Cuyama Basin GSP - Measurable Objectives and Minimum Thresholds for Representative Wells in each Threshold Region
December 21, 2018
(all values in feet)

OPTI Well	Region	Final MT	Final MO	Well Depth	Screen Top	Screen Bottom	GSE
72	Central	169	124	790	340	770	2171
77	Central	450	400	980	960	980	2286
91	Central	625	576	980	960	980	2474
95	Central	573	538	805			2449
96	Central	333	325	500			2606
98	Central	450	439	750			2688
99	Central	311	300	750	730	750	2513
103	Central	341	254	1030			2289
316	Central	623	574	830			2474
317	Central	623	573	700			2474
322	Central	307	298	850			2513
324	Central	311	299	560			2513
325	Central	300	292	380			2513
420	Central	450	400	780			2286
421	Central	446	398	620			2286
422	Central	444	397	460			2286
602	Central	497	408	725	325	725	2114
604	Central	526	487	924	454	924	2125
608	Central	436	407	745	440	745	2224
609	Central	458	375	970	476	970	2167
610	Central	621	591	780	428	780	2442
612	Central	463	440	1070	657	1070	2266
613	Central	503	475	830	330	830	2330
615	Central	500	451	865	480	865	2327
620	Central	606	566	1035	550	1035	2432
629	Central	559	527	1000	500	1000	2379
633	Central	547	493	1000	500	1000	2364
62	Eastern	167	142	212			2921
85	Eastern	171	147	233			3047
100	Eastern	154	125	284			3004
101	Eastern	104	81	200			2741
121	Northwestern	169	119	98.25			1984
830	Northwestern	169	119	77.2			1571
833	Northwestern	169	119	503.55			1457
835	Northwestern	169	119	162.2			1555
840	Northwestern	169	119	900	200	880	1713
841	Northwestern	169	119	600	170	580	1761
845	Northwestern	169	119	380	100	360	1712
849	Northwestern	169	119	570	150	550	1713
2	Southeastern	72	55	73			3720
89	Southeastern	64	44	125			3461
106	Western	154	141.4	227.5			2327
108	Western	165	135.62	328.75			2629
115	Western	267	102.8	1200			2276
117	Western	160	150.82	212			2098
118	Western	124	57.22	500			2270
123	Western	31	12.59	138			2165
127	Western	42	31.74	100.25			2364

DEVELOPMENT OF CUYAMA BASIN MEASURABLE OBJECTIVES AND MINIMUM THRESHOLDS BY THRESHOLD REGIONS

The attached table shows Measurable Objective (MO) and Minimum Threshold (MT) numbers that were developed for each representative well using the approaches approved for each threshold region by the Cuyama Basin GSA Board on December 18, 2018.

The methodologies used to develop these numbers are described below.

ACRONYM LIST

DWR = Department of Water Resources

GIS = Geographic Information System

MO = Measurable Objective

MT = Minimum Threshold

OPTI = the Cuyama Basin Data Management System (http://opti.woodardcurran.com/cuyama/login.php)

1. SOUTHEASTERN REGION

The MO is calculated by finding the measurement taken closest to (but not before) 1/1/2015. Additionally, measurements were not used if they exceeded 4/30/2015. If no measurement was taken during this 4-month period, then a linear trendline was applied to the data and the value for 1/1/2015 was extrapolated.

The MT is calculated by adding 5 years of groundwater storage to the MO. 5 years of storage is calculated by calculating the decline in groundwater levels form 2013-2018 (a drought period). If measurements are insufficient for this time period, a linear trendline was used to extrapolate the value.

2. EASTERN REGION

The MT is calculated by taking the either the value 20% groundwater level range below 2015 measurement, or 10 feet above the nearest well - whichever is more restrictive (depth to water's lowest value).

20% of the range of groundwater level measurements is calculated by taking the minimum and maximum groundwater levels for each well, taking 20% of that total range and subtracting it from the measurement closest measurement to (but not before) 1/1/2015. If no measurement was taken during this 4-month period, then a linear trendline was applied to the data and the value for 1/1/2015 was extrapolated.

A Geographic Information System (GIS) analysis was conducted to find the shallowest wells near each of the representative wells. This incorporated both the OPTI dataset, as well as the Department of Water Resources (DWR)'s Township and Range mapping application that utilizes well drilling reports. OPTI well

analysis used a 1.5-mile radius circle to find nearby well depths, and the DWR data uses a 9 square mile grid to find the shallowest well.

The MO is calculated by subtracting 5-yrs of groundwater storage from the MT. 5-yrs of storage is calculated by calculating the decline in groundwater levels form 2013-2018 (a drought period). If measurements are insufficient for this time period, a linear trendline was used to extrapolate the value.

3. CENTRAL REGION

The MT is calculated by taking the minimum and maximum groundwater levels for each well, taking 20% of that total range and subtracting it from the measurement closest measurement to (but not before) 1/1/2015. If no measurement was taken during this 4-month period, then a linear trendline was applied to the data and the value for 1/1/2015 was extrapolated.

The MO is calculated by subtracting 5-yrs of groundwater storage from the MT. 5-yrs of storage is calculated by calculating the decline in groundwater levels form 2013-2018 (a drought period). If measurements are insufficient for this time period, a linear trendline was used to extrapolate the value.

4. WESTERN REGION

The MT is calculated by taking the difference between the total well depth and the value closest to mid-February, 2018, and calculating 15% of that depth. That value is then subtracted from the mid-February measurement to get the final MT.

The MO is calculated by finding the measurement closest to mid-February, 2018 (i.e what is considered a "full" condition) and setting it as the MO.

5. NORTHWESTERN REGION

The MT is calculated using 15% of the saturated thickness for the overall region, which is equal to approximately 169 feet below ground surface elevation.

The MO is calculated using 5 years of storage. Because historical data reflecting new operations in this Threshold Region is extremely limited, 50 feet was used as 5 years of storage based on local landowner input.