

Loco Hills Yeso

Simulation Model Study

June 2011

William M. Cobb & Associates, Inc.

New Mexico OCD
Consolidated Hearing Cases:
14613 & 14647
Burnett Oil Co., Inc./
Hudson Oil Company of Texas
Exhibit # 60

Summary and Conclusions

- *Built 40 acre, 12 layer Yeso simulation model*
- *Made primary depletion runs*
 - *Varied oil rate allowable and GOR limit*
 - *Studied 20 acre and 10 acre development*
- *Main conclusions*
 - *Oil recovery is sensitive to rate and GOR limit*
 - *Oil recovery decreases with higher oil allowable*
 - *Oil recovery is higher for limited GOR cases*
 - *10 acre development recovers very little additional oil above 20 acre development*

Loco Hills Yeso Model

40 Acre - 12 Layer Model

Development on 20 ac spacing:

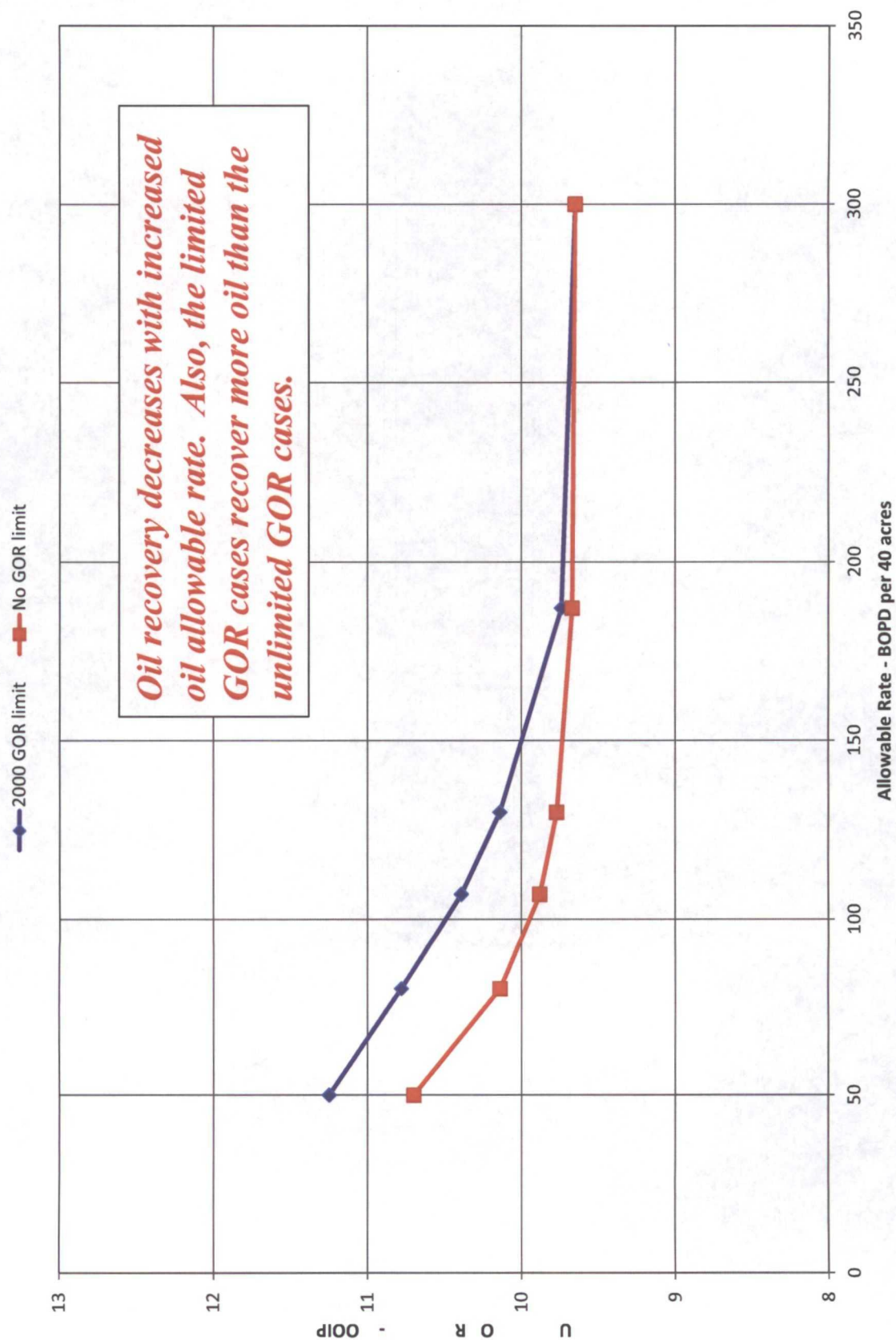
allowable BOPD/40 ac.	allowable BOPD/well	2000 GOR Limit			No GOR Limit		
		EUR %OOIP	EUR %OGIP	40 Ac. EUR MSTB	EUR %OOIP	EUR %OGIP	40 Ac. EUR MSTB
50	25	11.25	87.81	201.9	10.70	86.16	192.1
80	40	10.78	86.65	193.5	10.14	86.18	182.0
107	53.5	10.39	86.40	186.5	9.88	86.40	177.3
130	65	10.14	86.36	182.0	9.77	86.49	175.4
187	93.5	9.74	86.45	174.8	9.67	86.60	173.6
300	150	9.65	86.64	173.2	9.65	86.62	173.2

Development on 10 ac spacing:

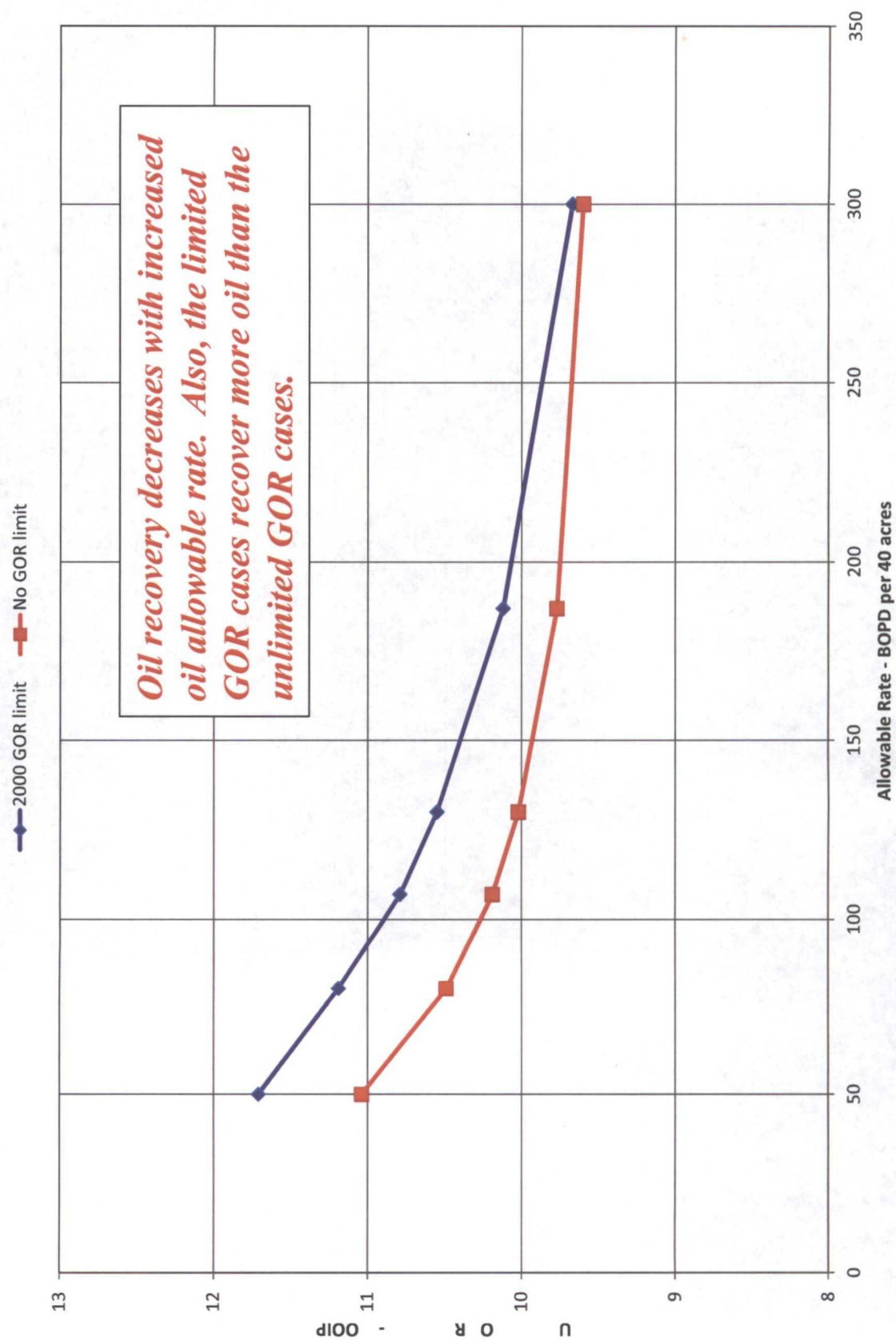
allowable BOPD/40 ac.	allowable BOPD/well	2000 GOR Limit			No GOR Limit		
		EUR %OOIP	EUR %OGIP	40 Ac. EUR MSTB	EUR %OOIP	EUR %OGIP	40 Ac. EUR MSTB
50	12.5	11.71	87.32	210.2	11.04	85.04	198.2
80	20	11.19	86.08	200.9	10.49	84.93	188.3
107	26.75	10.79	85.56	193.7	10.19	85.04	182.9
130	32.5	10.55	85.47	189.4	10.02	85.19	179.9
187	46.75	10.12	85.32	181.7	9.77	85.41	175.4
300	75	9.67	85.63	173.6	9.60	85.68	172.3

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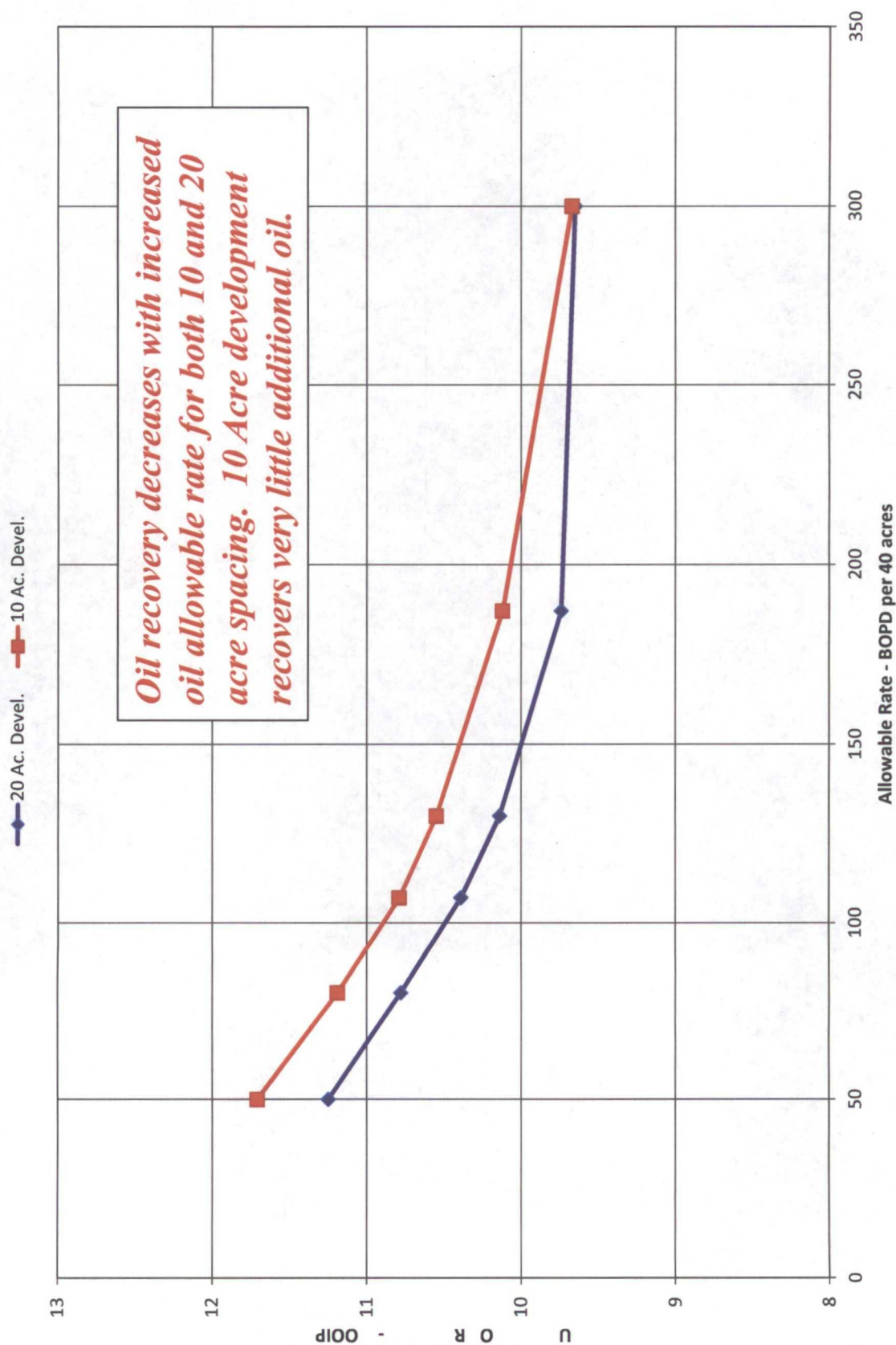
Loco Hills 40 Acre Model - 20 Acre Spacing



Loco Hills 40 Acre Model - 10 Acre Spacing



Loco Hills 40 Acre Model - 2000 GOR Limit



Scope of Study

- *Prepare model for “typical” 40 acre element*
 - *Rock and fluid saturations from log and core data*
 - *Fluid properties from correlations*
- *Model primary oil recovery 20 acre and 10 acre development*
 - *Include effects of hydraulic fracture treatments*
 - *Study sensitivity of oil recovery to allowable oil rate and GOR limits*

Model Description

- *Software – Merlin black oil simulator marketed by Gemini Solutions Inc.*
- *40 acre area*
 - *2 wells for 20 acre spacing runs*
 - *4 wells for 10 acre spacing runs*
- *12 vertical layers*
 - *From Paddock zone in Gissler B 44 well*
 - *Used Gissler B 33 whole core for vertical perms*
 - *Used rotary SWC data from all available wells for horizontal perm's*

Model Description – Cont.

- *Used correlations for relative permeability curves – no lab data available*
- *Used fluid correlations for PVT properties*
- *Hydraulic fracture geometry*
 - *20 acre cases*
 - *Cell width for frac = 1.81'*
 - *Frac length = 1027'*
 - *Frac perm = 100 md.*
 - *10 acre cases*
 - *Cell width for frac = 1.81'*
 - *Frac length = 440'*
 - *Frac perm = 100 md.*