

From: Fleckman, Kim B.
Sent: Sun May 16 15:39:31 2010
To: Tom Hunter
Cc: Caldwell, Jason
Subject: RE: Slides for May 16 Science Meeting
Importance: Normal
Attachments: Science Mtg May 16 2010.pdf

<<...>>

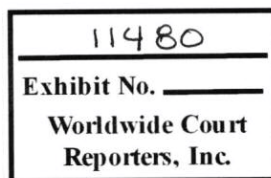
From: Fleckman, Kim B.
Sent: Sunday, May 16, 2010 10:14 AM
To: 'tohunte@sandia.gov'
Cc: Caldwell, Jason
Subject: Slides for May 16 Science Meeting

<< File: Science Mtg May 16 2010.pdf >>

Tom,
Attached are the slides James Dupree will review with you at 10:30am CST.
Kind regards,
Kim

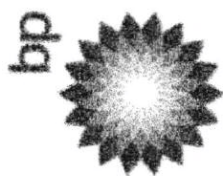
Kim Fleckman
E&P Executive Office
BP ~ 501 WestLake Park Blvd. ~ Houston, TX 77079
WestLake I ~ Room 15.179
Tel: 281-366-3062 ~ Email: kim.fleckman@bp.com

CONFIDENTIAL



BP-HZN-2179MDL05814853

TREX 011480.0001



Deepwater Horizon Review

Sunday May 16, 2010

Recommendation



OPTION: Recommend a Dynamic/Momentum Kill with a blend of 16.4 lb and 14.2 lb water based mud

BASIS:

- Low Risk, High Reward
- Base of BOP pressure
- Does not pressure burst disks
- If unsuccessful no regrets
- Multiple attempts possible

Governing Question



What is the shut in pressure that would be expected in the BOP & LMRP?

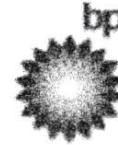
DATA: Reservoir pressure is 11,850 psi at 13,047' below the mud line, fluid density from samples

CALCULATE: We believe the pressure would be between 8400 and 8900 psi.

UNCERTAINTY: in calculation due to reservoir fluid composition and remote possibility of other sources

REVIEW: Three independent groups from Sandia, Los Alamos, and Livermore are verifying calculations.

Governing Question



What are the implications of a 8900 psi shut in pressure?

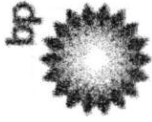
DATA: Casing design steel strength, casing tests during drilling, rupture disk ratings

CALCULATE: 8900 psi shut in pressure is below the 16" burst disk rupture pressure by 1,000 psi +/-.

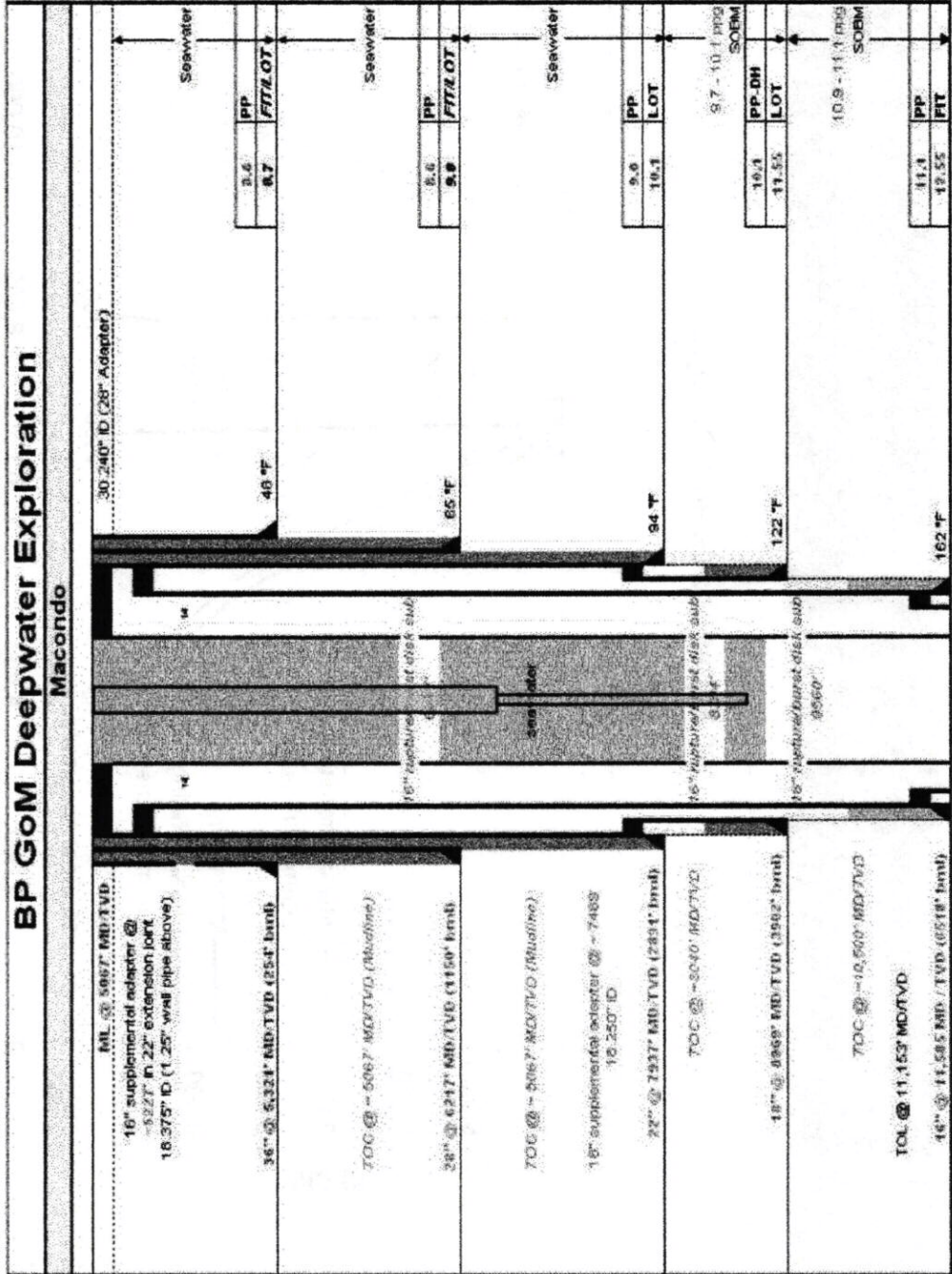
IMPLICATIONS: If rupture disks fail, broach of 18" shoe and potential hydrocarbons to sea floor

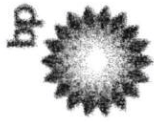
UNCERTAINTY: External pressure load

REVIEW: National Lab is reviewing likely external pressure on 16" casing under static conditions.

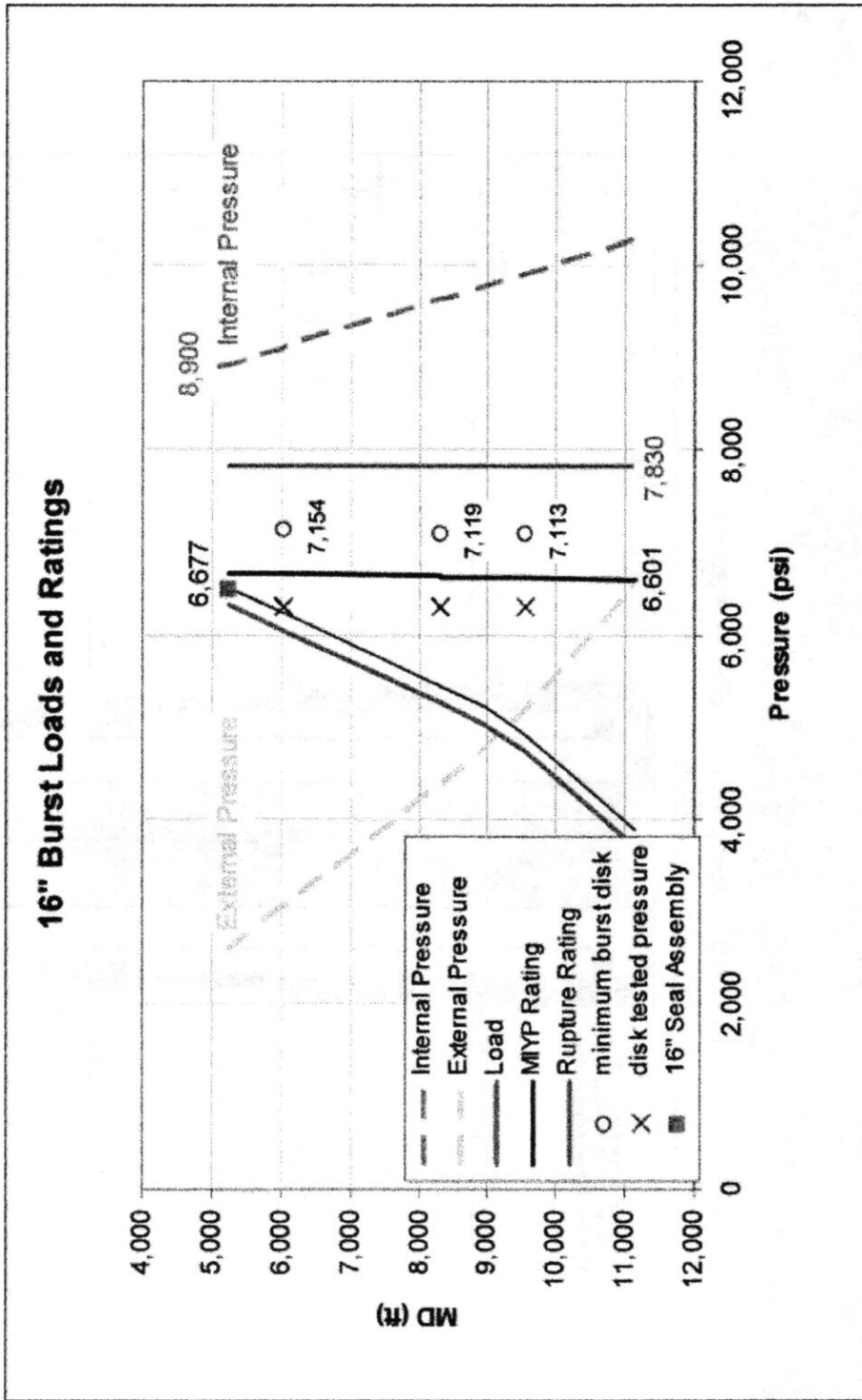


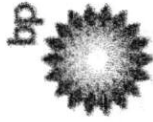
MC 252#1 Wellbore Schematic



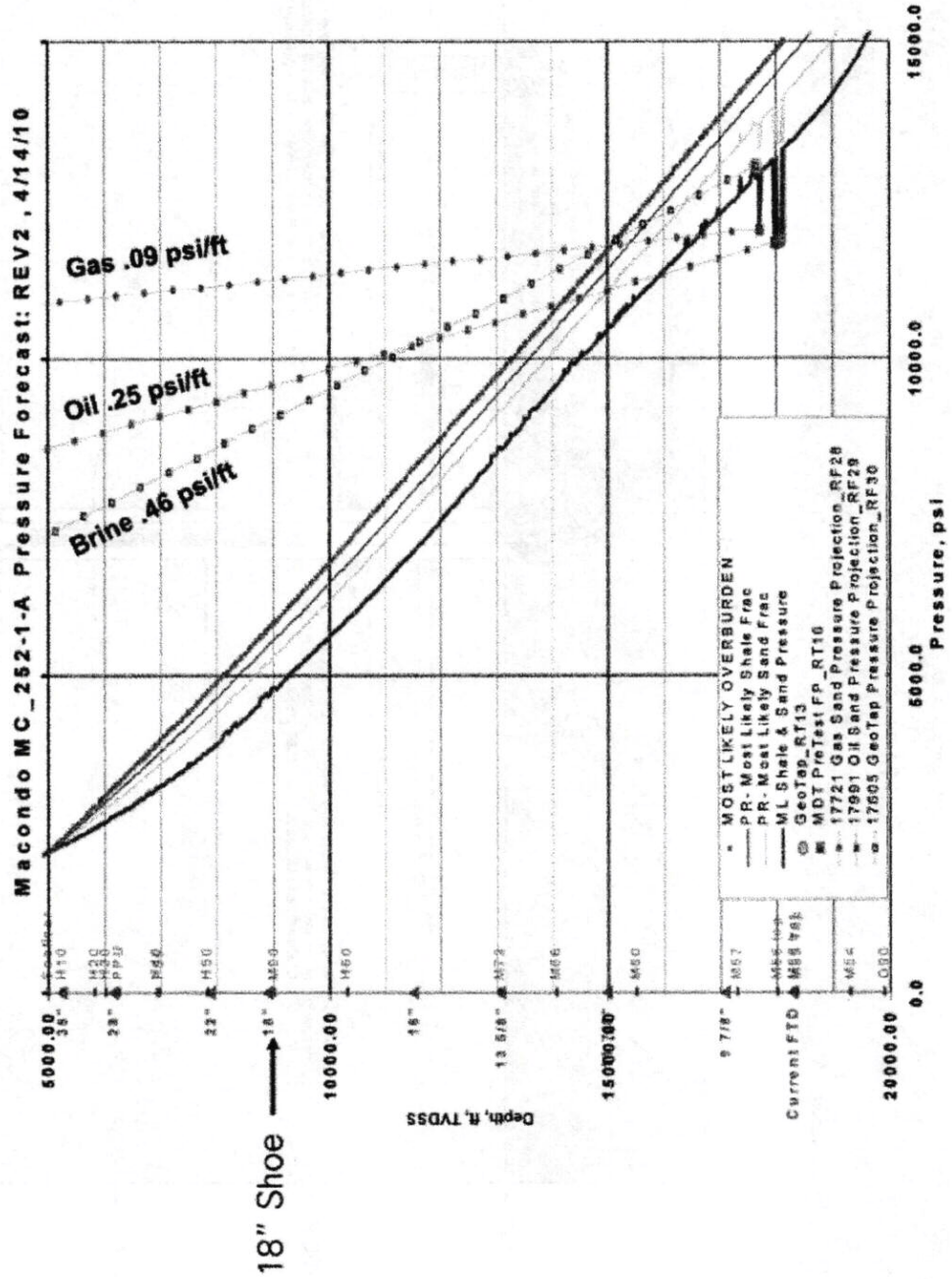


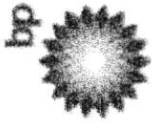
16" casing implications of SI well head pressure



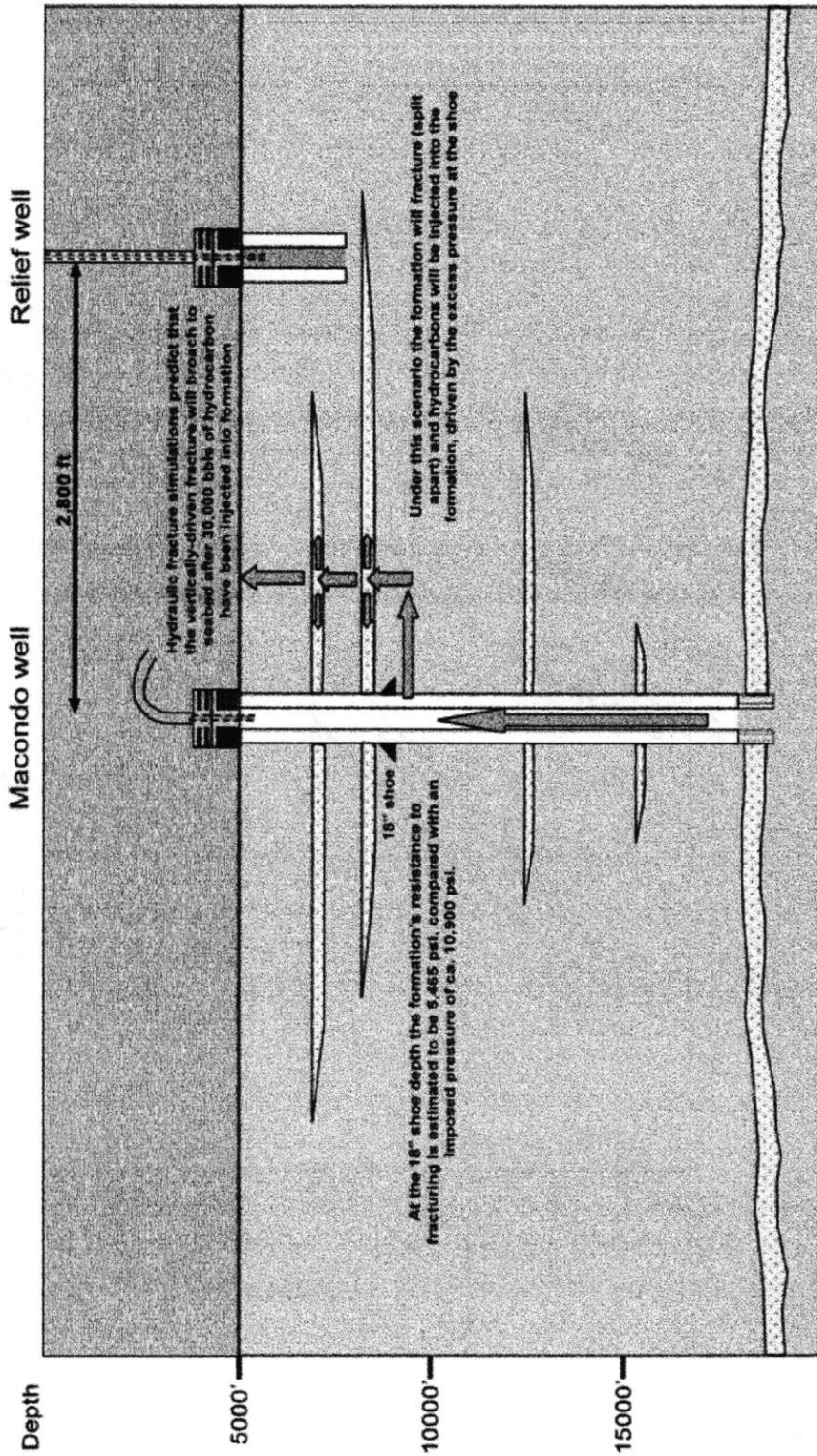


18" shoe implications – pressure profiles

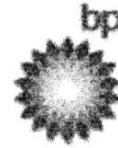




18" shoe implications - fracturing pathways to sea floor



Governing Question

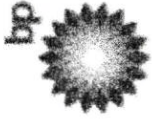


What are the implications of the latest pressure data at the top of the LMRP and base of the BOP?

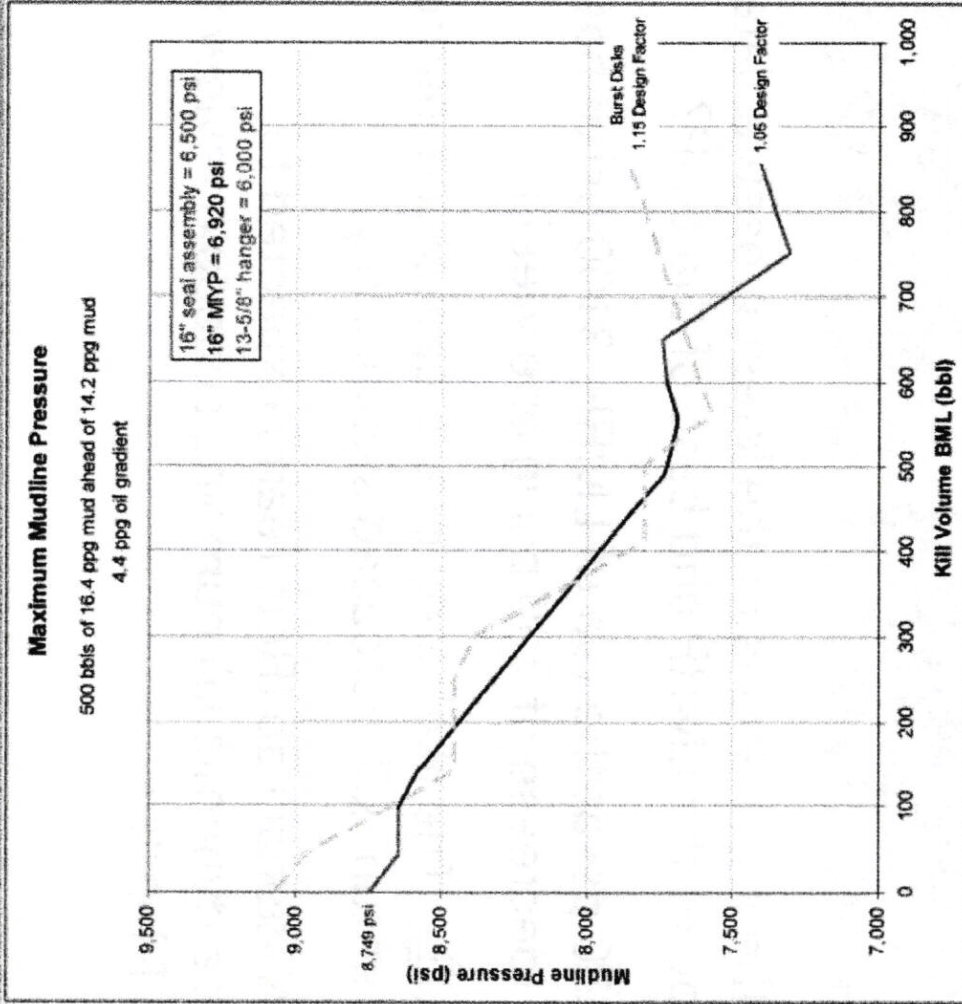
DATA: 2650 psi at the top of LMRP, 3100 psi at base of BOP (decrease of 700 psi in one week)

CALCULATE: The likelihood of a successful dynamic or momentum kill increased significantly.

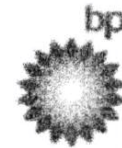
REVIEW: National Lab (Red Team) expected to conduct a dynamic kill pumping schedule review as early as Monday.



Maximum Allowable Pressure



Option Summary



Option	Execution Issues	Risk
Dynamic/Momentum Kill	<ul style="list-style-type: none"> • Yellow pod function • Subsea system integrity 	Limited downside if pump pressure managed
BOP on BOP	<ul style="list-style-type: none"> • Removal of LMRP • Hydrate formation • Drill pipe presence? 	Breach of 18"
Junk Shot then Kill	<ul style="list-style-type: none"> • Yellow pod function • Subsea system integrity • Choke and kill line configuration 	Pressure increase in BOP before kill
Valve on top of LMRP	<ul style="list-style-type: none"> • More complicated than BOP on BOP • ROV operations • Hydrate formation • Drill pipe presence? 	Breach of 18"



Deepwater Horizon Review

Sunday May 16, 2010

Recommendation



OPTION: Recommend a Dynamic/Momentum Kill with a blend of 16.4 lb and 14.2 lb water based mud

BASIS:

- Low Risk, High Reward
- Base of BOP pressure
- Does not pressure burst disks
- If unsuccessful no regrets
- Multiple attempts possible

Governing Question



What is the shut in pressure that would be expected in the BOP & LMRP?

DATA: Reservoir pressure is 11,850 psi at 13,047' below the mud line, fluid density from samples

CALCULATE: We believe the pressure would be between 8400 and 8900 psi.

UNCERTAINTY: in calculation due to reservoir fluid composition and remote possibility of other sources

REVIEW: Three independent groups from Sandia, Los Alamos, and Livermore are verifying calculations.

Governing Question



What are the implications of a 8900 psi shut in pressure?

DATA: Casing design steel strength, casing tests during drilling, rupture disk ratings

CALCULATE: 8900 psi shut in pressure is below the 16" burst disk rupture pressure by 1,000 psi +/-.

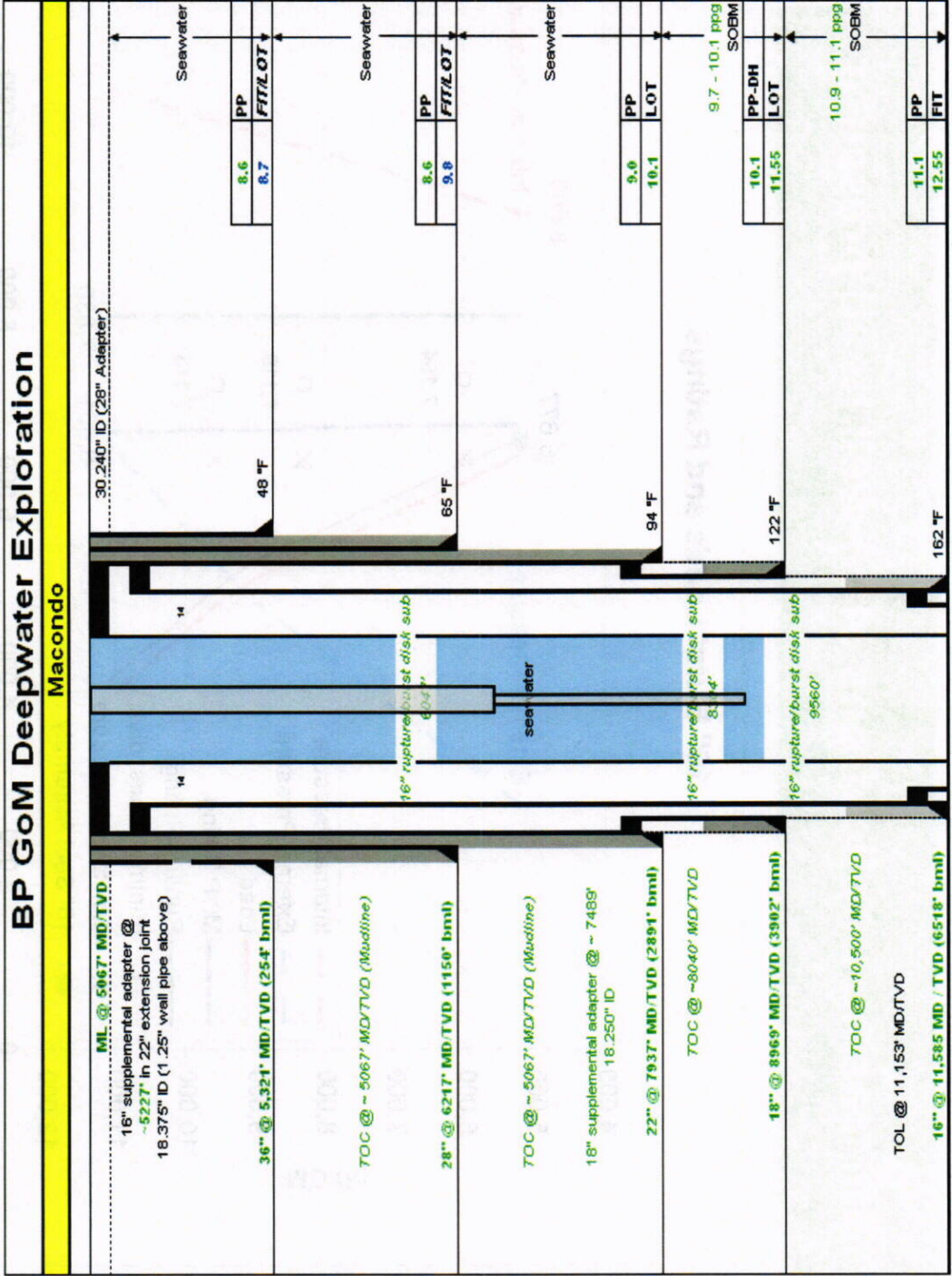
IMPLICATIONS: If rupture disks fail, broach of 18" shoe and potential hydrocarbons to sea floor

UNCERTAINTY: External pressure load

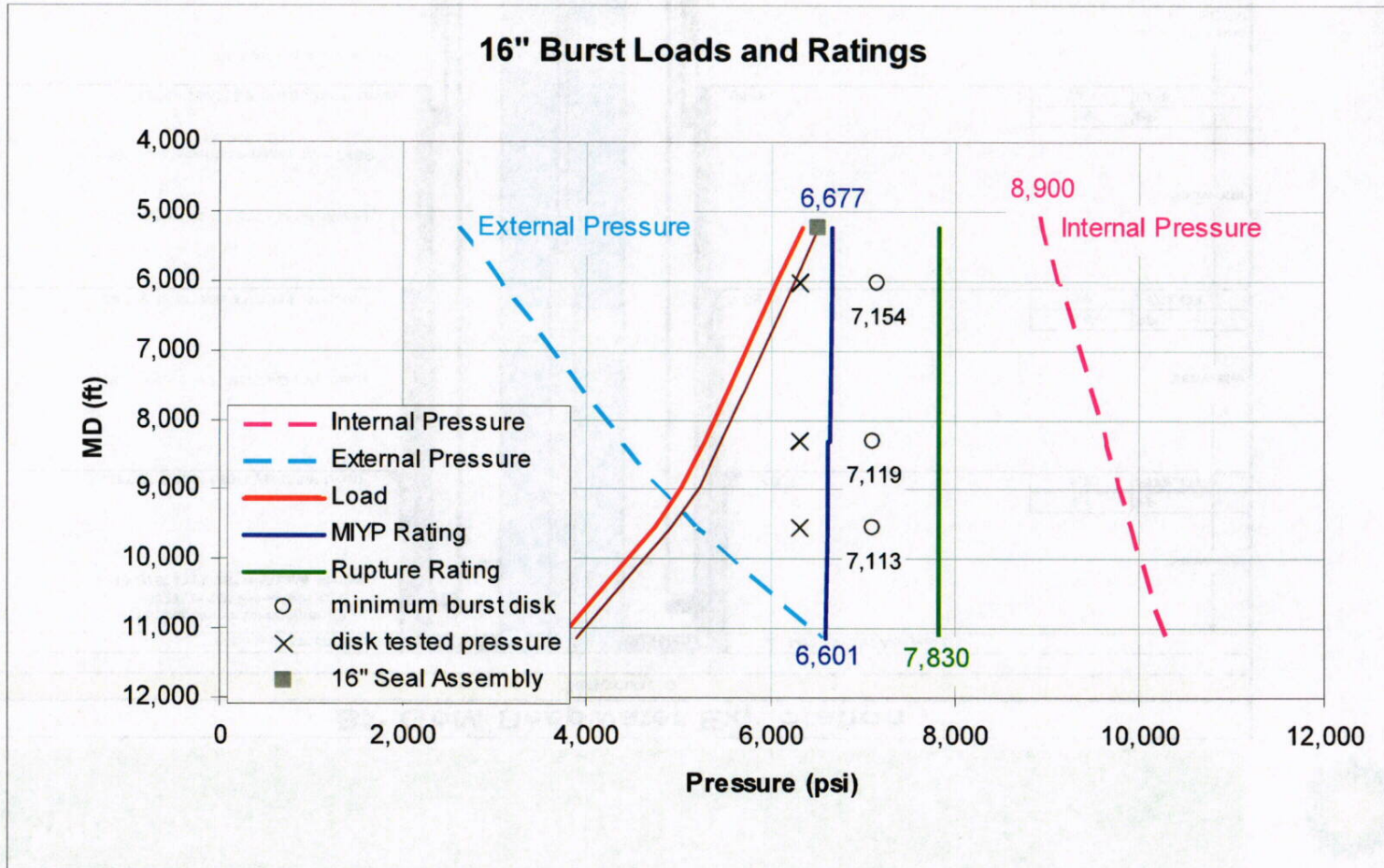
REVIEW: National Lab is reviewing likely external pressure on 16" casing under static conditions.



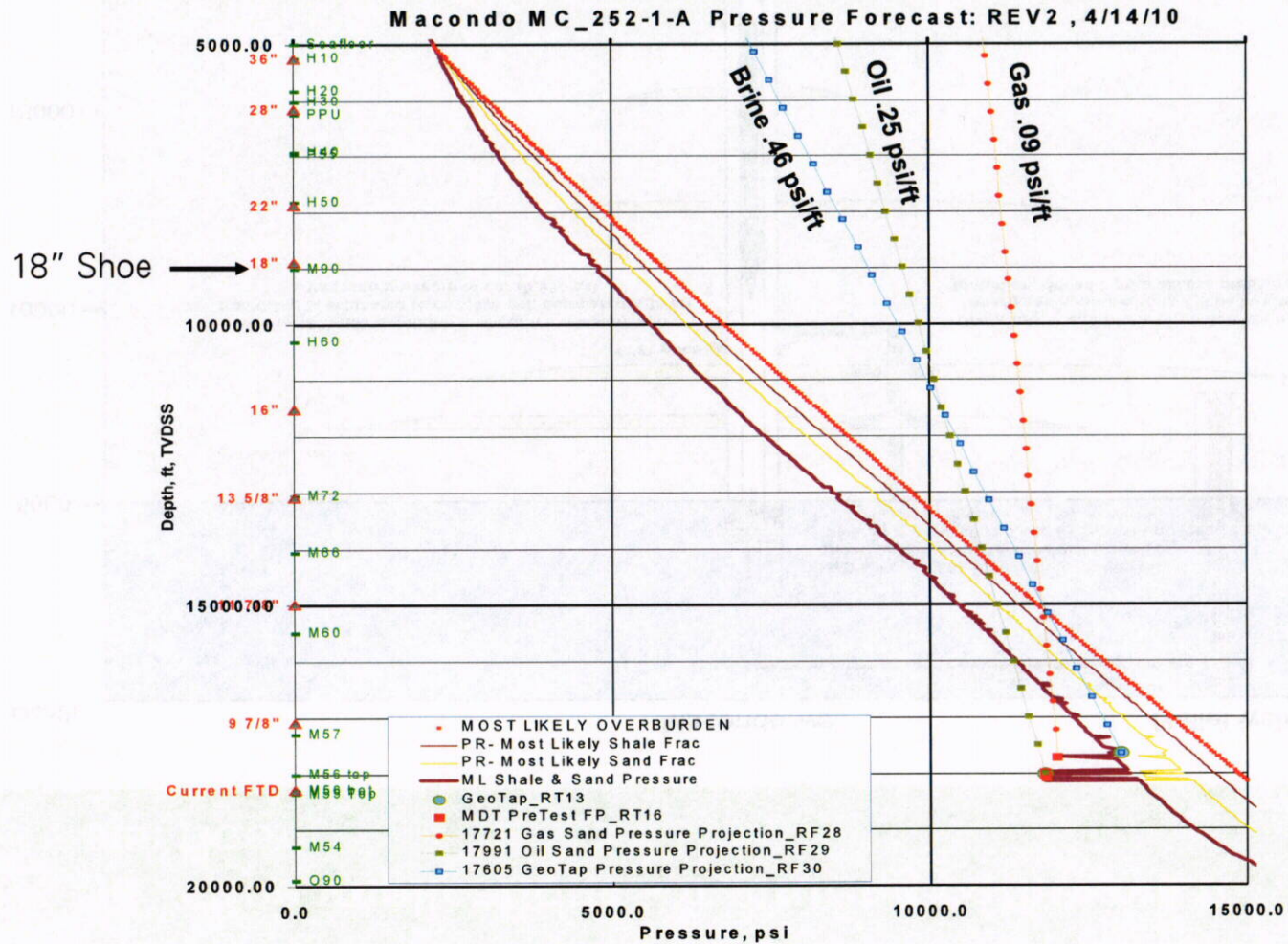
MC 252#1 Wellbore Schematic



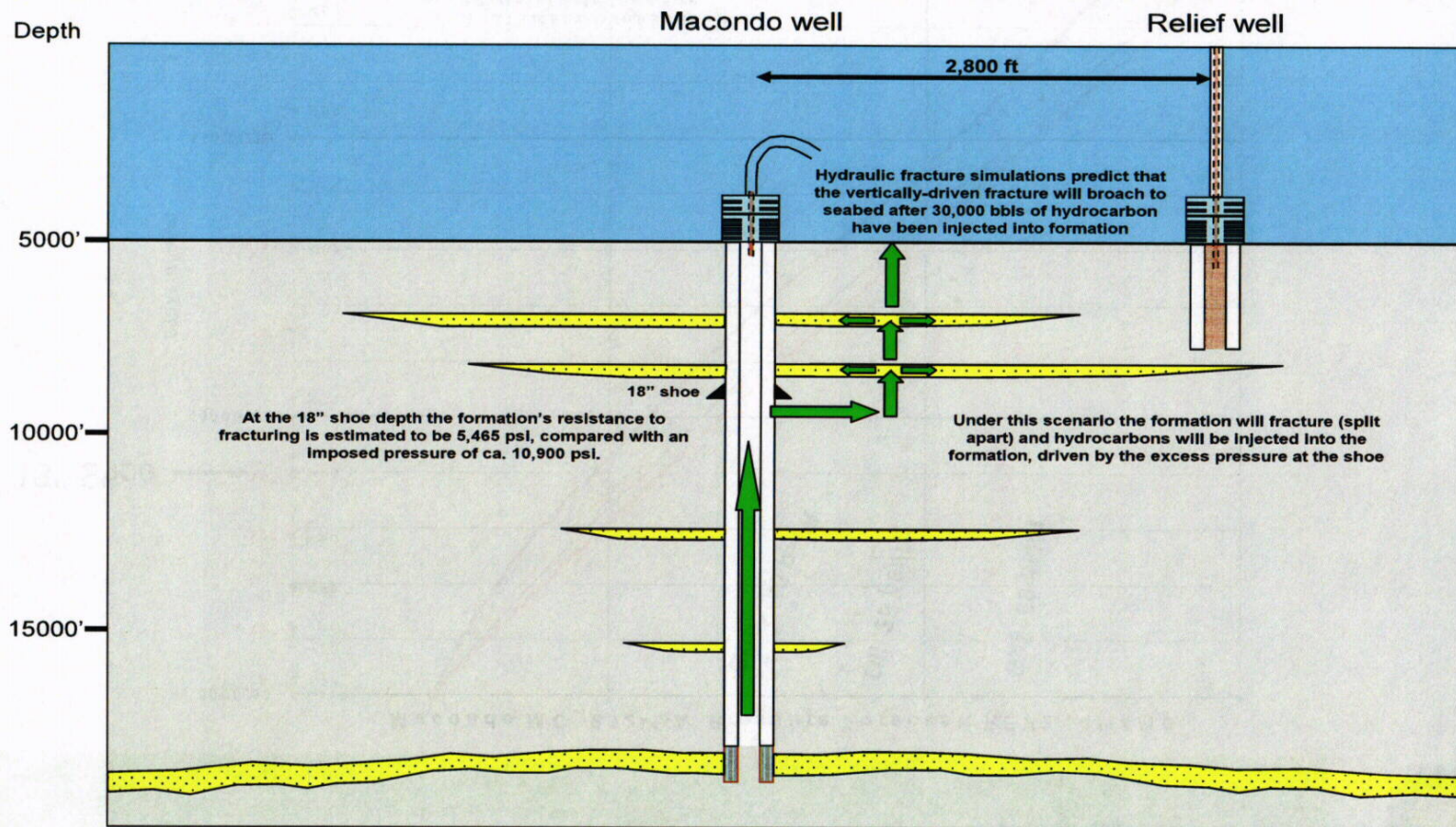
16" casing implications of SI well head pressure



18" shoe implications – pressure profiles



18" shoe implications – fracturing pathways to sea floor



Governing Question



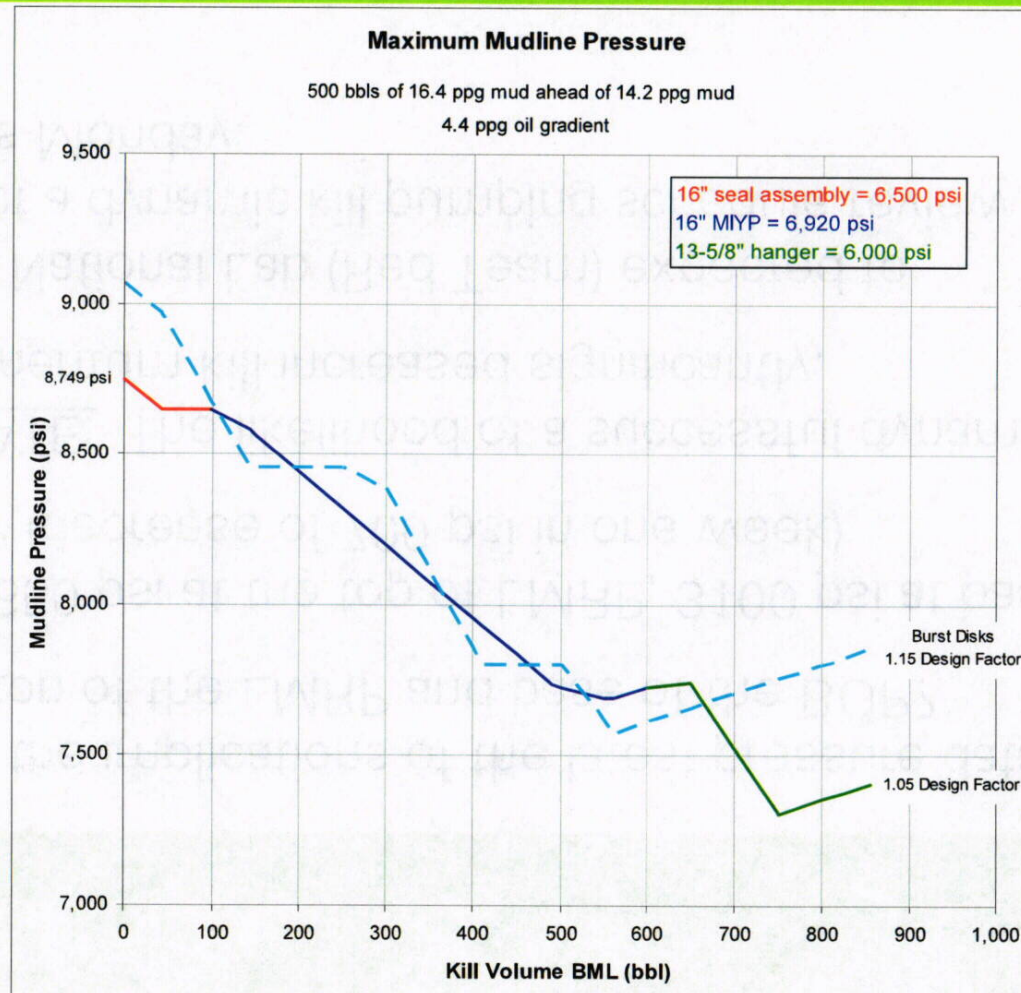
What are the implications of the latest pressure data at the top of the LMRP and base of the BOP?

DATA: 2650 psi at the top of LMRP, 3100 psi at base of BOP (decrease of 700 psi in one week)

CALCULATE: The likelihood of a successful dynamic or momentum kill increased significantly.

REVIEW: National Lab (Red Team) expected to conduct a dynamic kill pumping schedule review as early as Monday.

Maximum Allowable Pressure



Option Summary



Option	Execution Issues	Risk
Dynamic/Momentum Kill	<ul style="list-style-type: none"> • Yellow pod function • Subsea system integrity 	Limited downside if pump pressure managed
BOP on BOP	<ul style="list-style-type: none"> • Removal of LMRP • Hydrate formation • Drill pipe presence? 	Breach of 18"
Junk Shot then Kill	<ul style="list-style-type: none"> • Yellow pod function • Subsea system integrity • Choke and kill line configuration 	Pressure increase in BOP before kill
Valve on top of LMRP	<ul style="list-style-type: none"> • More complicated than BOP on BOP • ROV operations • Hydrate formation • Drill pipe presence? 	Breach of 18"