interval; Info from CASGEM database. Necks down to 8".

Unavailable
Necks down to 12" then 10"

Unavailable

WCR Unavailable
WCR Unavailable

Geologic_Unit
70'-80' Q1; 170'-180' UTT1
10'-44' Q1; 68-383' Q2 & UTT1 & UTT2/LT
UTT2/LT
UTT1
130'-140' UTT1; 170'-180' UTT2/LT, all Tuscan but UTT1 and UTT2/LT show little difference
460'-710' UTT2/LT (could reach into formation underlying Tuscan, but doubtful based on WCR comments)
UTT1
UTT2/LT
UTT2/LT
both screens in UTT1, also very close to Laguna Formation in Wyandotte Creek area
13'-101' UTT1, could be approaching Laguna Formation in Wyandotte Creek area
320'-360' and 367'-407' UTT1 and/or UTT2
50'-150' Q2; if open to 150'-600' then UTT1 & UTT2 (or UTT2/LT) & LT
UTT1 & UTT2 (or UTT2/LT); mostly in UTT1
93'-143' Q2; 143'-367' UTT1; 367'-472' UTT2 (or UTT2/LT); 472'-515' LT (or UTT2/LT)
LT
LT
UTT1
1'-20' Q1; 128'-290' UTT1
both screens in UTT2
no screens, 0-50' Q1; 50'-93' Q2
UTT2 or UTT2/LT
24'-108' Q1; 108'-168' Q2; 168'-328' UTT1; 328'-516' UTT2 (or UTT2/LT)
no screens, TD to 112', Q1
18'-138' Q1; 138'-173' Q2
all screens LT
360'-370' UTT1; 480'-500' UTT2/LT or LT; 610'-620' LT or UTT2/LT
all screens UTT1
100'-238' UTT1
below LT
UTT2/LT
UTT2/LT
UTT2/LT
100'-140' Q2; 140'-317' UTT1
Q2
70'-100' LT, 100'-143' below LT (Ione?)
120'-160' LT; 180'-240', 260'-270', 286'-350' all below LT; no lithologies
UTT2/LT
Q1 and/or Q2
all screens are LT
TD of 110' Q1 and/or Q2
all screens LT
460'-640' LT

not verified on log: all screens in LT
24'-70' Q1 and/or Q2; 200'-240' UTT1; 240'-270' UTT2; 350'-400' UTT2
740'-800' LT
200'-350' UTT2; 350'-450' LT
assume open hole to TD at 200'; 0-90' Q1, 90'-160' Q2; 160'-200' UTT1
94'-180' LT, close to outcrop of Tuscan
both screens in LT
both screens in Q1 or Q2
105'-150' Q1 or Q2, 150'-205' UTT2; 300'-345' UTT2 or LT; 410'-430' LT
UTT2
no screens, if open hole to TD (265') then 0-100' Q1 and/or Q2; 100'-265' UTT1 or UTT2)
53'-93' (Q1 and/or Q2); 93'-263' UTT1 or UTT2; 263'-506' LT
LT
UTT2
UTT1
no screens, TD to 110'; 0-30' Q1; 30'-110' Q2
LT
30'-60' Q2; 60'-90' UTT1; 190'-200' lower UTT1
90'-183' Q1 or Q2
97'-112' Q2; 131'-151', 244'-256' UTT1
160'-200' UTT1 or UTT2; 320'-340' UTT2; 520'-600' LT
65'-102' Q2
all screens LT
640'-670' UTT2
120'-130' Q2; 155-165' Q2 or UTT1
Q1
all screens LT
all screens UTT2
140'-150' UTT1
Q1
no screens, TD to 165', (Q1 and Q2)
no screens, TD to 243', 0-100' Q1 and Q2; 100'-170' UTT1; 170'-243' UTT2

Confidence	shallow/deep
1	shallow-intermediate
1	shallow-intermediate-deep
1	deep
1	intermediate
1	intermediate
1	deep
1	intermediate
1	deep
1	deep
2	intermediate
2	intermediate
2	intermediate
2	shallow-intermediate-deep
2	intermediate
2	shallow-intermediate-deep
1	deep
2	deep
2	intermediate
1	shallow-intermediate
1	intermediate
1	shallow
2	intermediate-deep
2	shallow-intermediate-deep
1	shallow
1	shallow
1	deep
2	intermediate-deep
1	intermediate
1	intermediate
1	deep
1	deep
2	deep
2	deep
2	shallow-intermediate
1	shallow
2	deep
2	deep
2	deep
2	shallow
2	deep
1	shallow
1	deep
1	deep

2 deep
1 shallow-intermediate
1 deep
2 intermediate-deep
1 shallow-intermediate
2 deep
1 deep
1 shallow
2 shallow-intermediate-deep
2 intermediate
2 shallow-intermediate
2 shallow-intermediate-deep
1 deep
1 intermediate
1 intermediate
1 shallow
1 deep
1 shallow-intermediate
1 shallow
1 shallow-intermediate
2 intermediate-deep
1 shallow
1 deep
1 intermediate-deep
2 shallow-intermediate
1 shallow
1 deep
1 intermediate
1 intermediate
1 shallow
2 shallow
2 shallow-intermediate

Notes on UTT
UTT1 most likely Tuscan
UTT1 and UTT2 most likely Tuscan
UTT2 most likely Tuscan
UTT1 most likely Tuscan
UTT1 and UTT2 most likely Tuscan
UTT2 most likely Tuscan
UTT1 most likely Tuscan
UTT2 most likely Tuscan
UTT2 most likely Tuscan
UTT1 most likely Tuscan, could be Laguna Formation too
UTT1 most likely Tuscan, could be Laguna Formation too
UTT1 and UTT2 most likely Tuscan
UTT1 and UTT2 most likely Tuscan
UTT1 and UTT2 most likely Tuscan
UTT1 and UTT2 most likely Tuscan

UTT1 most likely Tuscan
UTT1 most likely Tuscan
UTT2 most likely Tuscan, interbedded lahars

UTT2 most likely Tuscan
UTT1 and UTT2 most likely Tuscan

UTT1 and UTT2 most likely Tuscan
UTT1 most likely Tuscan
UTT1 most likely Tuscan

UTT2 most likely Tuscan
UTT2 most likely Tuscan
UTT2 most likely Tuscan
UTT1 most likely Tuscan

UTT2 is Tuscan

UTT1 and UTT2 most likely Tuscan

UTT2 most likely Tuscan
UTT1 could be Tuscan or Tehama

UTT2 is Tuscan
UTT2 is Tuscan
UTT1 and UTT2 are Tuscan
UTT1 and UTT2 are Tuscan

UTT2 is Tuscan
UTT1 isTuscan

UTT1 is Tuscan

UTT1 is Tuscan
UTT1 and UTT2 are most likely Tuscan

UTT2 is most likely Tuscan
UTT1 is most likely Tuscan

UTT2 could be Tuscan or Tehama
UTT1 could be Tuscan or Tehama

UTT1 and UTT2 could be Tuscan or Tehama

other comments

65' screen in "brown clay" and 3' of "lava gravel"

could reach in to formation below Tuscan (Ione?)

both screens are in "siltstone/sandtone" and "siltstone", missing a 20' sandstone

50'-150' mostly in clays. If it's open-hole 150'-600' then it's open to entire Tuscan.
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screened mostly in clays according to nearby wells