

From: Gansert, Tanner
Sent: Thu Oct 22 17:17:46 2009
To: Zamorouev, Alexander V; Bozeman, Walt; Simpson, Brad; Mago, Alonso; Schott, David W
Subject: RE: Macondo Core VOI
Importance: Normal
Attachments: Macondo Core VOI.ZIP; Macondo Evaluation.ZIP

Thanks for all of your input in this morning's discussion. As requested, I have attached the VOI presentation below. If you have any further questions about the analysis please let me know.

<<...>>

Also, the slide below is an excerpt from the RVA presentation detailing the evaluation program for success and failure cases. The success and failure cases have been defined as >45 ft and <20 ft of pay, respectively. Intermediate cases would be evaluated under success case only if it is recommended and approved based on the available well data at the time.

<<...>>

From: Zamorouev, Alexander V
Sent: Thursday, October 22, 2009 11:38 AM
To: Gansert, Tanner; Bozeman, Walt
Cc: Simpson, Brad; Mago, Alonso
Subject: Logs for Macondo

Gentlemen,

Can you please forward us a list of logs, cores and samples you are planning to run in Macondo in success/failure case?

Tanner, can you please forward your VOI presentation to us too?

Thank you!

Kind regards,

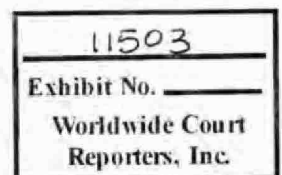
Sasha Zamorouev

Pompano/Mica Geophysicist

GOM DWP, BP Houston

281-366-5344

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Macondo RVA Follow-up

Core VOI

Objective



- Address pore volume compressibility uncertainty highlighted in Macondo RVA
- Determine the necessity of whole core acquisition in Macondo exploration well.

Agenda

- Temp./Porosity relationship
- Expected Macondo compressibility
- Potential aquifer size
- Recovery Factor range
- Whole core acquisition

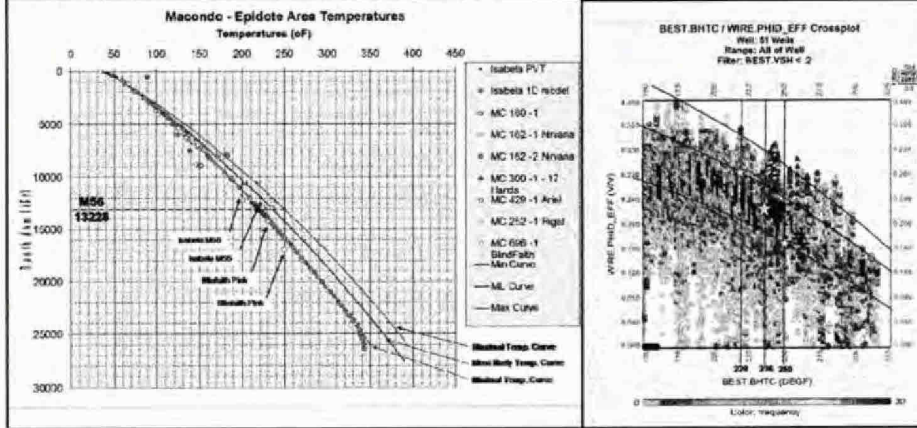
Macondo Temperature



ML Temp = 236°F vs. 209°F at Isabela

ML Porosity = 23% vs. 26% at Isabela

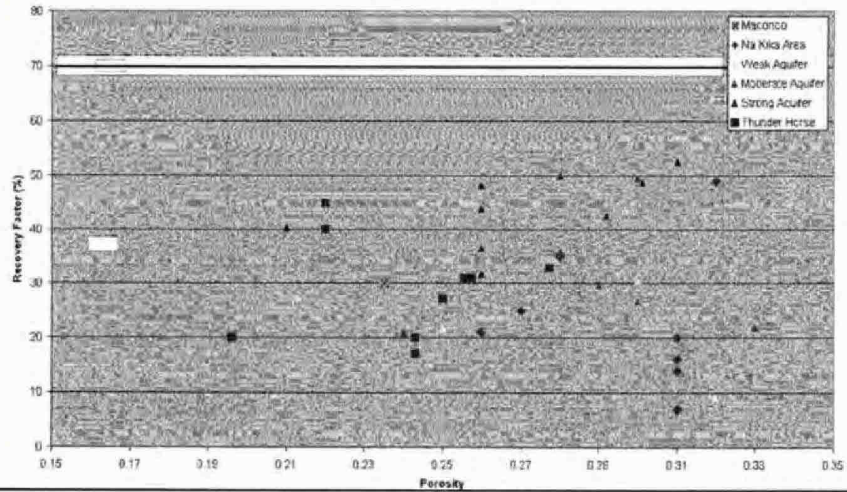
Is compressibility a critical uncertainty for RF?



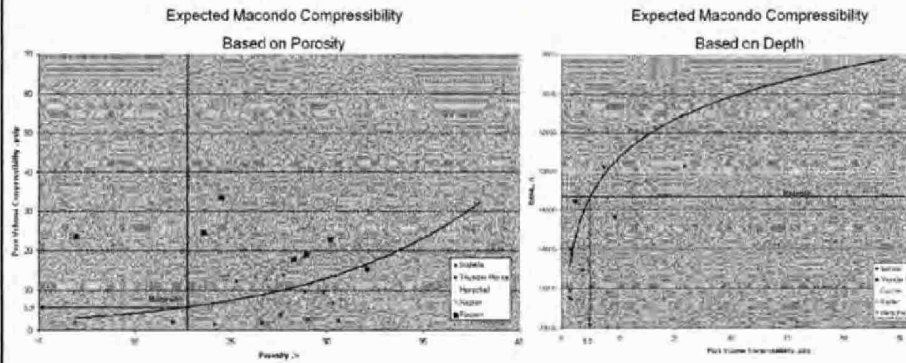
Effect of Porosity on Recovery Factor



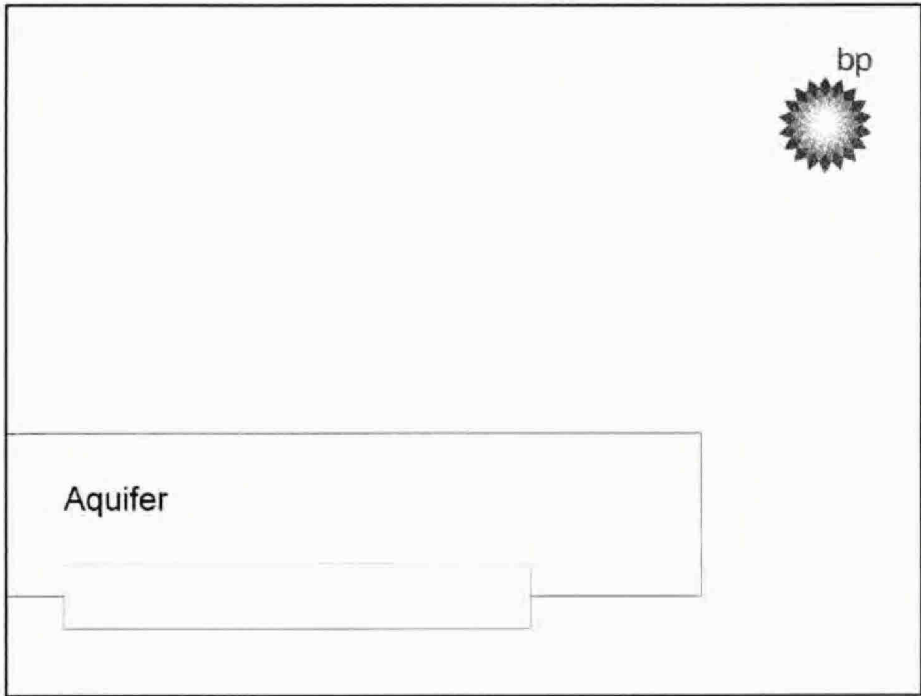
BP Depletion Drive Turbidite Reservoirs with Wet Tree Developments + Thunder Horse



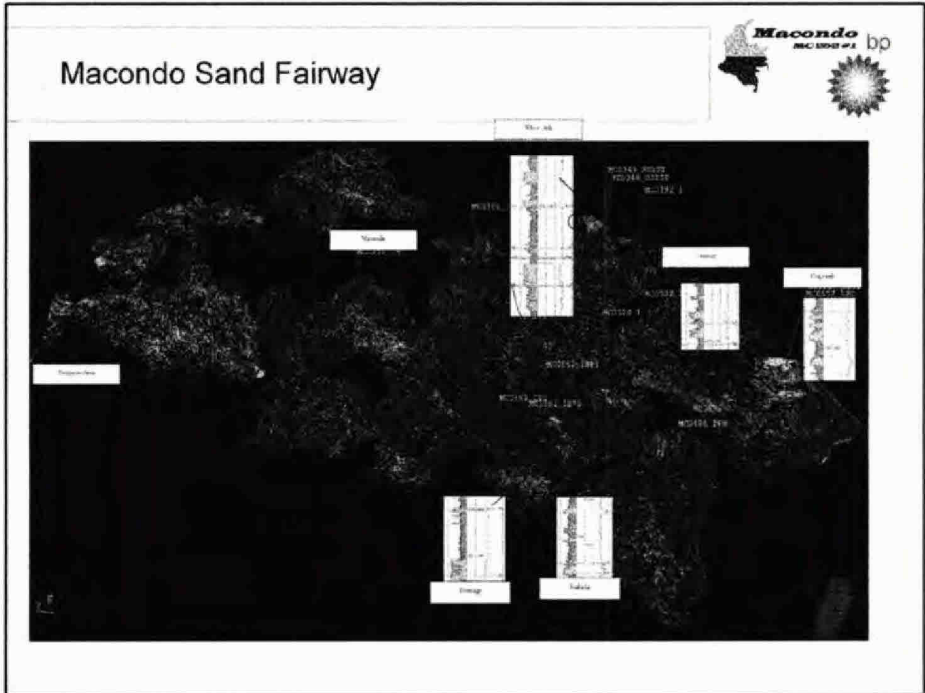
Macondo Pore Volume Compressibility



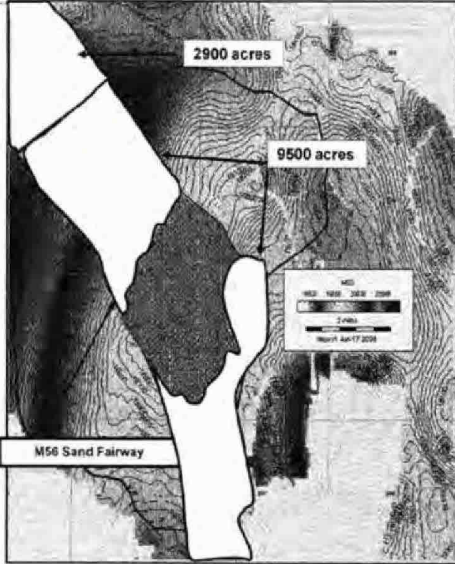
- Well developed compressibility trend with porosity and burial depth.
- 5-6 μ sip expected at Macondo



Macondo Sand Fairway



Aquifer Size



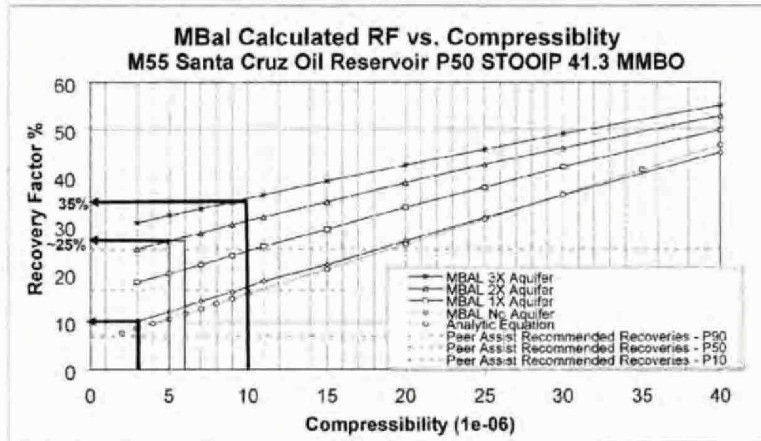
9500 acre Aquifer		
Net Sand Thickness, ft.	Porosity, %	Aquifer Size
44	13	1.5x
44	17	2.0x
66	17	2.9x

12400 acre Aquifer		
Net Sand Thickness, ft.	Porosity, %	Aquifer Size
44	13	1.9x
44	17	2.5x
66	17	3.7x

Macondo Recovery Factor



- Aquifer size and connectivity remains the dominant source of uncertainty.
- Pre RVA Estimate: 15% - 30% - 45% Potential update: 10% -25% - 35% due to lower expected compressibility



Coring



- Whole core acquisition is not recommended based on reducing RF uncertainty.
- RF range reduced only $\pm 2\%$ with known compressibility due to unknown aquifer response.

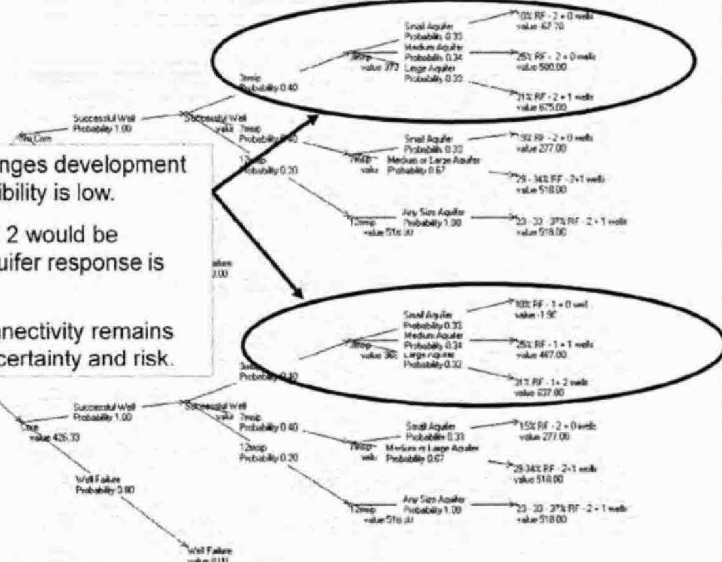
Coring Decision

Reasons to Core	Reasons to NOT Core
•compressibility uncertainty	•Estimated \$7MM •Bypass integrity •Risk in heads-up •Rotary sidewalls

Core VOI



- Whole core changes development only if compressibility is low.
- In this case well 2 would be deferred until aquifer response is understood.
- Aquifer size/connectivity remains the dominant uncertainty and risk.





Coring Decision – No Whole Core

- Potential value of Core is prevention of over-development in the case of low measured compressibility and very weak aquifer.
 - NPV Core = \$-1.9 vs. NPV No Core = \$-68 MM
- Delayed development caused by core analysis indicating low compressibility erodes value in cases of weak to moderate aquifer support.

Expected Value: With Core Without Core
 \$419 MM \$427 MM

Assumptions

Pro Core bias	No Core bias
<ul style="list-style-type: none"> • Compressibility measurements from relay SWC are too important to add value. Development plan is identical regardless of SWC compressibility • Whole core compressibility measurements are 100% accurate • 100% Ps for material discovery if core criteria (sand with show) is met • No risk to integrity of exploration well 	<ul style="list-style-type: none"> • No change in facility cost if low compressibility is measured in whole core, allowing future expansion if aquifer support is present.
<p>*No change vs. pre-drill development plan if moderate-high compressibility is measured in whole core. MC252 can only support 2-3 max.</p>	

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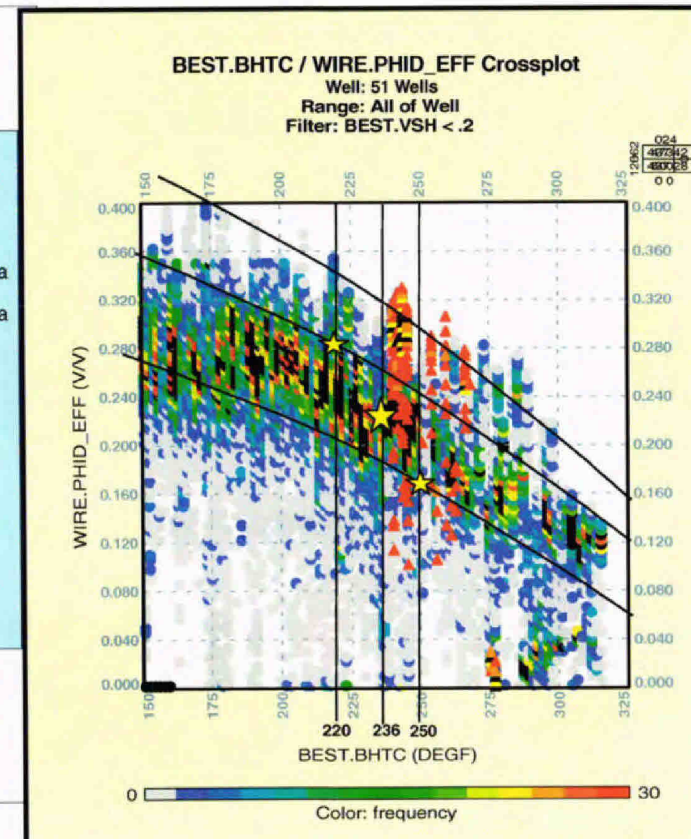
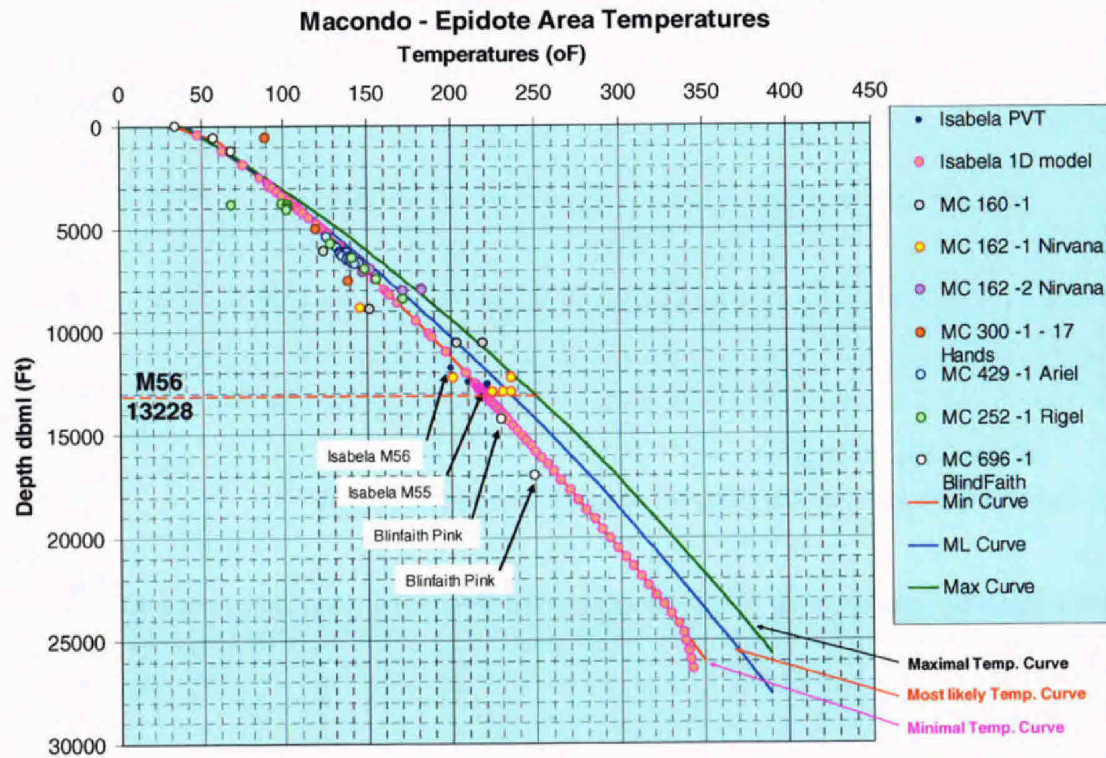
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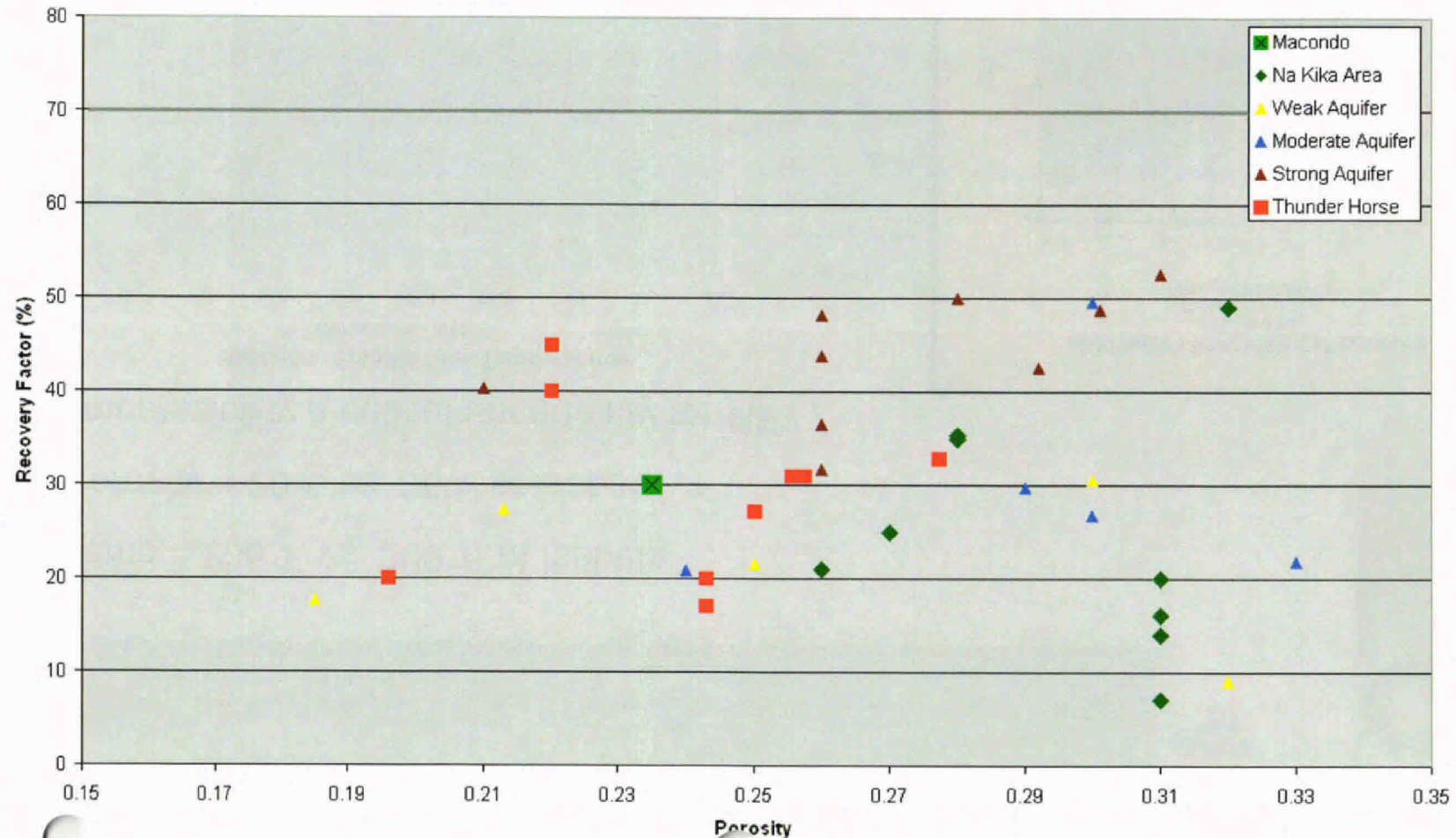
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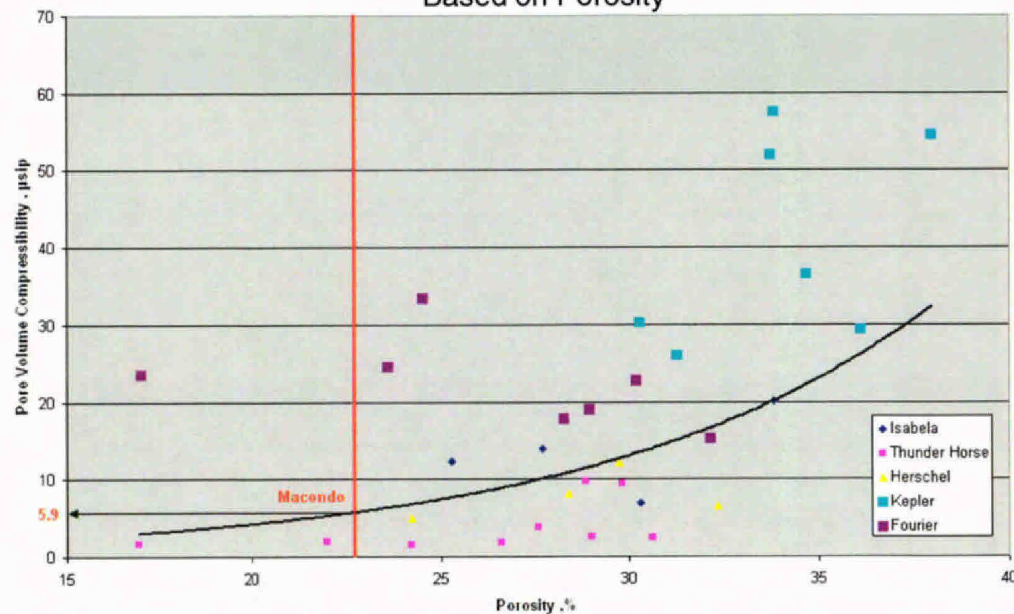
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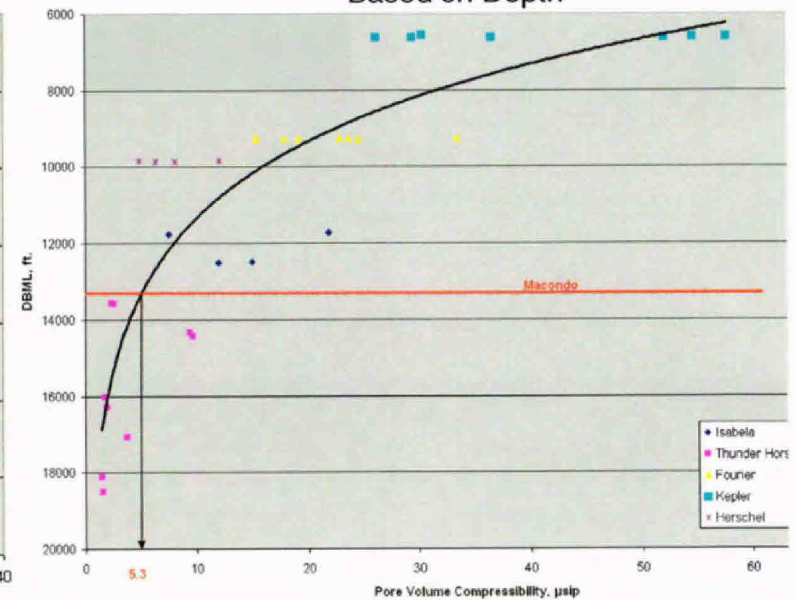
Macondo Pore Volume Compressibility



Expected Macondo Compressibility
Based on Porosity



Expected Macondo Compressibility
Based on Depth



- Well developed compressibility trend with porosity and burial depth.
- 5-6 μsip expected at Macondo

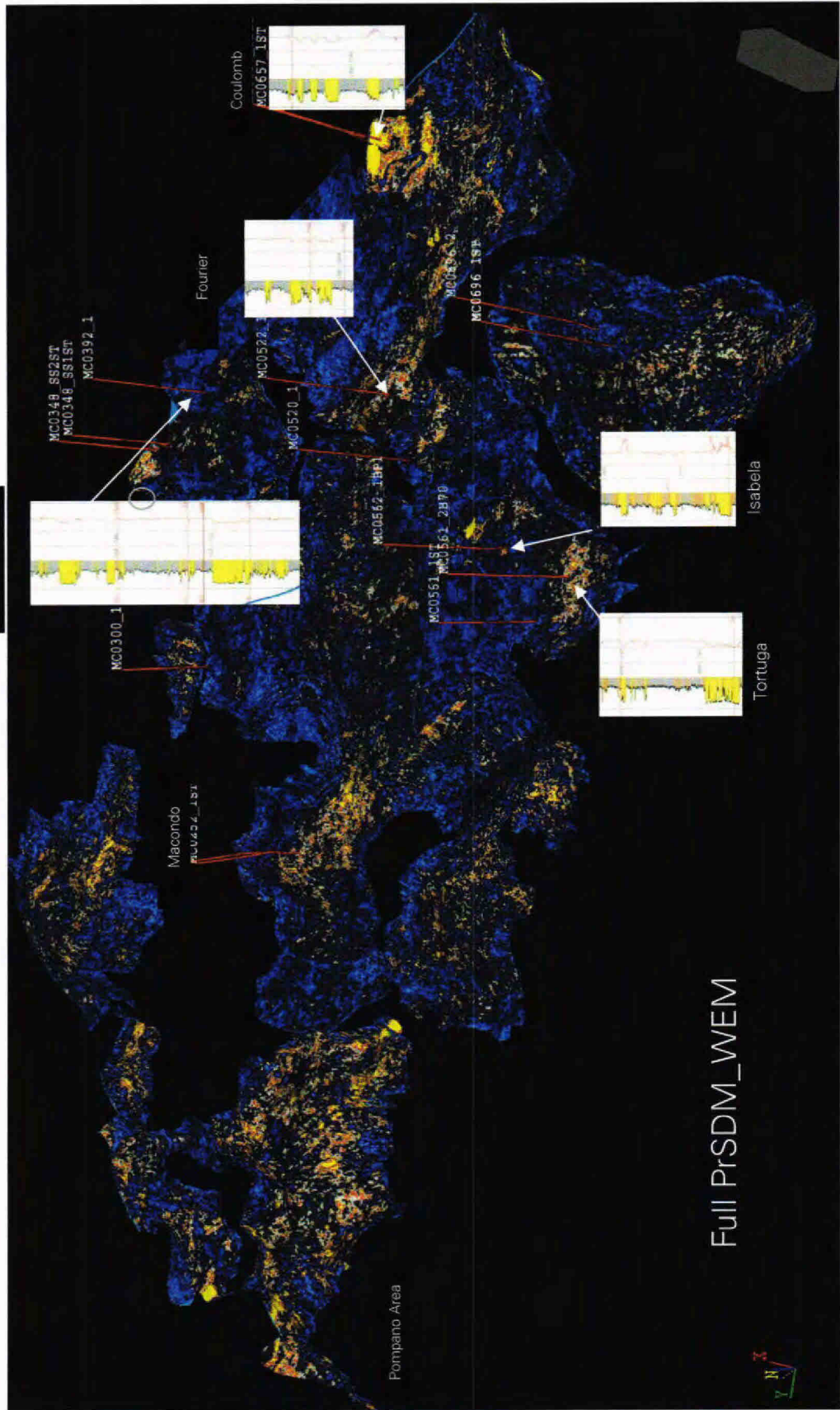


Aquifer



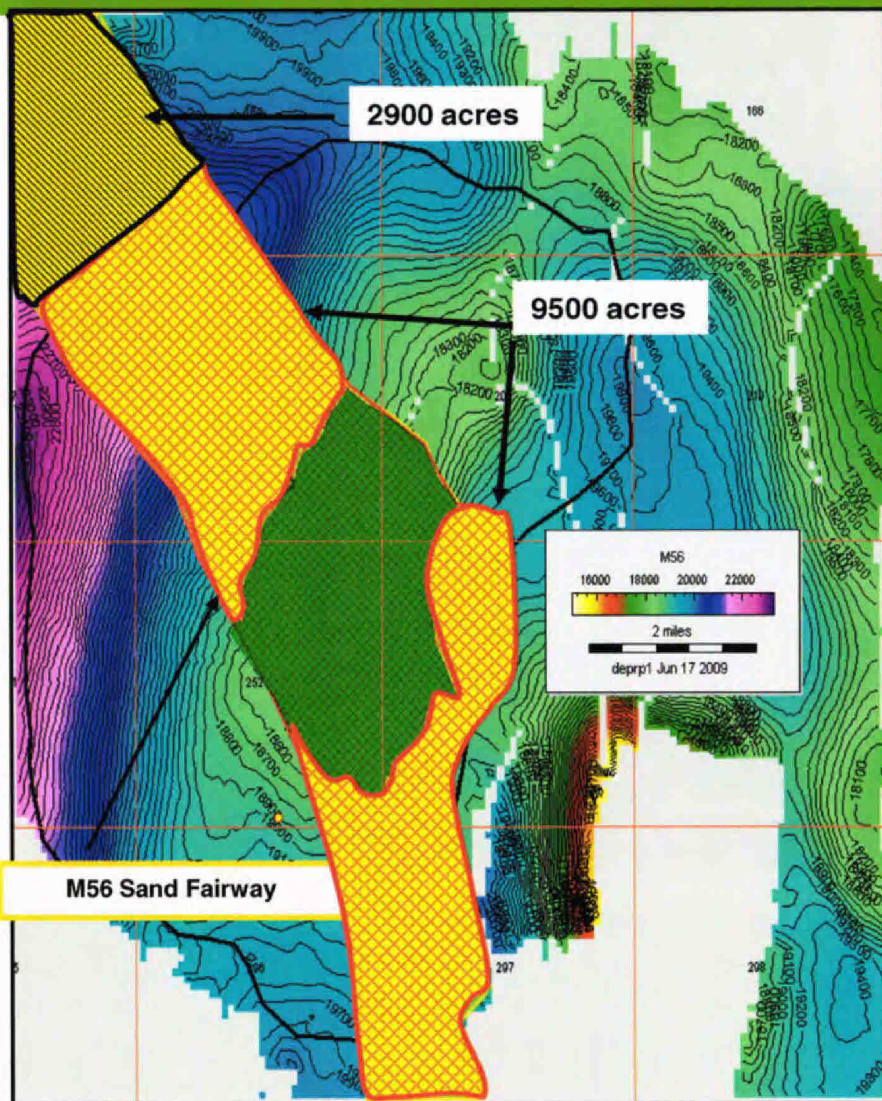
Macondo Sand Fairway

White Ash



Full PrSDM_WEM

Aquifer Size



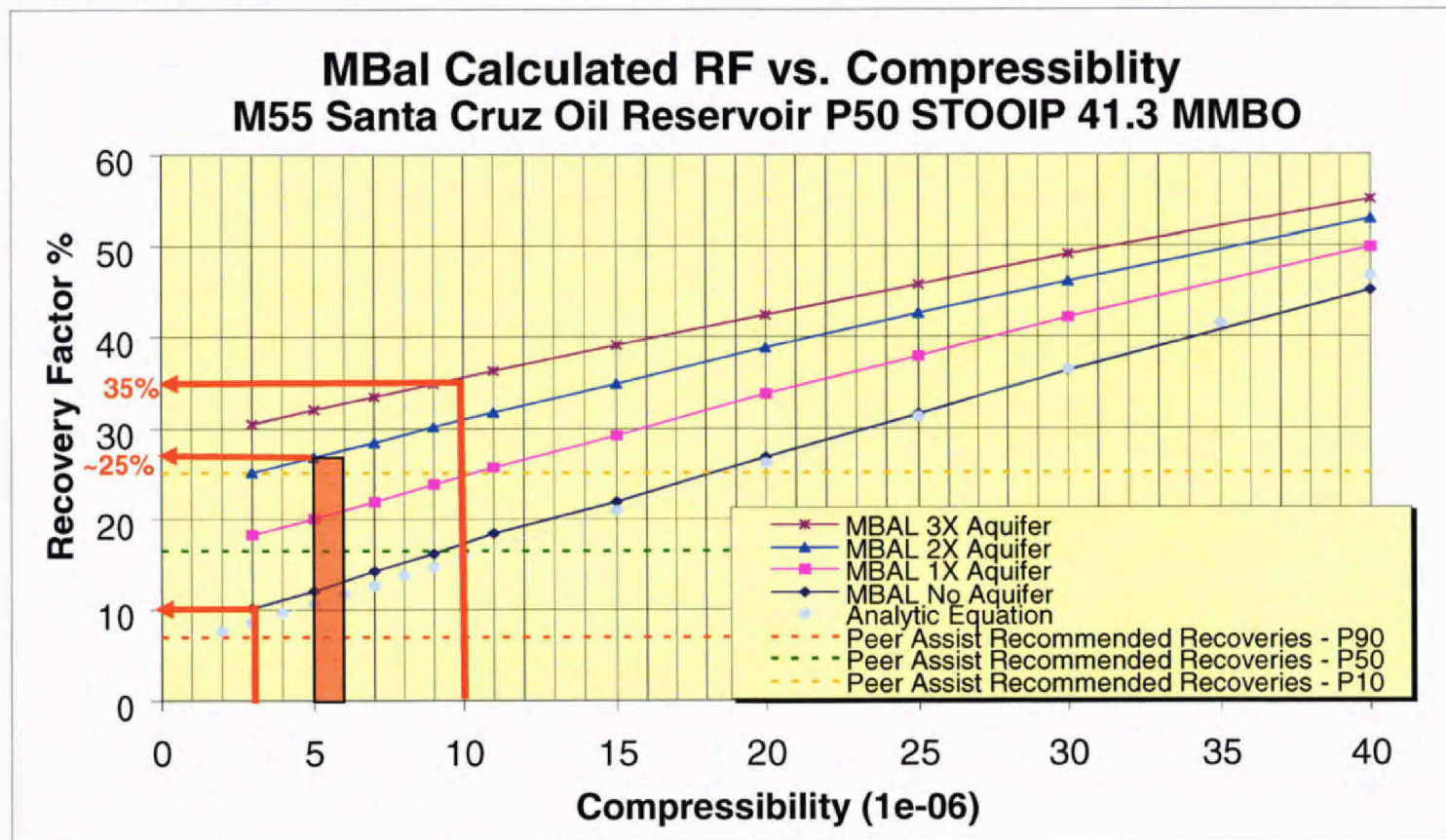
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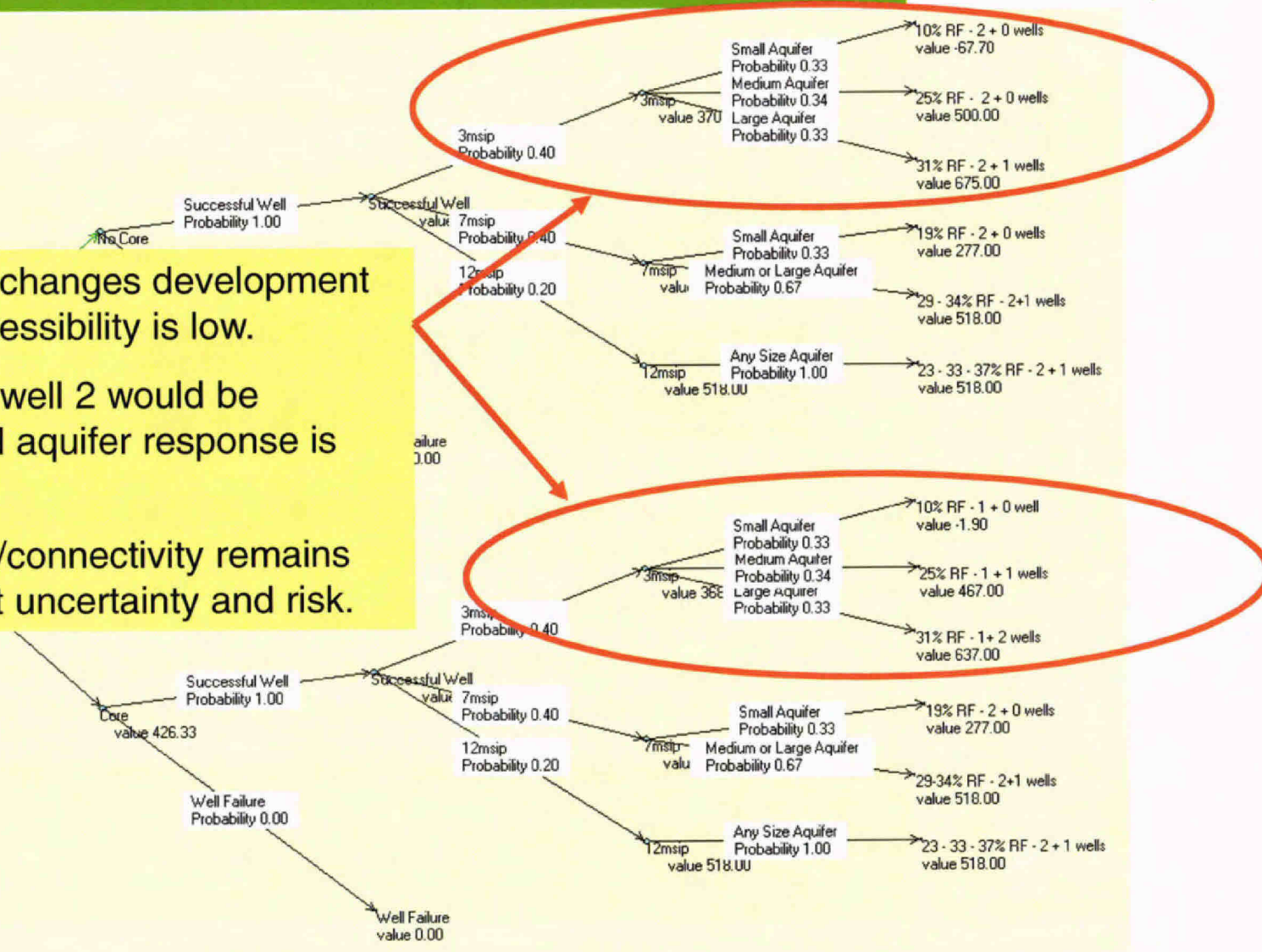
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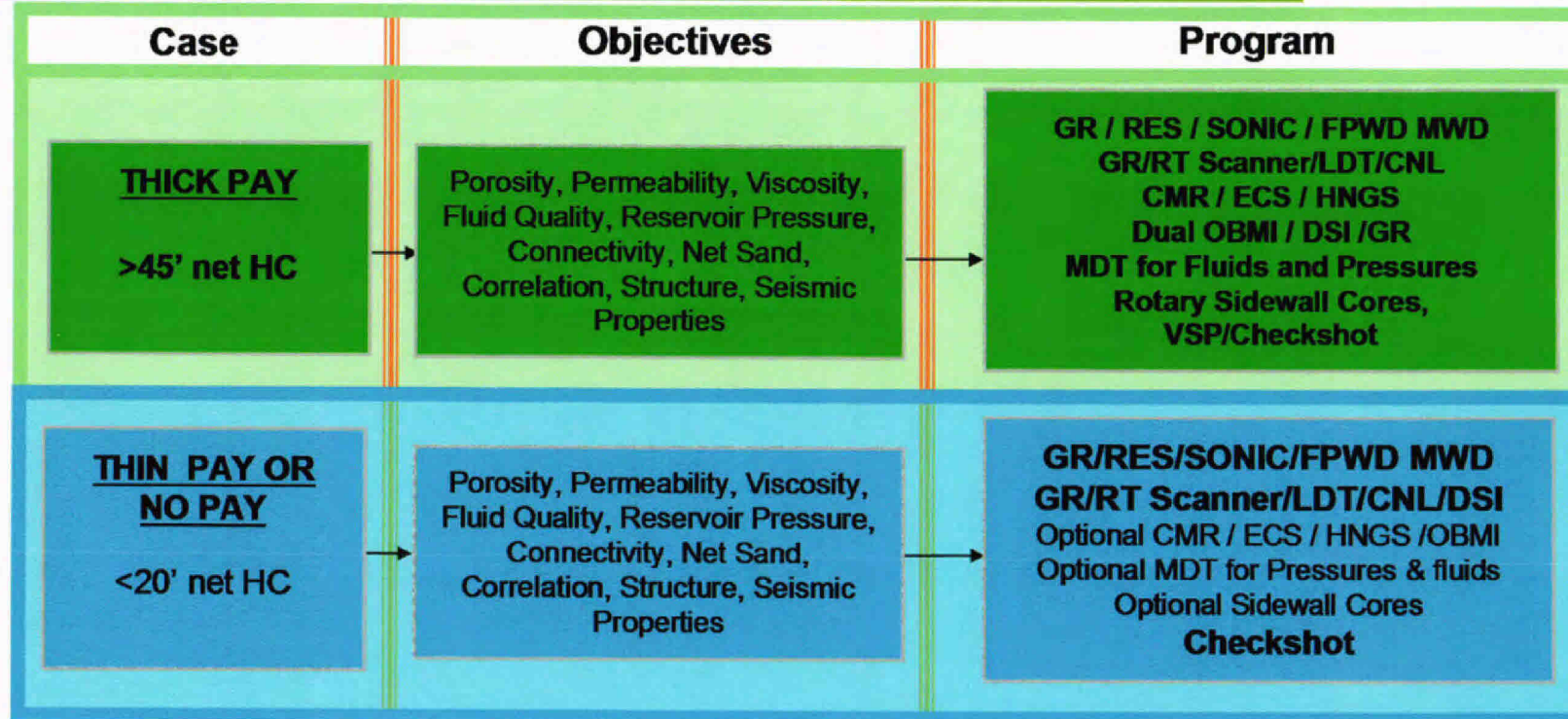
**Macondo Evaluation Program
TD logging run**



Case	Objectives	Program
THICK PAY >45' net HC	Porosity, Permeability, Viscosity, Fluid Quality, Reservoir Pressure, Connectivity, Net Sand, Correlation, Structure, Seismic Properties	GR / RES / SONIC / FPWD MWD GR/RT Scanner/LDT/CNL CMR / ECS / HNGS Dual OBMI / DSI/GR MDT for Fluids and Pressures Rotary Sidewall Cores, VSP/Checkshot
THIN PAY OR NO PAY <20' net HC	Porosity, Permeability, Viscosity, Fluid Quality, Reservoir Pressure, Connectivity, Net Sand, Correlation, Structure, Seismic Properties	GR/RES/SONIC/FPWD MWD GR/RT Scanner/LDT/CNL/DSI Optional CMR / ECS / HNGS /OBMI Optional MDT for Pressures & fluids Optional Sidewall Cores Checkshot

Evaluated @ \$75/bbl	Prospect ML Values	3 Well Economic Threshold	Single Well Economic Threshold
Resource Volume (mmboe)	64	54	23
Prospect Average Thickness (ft)	44	38	20
Net Pay at Exploration Well (ft)	108	91	45

Macondo Evaluation Program TD logging run



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Macondo Evaluation Program
TD logging run



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THIN PAY OR NO PAY ~20' net HC	Porosity, Permeability Viscosity, Fluid Quality Reservoir Pressure Connectivity, Net Sand Correlation, Structure Seismic Properties	GR/RES/SONIC/FPWD MWD GR/RT Scanner/LD/CNL/DSI Special CMR / ECS / HNGS OBMI Optional MDT for Production & Flow Optional Sidewall Cores Checkshot

Evaluate d @ \$75/ctbl	Proposed Well	1 Well Economic Threshold	Sign. Prod. Economic Break-Even
Volume (cubic feet)	10	50	100
Weight Average Thickness (ft)	10	20	30
Net Pay @ Gradient Net ft	10	20	30

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