
Interim Results Regarding Additional Investigation of 25,000 AFY ALCOA Permit

Presented to:
Post Oak Savannah Public Hearing
Milano Civic Center
120 West Avenue E
Milano, TX 76556

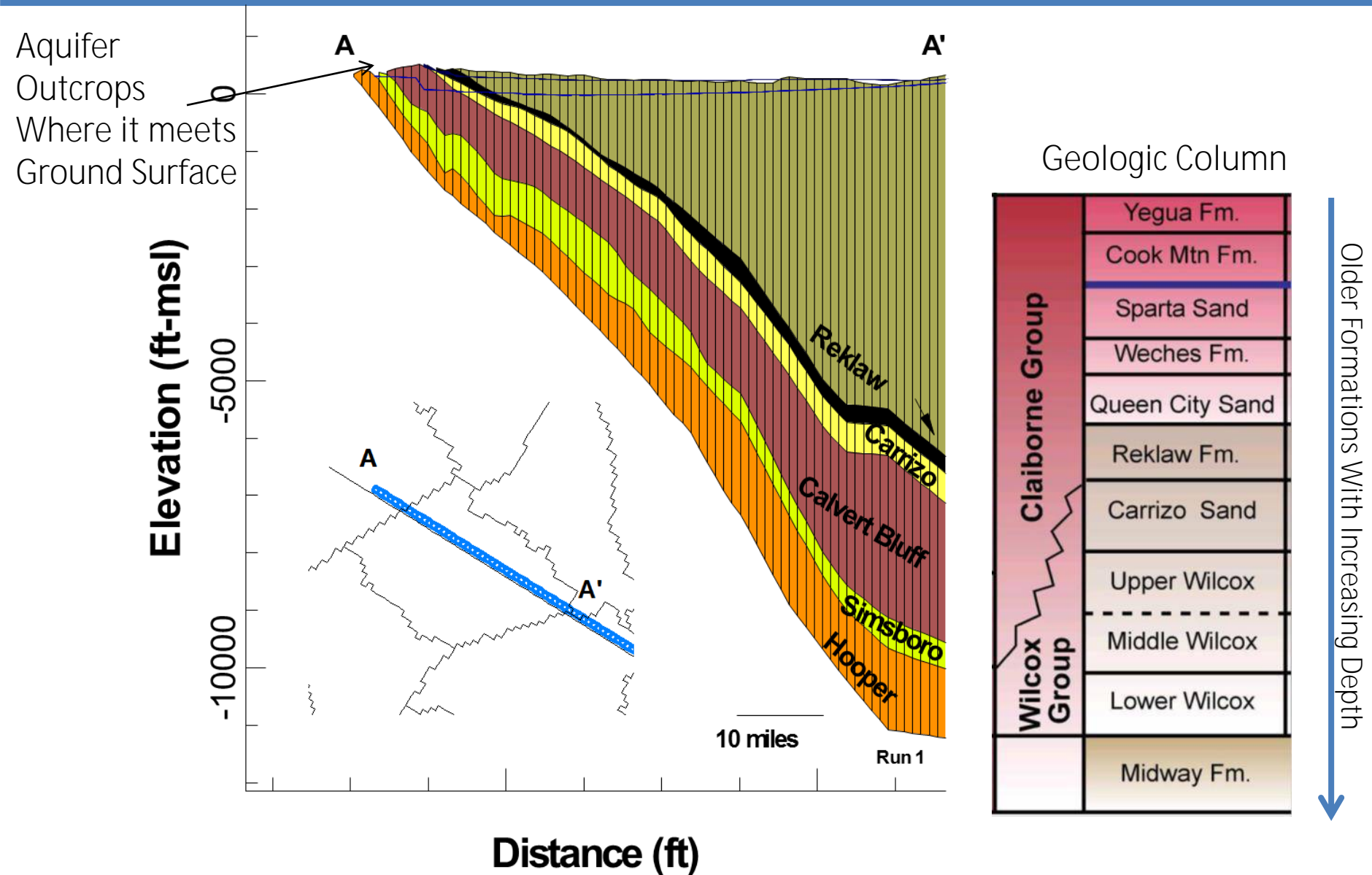
Presented by:
Steven C. Young Ph.D., PE, PG
INTERA Inc.,
November 13, 2012

Outline

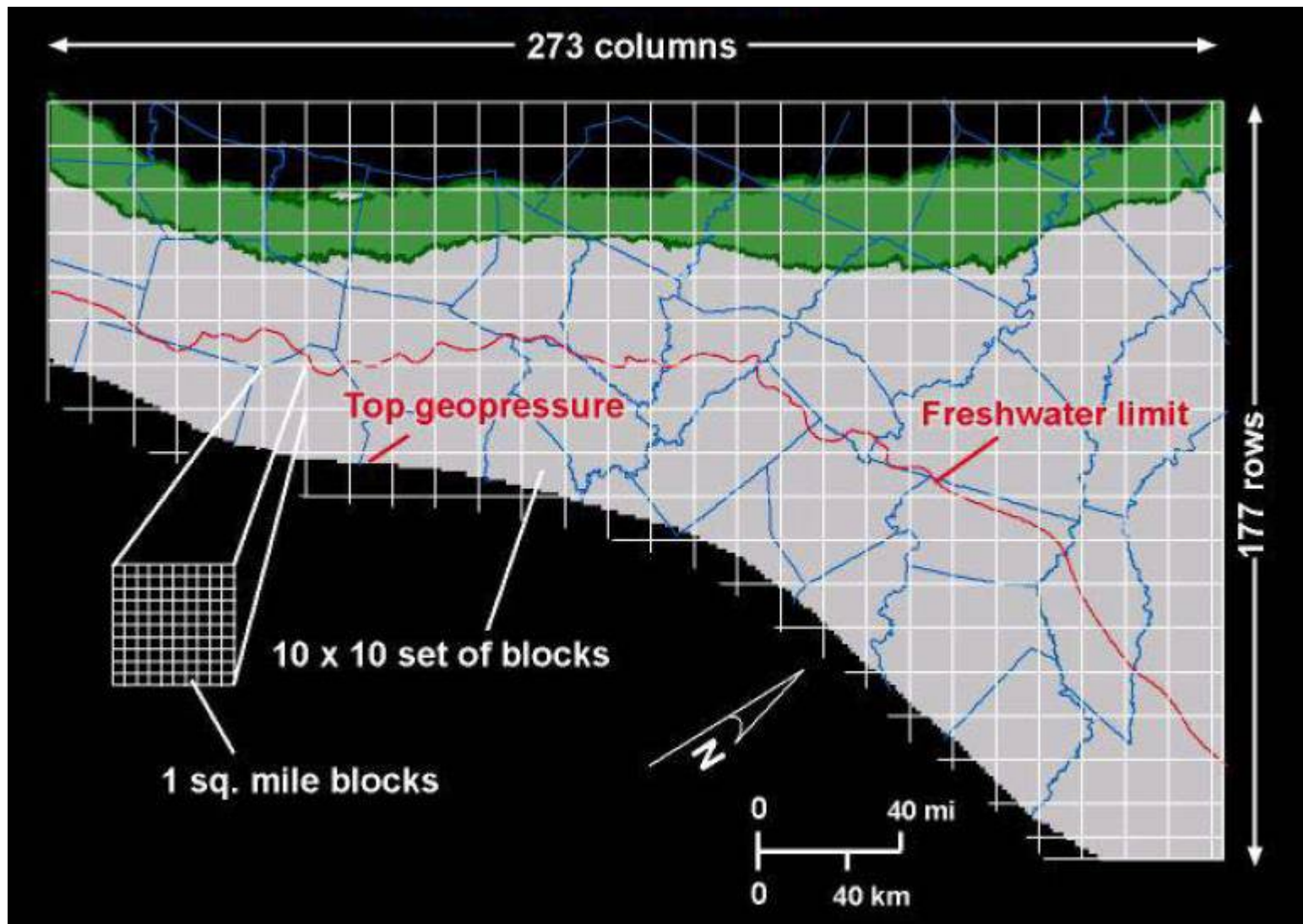
- Review September 11 Presentation
 - POSGCD Hydrogeology and Groundwater model
 - GMA 12 and District Management Goals
 - Estimated Impacts Based on Fully Implementation of Pumping
- Interim Findings From Additional Investigation of ALCOA Impacts
 - Regional GMA 15 Desired Future Conditions
 - District Threshold Targets in Shallow Aquifer Zones
 - Change in Water Columns for Milam Wells in Carrizo-Wilcox

Highlights of September 11 Presentation

Carrizo-Wilcox Vertical Structure Perpendicular to Coastline



Model Grid for Central QCSP and C-W GAMs



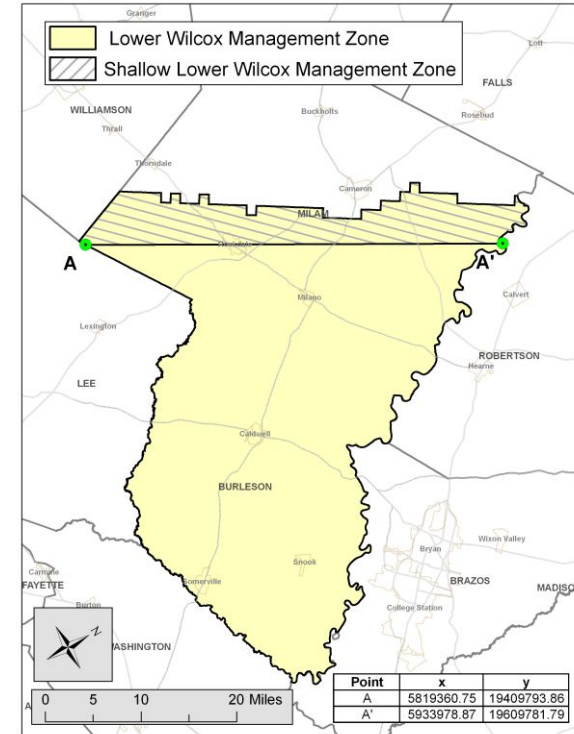
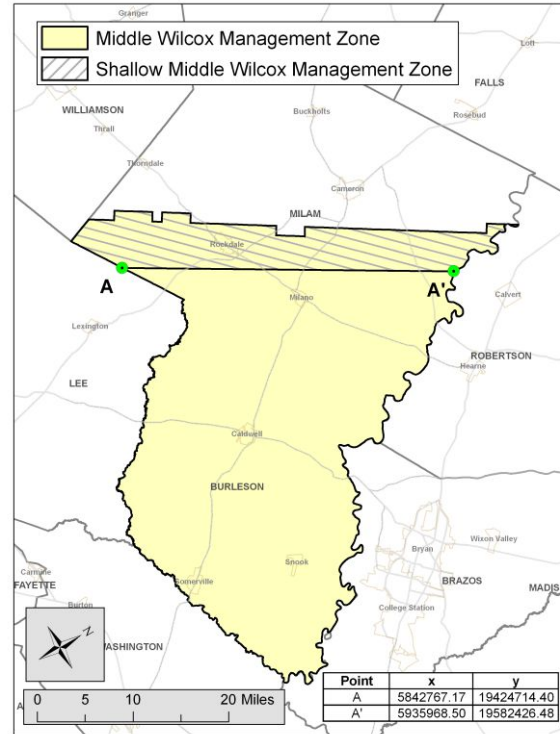
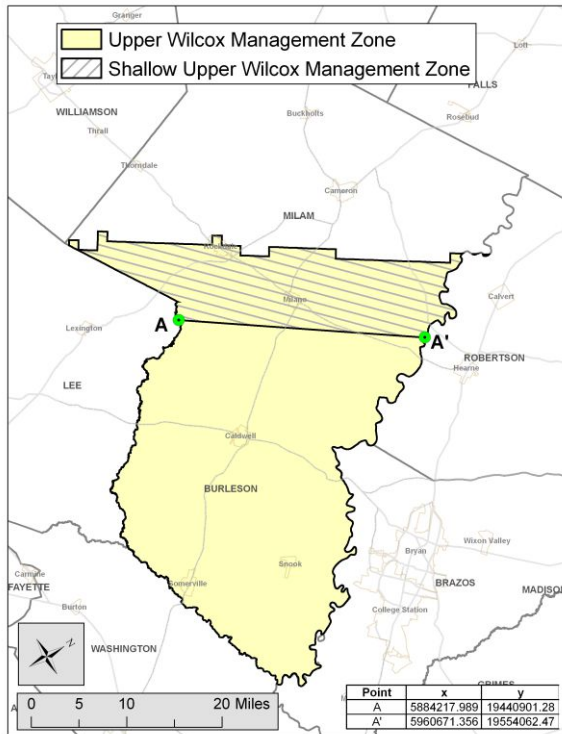
Note: From Carrizo-Wilcox GAM Stakeholder Advisory Forum Meeting (August , 2002)

QCSP GAM Run For GMA 12 Desired Future Conditions

Table B-2. Calculated Average Drawdowns Based from a Predicted Simulation Using the Central Queen City and Sparta GAM and Pumping File Run GAM_7B

Groundwater Conservation District or County	Average Drawdown (ft) in Each Aquifer Calculated from the Start of Year 2000 to the Start of Year 2060					
	SPARTA	QUEEN CITY	CARRIZO	CALVERT BLUFF	SIMSBORO	HOOPER
BRAZOS VALLEY	14	12	48	109	271	177
FAYETTE COUNTY	59	58	59	126	220	172
LOST PINES	4	13	47	94	236	133
MID-EAST TEXAS	0	-3	53	67	114	96
POST OAK SAVANNAH	28	28	61	137	298	178
FALLS COUNTY	-	-	-	-	-1	20
LIMESTONE COUNTY	-	-	-	9	43	40
NAVARRO COUNTY	-	-	-	-1	1	1
WILLIAMSON COUNTY	-	-	-	-11	47	56

Drawdown DFCs and Thresholds from 2000 to 2060 (from Management Plan)

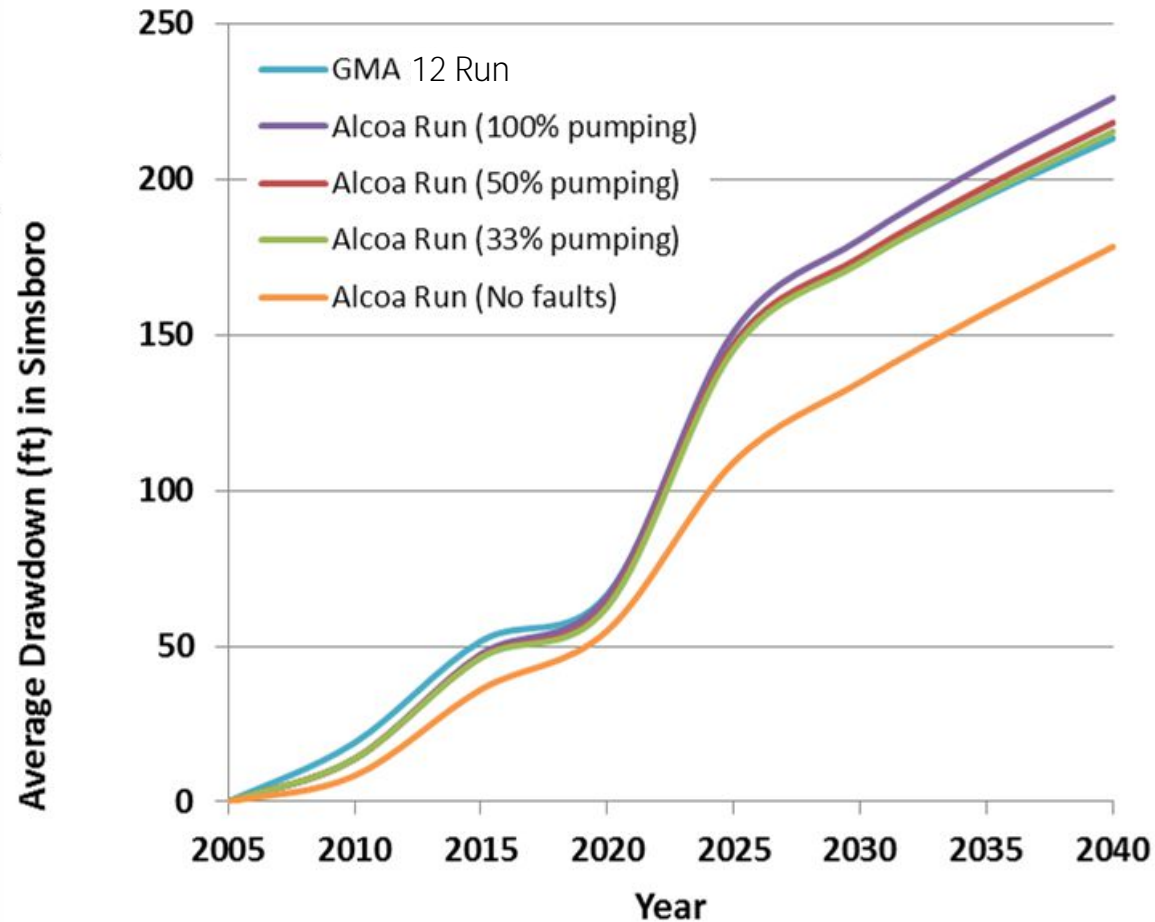


Aquifer	Average Drawdown (ft) from 2000 to 2060	
	DFC for entire area	Threshold for Shallow Management Area
Calvert Bluff	140	20
Simsboro	300	20
Hooper	180	20

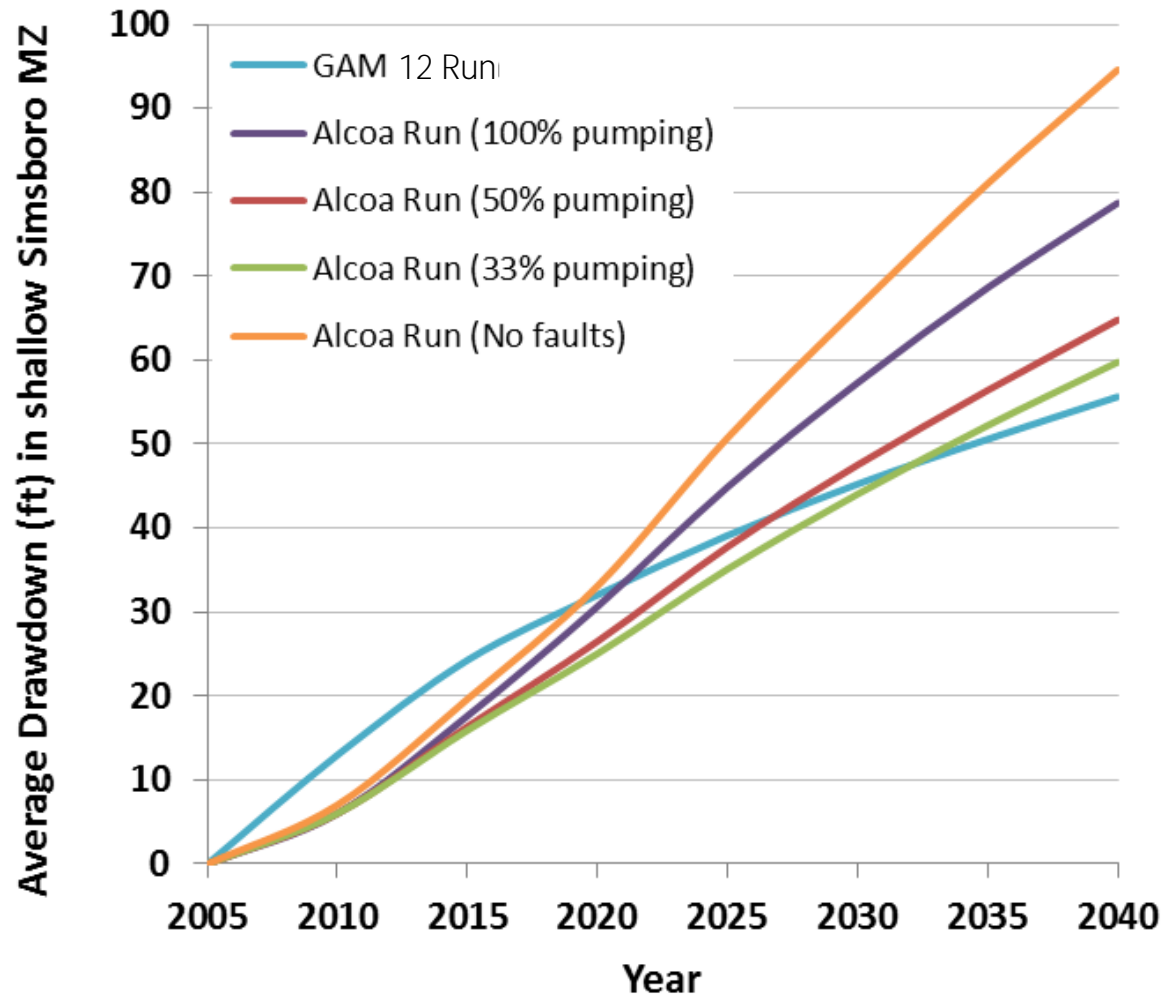
ALCOA Permit Application

- Historical Permit of 15,000 acre-feet per year (AFY) (~9,300 gpm)
 - Simsboro Aquifer
 - From 1988 to 2010, average pumping is 12,000 AFY
 - From 1994 to 2006, average pumping is ~30,000 AFY
- Operating Permit for additional 25,000 AFY (~15,500 gpm)
 - 24,552.7 contiguous acres (entitled to 49,105 AFY)
 - 24 new wells & 32 wells with historic permit
- Aquifer Impact Study
 - Used a GAM 12 Run 7-B modified with ALCOA pumping estimates
 - Simulated drawdown in Simsboro from 2005 to 2040

Predicted Average Drawdowns in Simsboro From 1980 and 2005



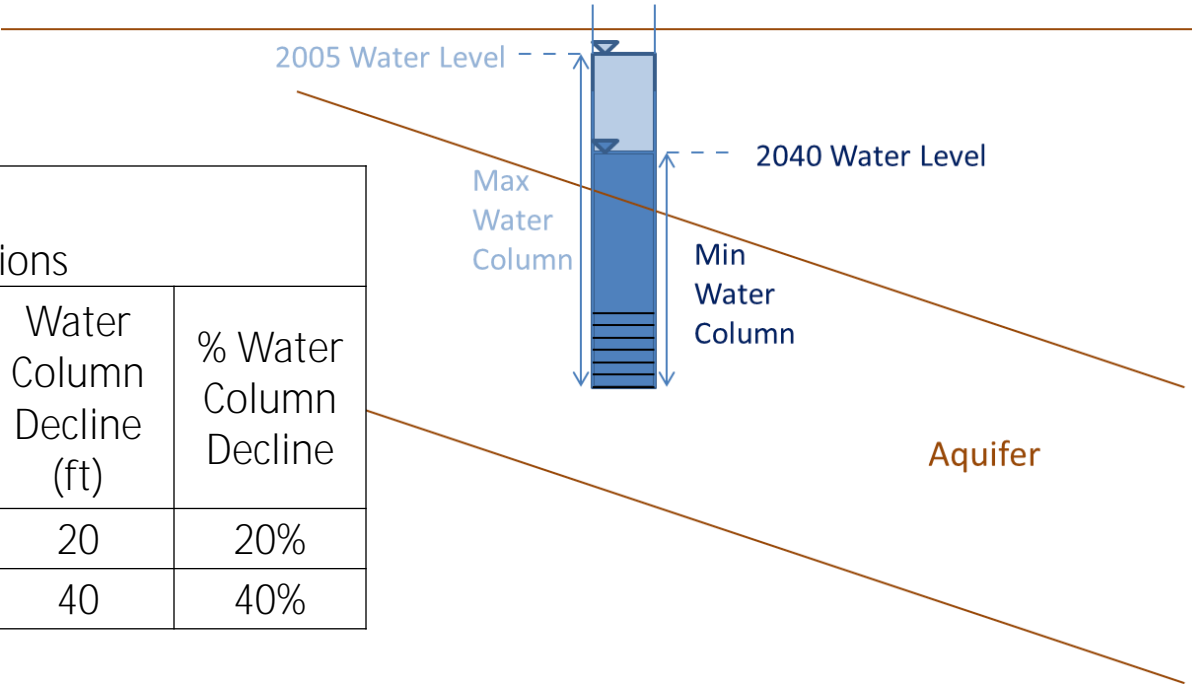
Predicted Average Drawdowns in Simsboro Management Zones from 2005



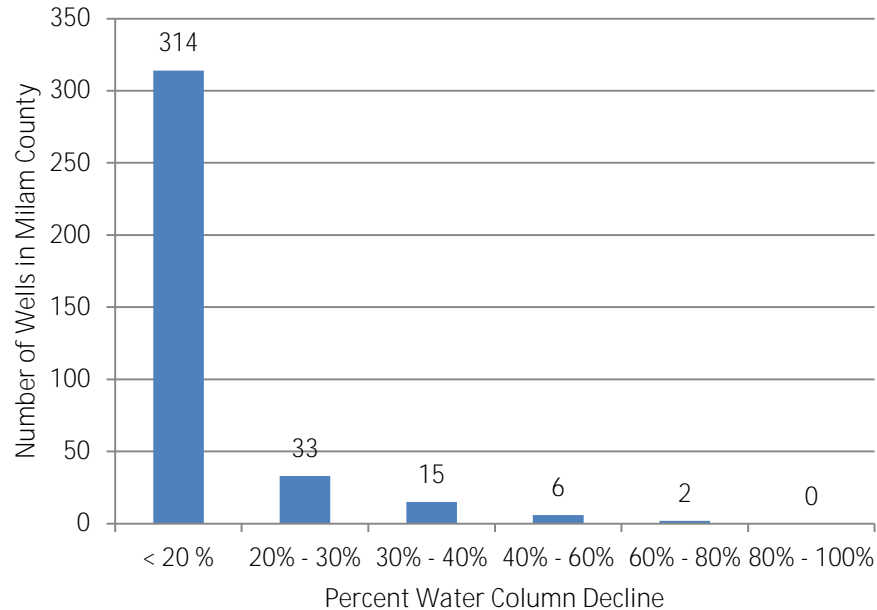
Example Calculation of Water Column in Wells



Example Calculations				
Well ID	Max Water Column (ft)	Min Water Column (ft)	Water Column Decline (ft)	% Water Column Decline
Well 1	100	80	20	20%
Well 2	100	60	40	40%

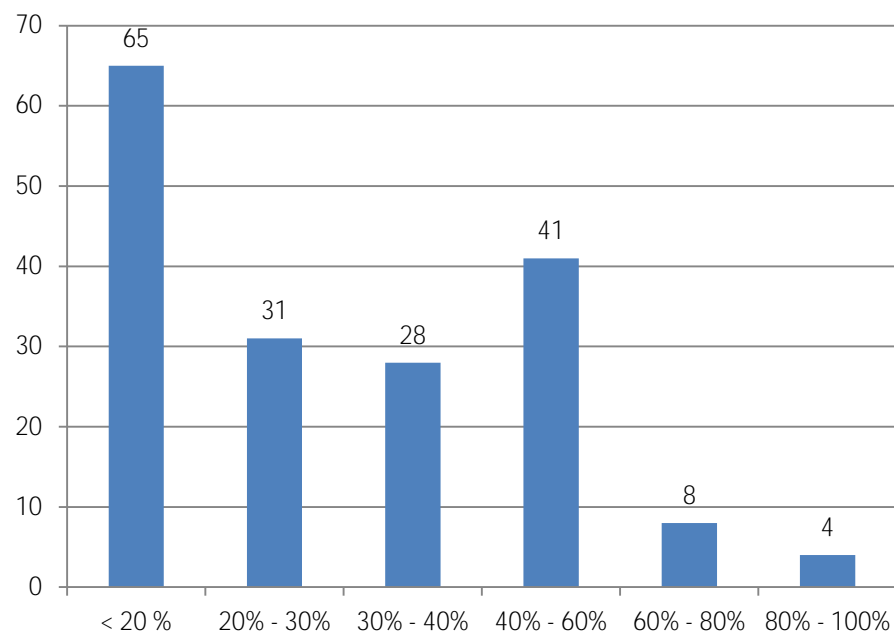


Estimate Water Column Decline in Wells from 2005 to 2040 in Calvert Bluff



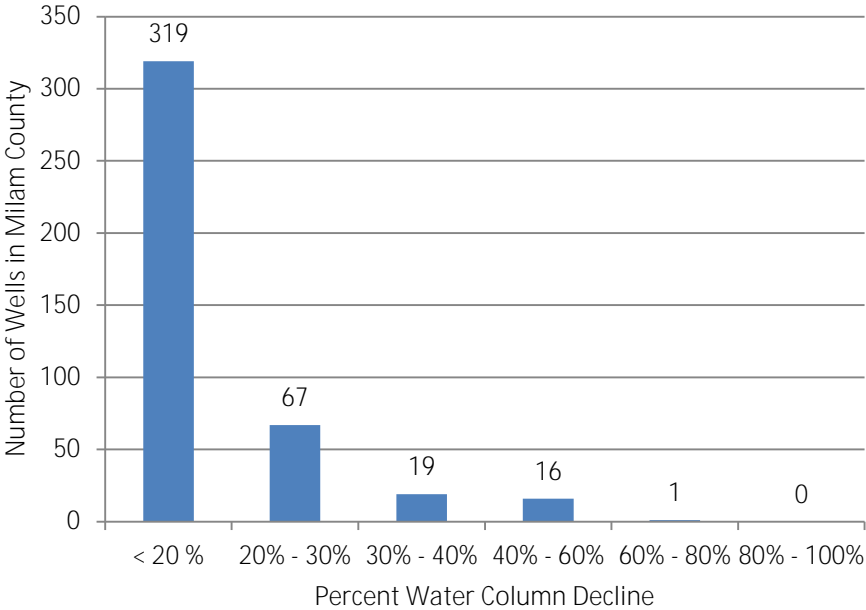
Percentage Change	Median Values			
	Well Count	Max Water Column (ft) (2005)	Min Water Column (ft) (2040)	Water Column Decline (ft)
< 20 %	314	412	376	33
20% - 30%	33	311	238	71
30% - 40%	15	146	90	53
40% - 60%	6	81	38	43
60% - 80%	2	66	25	40

Estimate Maximum Water Column Decline in Wells from 2005 to 2040 in Simsboro



Percentage Change	Median Values			
	Well Count	Max Water Column (ft) (2005)	Min Water Column (ft) (2040)	Water Column Decline (ft)
< 20 %	65	440	395	49
20% - 30%	31	264	192	69
30% - 40%	28	338	217	124
40% - 60%	41	223	104	113
60% - 80%	8	205	55	144
80% - 100%	4	48	6	39

Estimate Maximum Water Column Decline in Wells from 2005 to 2040 in Hooper



Percentage Change	Median Values			
	Well Count	Max Water Column (ft) (2005)	Min Water Column (ft) (2040)	Water Column Decline (ft)
< 20 %	319	311	270	45
20% - 30%	67	166	131	38
30% - 40%	19	116	81	36
40% - 60%	16	74	39	35
60% - 80%	1	78	29	49

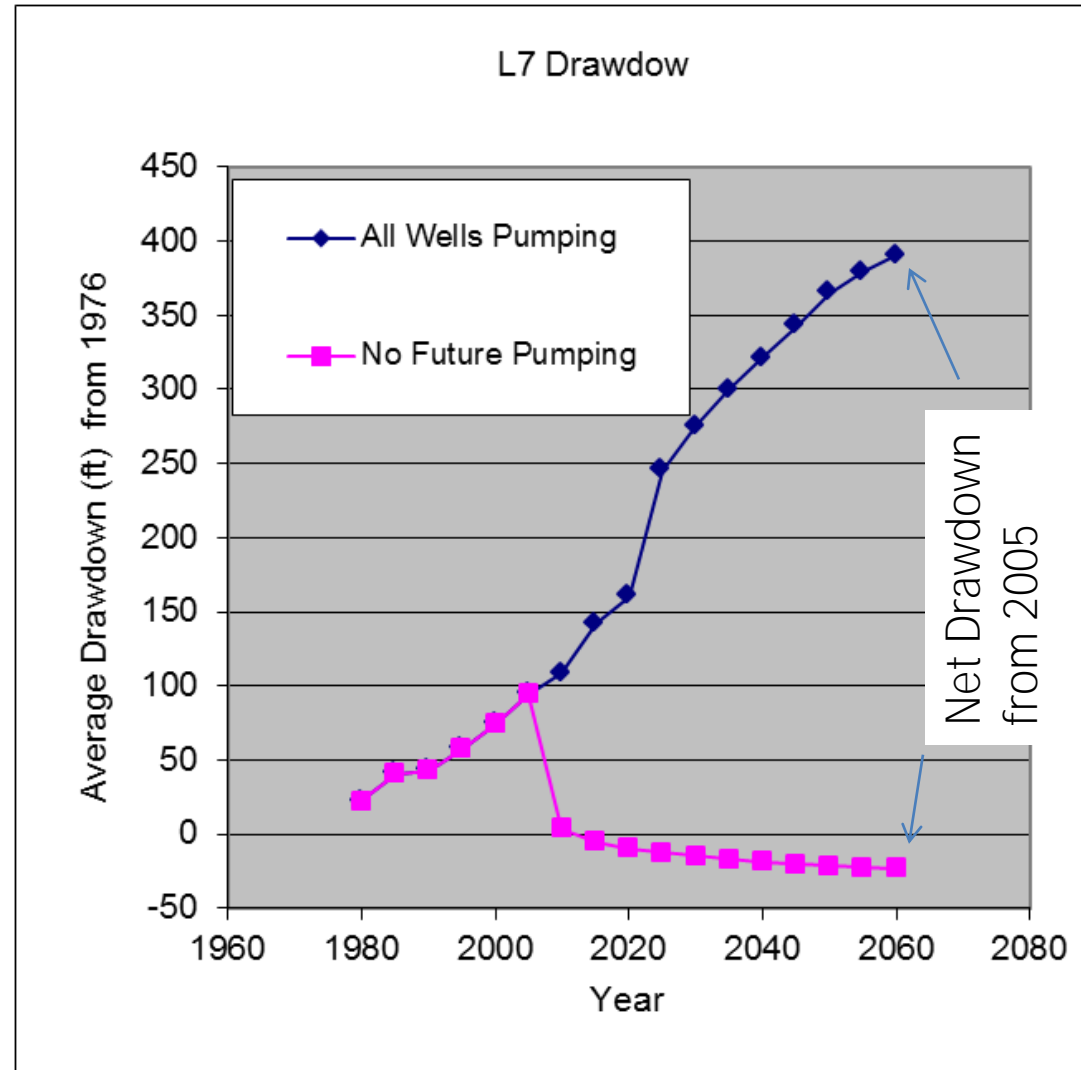
Summary Points

- Permit Meets District Rules on Well Spacings and Production Amounts
- Permit Provides Useful Information to Improve District Understanding of the Simsboro
- POSGCD has a Monitoring Network in place for the Simsboro capable of achieving District Management goals
- POSGCD has authority and rules in place to protect existing wells

Interim Findings From Additional Investigation of ALCOA Impacts

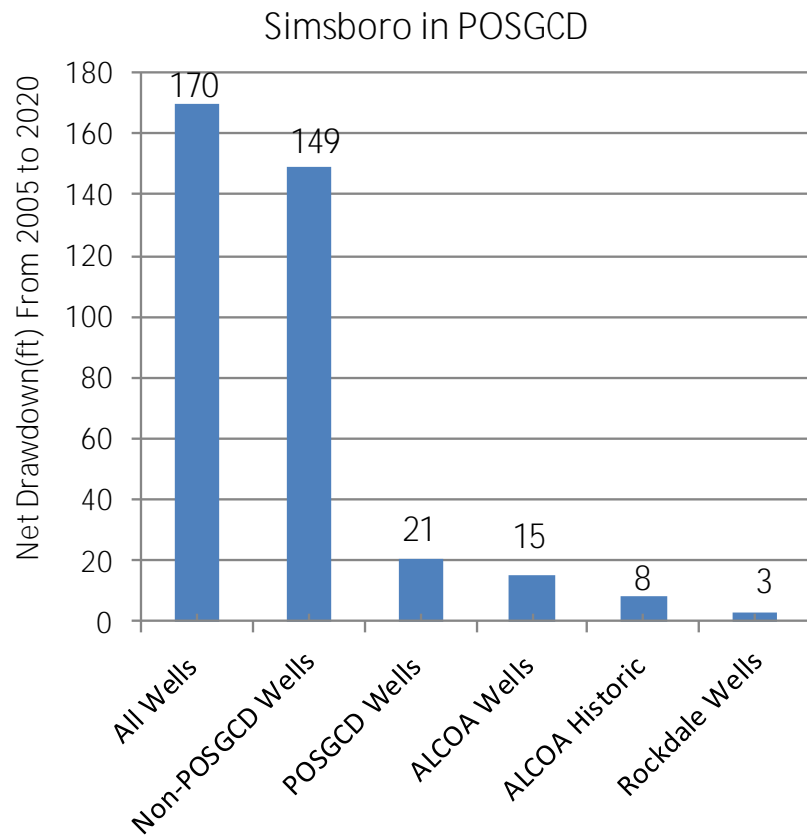
Analysis Method: Net Drawdown

- Evaluate the Impact of a well or group of wells based on the net drawdown
- Net drawdown is calculated not relative to an existing water table but based on the impact of the difference between a pumping and a non-pumping scenario

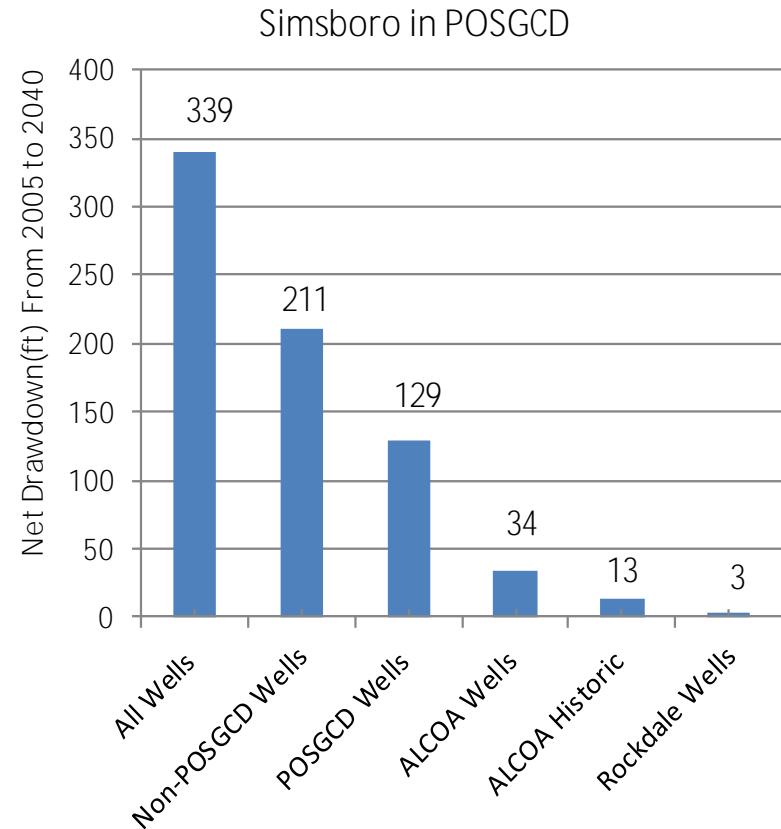


Net Drawdown in POSGCD Simsboro

2020



2040



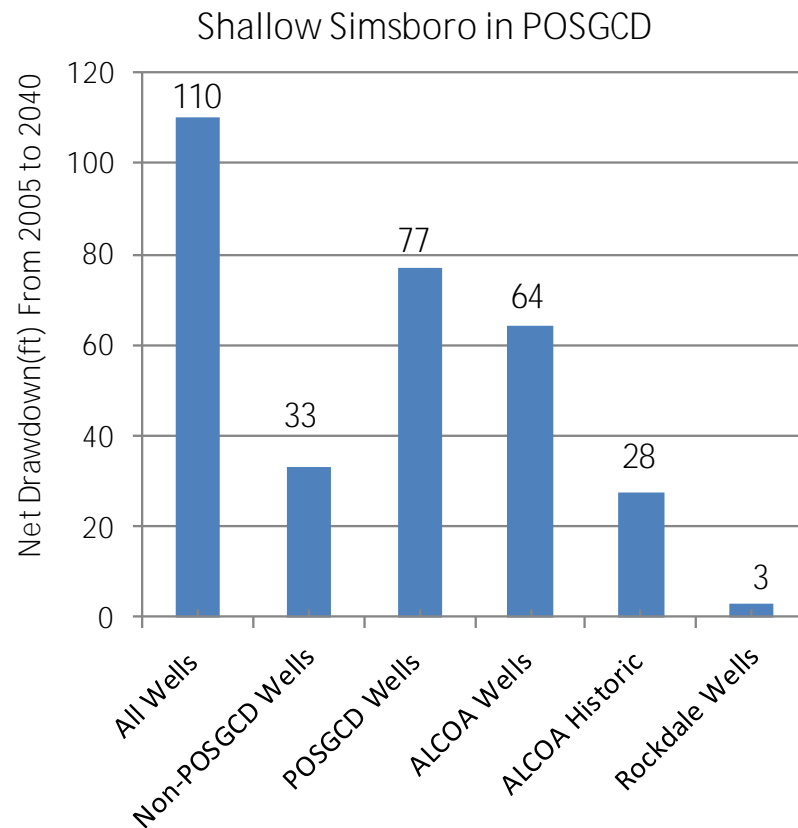
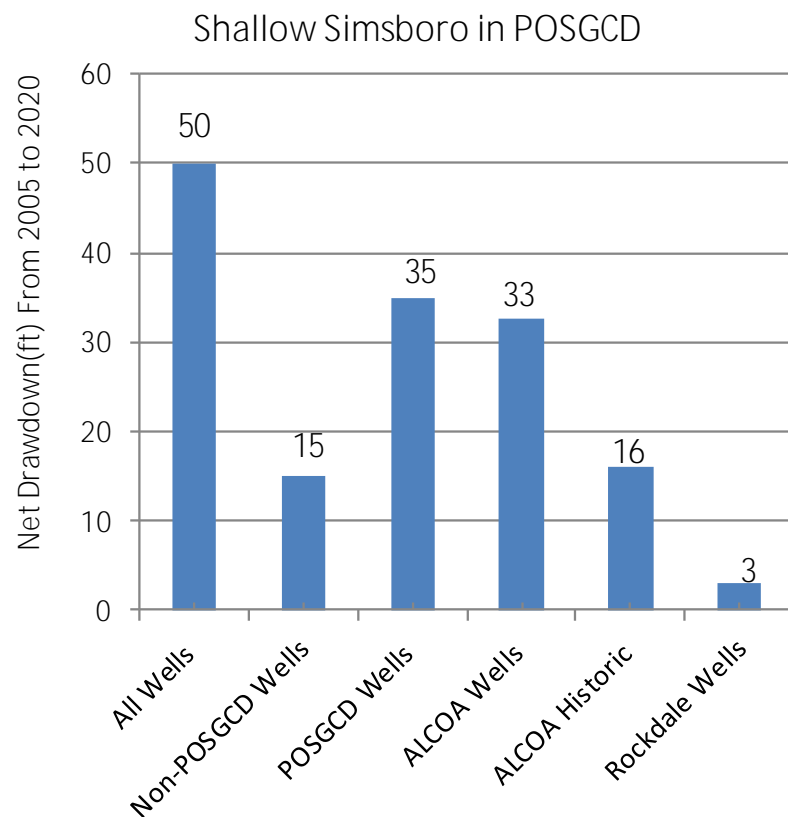
Contribution of Different Well Groups to Net Drawdown in POSGCD Simsboro

Well Group	Simsboro 2020	Simsboro 2040
Net Drawdown (ft)	179	339
Non-POSGCD Wells	87.9%	62.1%
POSGCD Wells	12.1%	37.9%
ALCOA Wells	9.1%	10.0%
ALCOA (Historic)	4.8%	3.9%
Rockdale Wells	1.8%	0.9%
ALCOA Wells (Permit)	4.3%	6.1%

Net Drawdown in POSGCD Shallow Simsboro

2020

2040



Contribution of Different Well Groups to Net Drawdown in POSGCD Shallow Simsboro

Well Group	Shallow Simsboro 2020	Shallow Simsboro 2040
Net Drawdown(ft)	50	110
Non-POSGCD Wells	30.0%	30.0%
POSGCD Wells	70.0%	70.0%
ALCOA Wells	65.0%	58.6%
ALCOA (Historic)	32.6%	25.0%
Rockdale Wells	6.0%	2.7%
ALCOA Wells (Permit)	32.4%	33.6%

Status of Assessment

- Net Drawdowns Calculated for Different Groups of Wells for Entire and Shallow Simsboro, Hooper, and Calvert Bluff
- Water Column Analysis is Nearly Complete
 - Future impact calculations will include approximately 100 more wells
 - Future impact calculations will no include wells in ALCOA permitted boundary
- Work has Not started on Impact of Changing of Well Spacing Requirements