Arrant, Bryan, EMNRD 30-015-35532

From: Dave A. Henard [Dave.Henard@respec.com]
Sent: Wednesday, April 04, 2007 3:03 PM
To: Jerry Sherrell
Cc: Richard Aguilar; Arrant, Bryan, EMNRD
Subject: Permit to Drill

lerry,
have recieved a permit to drill for the Mack Energy, Joker State Com #1 well from Richard Aguilar of the City of Carlsbad. The ›roposed well is located in Section 4, Township 23 South, Range 25 East, Eddy County. This location places the well within the Significant Impact Zone of the Sheep Draw Wellhead Protection Area. I will start a more thorough review of the application next veek. In the meantime, please provide me with an API# as soon as you hear from OCD with an approved C-101, and do we need o double check surface casing setting depth based on new knowledge of depth to fresh water at 532 feet below ground surface as eported by the City, especially as it pertains to OCD criteria. I did not correct for surface elevation between the Robin Fed and this vell. Let me know what you think.
Thanks
Dave Henard
RESPEC

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

March 27, 2007

Mack Energy Corporation
P.O. Box 960
Artesia, NM 88210
Attn: Jerry Sherrell or To Whom It May Concern:

Dear Mr. Sherrell or To Whom It May Concern:

RE: **Mack Energy Corporation: Application to drill (APD) for the Joker State Com. #1**
Surface location to be in Unit J, of Section 4, Township 23 South, Range 25 East, Eddy County, New Mexico.

In reference to the above noted APD, the New Mexico Oil Conservation Division (NMOCD) will require (in part) that drilling mud samples from the flow line be sampled every 100' in order to determine chloride levels during the drilling of the Capitan Reef section of the well bore. Results are to be submitted to our office before drilling to total depth.
Please note that the Capitan Reef section is to be drilled with a fresh water mud. It is also noted that drilling mud samples in the Capitan Reef section may not be possible due to loss circulation.
In addition, please submit a detailed drilling and cementing program for the entire well bore.
Please call me if you have any questions about this matter.

Respectfully yours,

Bryan G. Arrant
NMOCD's District II Geologist
Artesia, New Mexico
505-748-1283 ext. 103

CC: Well file
Dave Henard, Respect-Albuquerque
Tim Gum, NMOCD-Artesia

30-015-35532

ALLIANCE
DRILLING FLUIDS, LLC

Mack Energy Corporation

P.O. Box 960
Artesia, New Mexico 88211-0960

Joker State #1

Section 4, T-23-S, R-25-E
Eddy County, New Mexico
Prepared For:
Mr. Jerry Sherrell

Prepared by:
Charlie Branch

Alliance Drilling Fluids, LLC
701 W Main
Artesia, New Mexico 88210
Office: 505-736-6130

April 4, 2007

ALLIANCE
DRILLING FLUIDS, LLC

November 13, 2006

Mr. Jerry Sherrell
Mack Energy Corporation
P.O. Box 960
Artesia, New Mexico 88211-0960

Dear Mr. Sherrell:

State

Alliance Drilling Fluids LLC would like to thank you for the opportunity to present our recommendations for your **Joker #1 Well** to be drilled in Section 4, T-23-S, R-25-E, Eddy County, New Mexico.

The following suggested drilling fluids program is based on data supplied by Mack Energy Corporation and our experience in the area.

We suggest a **Bentonite/Lime** spud mud to drill the surface hole. Drill out from under13-3/8'' casing with **Fresh Water** while circulating the closed loop system.

Drill out below 9-5/8'' intermediate casing with **Fresh Water** while circulating the closed loop system. Add 10 lb/gal **Brine Water** as need for increasing mud weight. At 8,800', or prior to the top of the Strawn, we recommend displacing hole with 10 lb/gal brine and mud up with an **ALL ZAN/ALL CMS** type drilling fluid. Prior to drilling the Morrow, reduce the fluid loss to 6 - 8 cc.

Included in this program are recommended properties, estimated costs and offset wells. Should you have any questions or require additional information, please let me know.

Very truly yours,

Charlie Branch
Area Service Coordinator– NM
Alliance Drilling Fluids, LLC

Overview

- Drill surface and intermediate with fresh water through a closed loop system, with total losses to be expected.
- At 8,800', or prior to the top of the Strawn, displace the hole with 10.0 lb/gal **Brine Water** and mud up with an **ALL Zan/ALL CMS**.
- Maintain a 10.0 - 10.5 lb/gal mud weight, 34 - 40 sec/qt viscosity and 8-10 cc's fluid loss after mud up.
- If mud weights in excess of 10.5 lb/gal are required to control the pressures in the Strawn, then consideration should be made to setting 7'' casing prior to drilling to TD.
- At 10,100', or top of the Morrow Section, lower fluid loss to 6-8 cc's with ALL **CMS** and increase viscosity to 38 - 42 sec/qt.
- Pressures may be encountered in the Strawn, Atoka and Morrow Sections, that may require an increase in mud weight.

- **This estimate is based on the Alliance Drilling Fluids, LLC. pricing to Mack Energy Corporation.**

- **The total estimated drilling time is ( ) days.**

Key concerns include the following:

- Severe losses while drilling surface and intermediate.
- Hole cleaning while drilling with a **Clear Water** type fluid.
- Abnormal pressures in the Strawn, Atoka and Morrow Sections.
- Sensitive shales in the Morrow Section.

- **This well will be serviced from Alliance Drilling Fluids facility in Hobbs, New Mexico**

Drilling Issues

Seepage Losses

- Seepage losses can be expected in all intervals to be drilled.
- **Drilling Paper** additions should be sufficient to control any minor seepage losses.

Lost Returns

- Use **Bulky Fibrous LCM** pills with **Fiber Seal, Fiber Plug** and **Cotton Fiber** to control losses.
- **ALL Zone Seal, ALL Seal** and **Calcium Carbonate** (medium and coarse) are acid soluble **LCM** products and consideration should be given to using only these products in the production interval.
- Maintain fluid density as low as possible to minimize the problems of seepage losses to lost returns.

Hole Cleaning

- Use high viscosity **Bentonite** pill sweeps to aid in hole cleaning if dry drilling becomes necessary while drilling the surface hole.
- Use **Poly Plus** sweeps to ensure a clean hole while drilling with a **Clear Water** type fluid.

Abnormal Pressures

- Abnormal pressures may be expected in the Strawn, Atoka and Morrow Sections.
- Adjust drilling fluid weight as needed for well control with **Barite**.
- There is a possibility of encountering high pressure gas that will require raising the drilling fluid weight in the 10.5 lb/gal range to control.

Sensitive Shales

- Sensitive shales can be expected in the Morrow Section, lower filtrate to 6 - 8 cc.

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE DRILLING FLUIDS, LLC

Geology/Drilling Problems

ESTIMATED GEOLOGICAL FORMATION TOPS AND POTENTIAL DRILLING PROLEMS

FORMATION	TOP (Ft)	POTENTIAL DRILLING PROBLEMS
13-3/8" Casing	**325**	
Delaware Group	1,750	Sandstone. Seepage.
9-5/8" Casing	**1,595**	
Bone Springs	4,495	Dolomite, Anhydrite, Limestone. Seepage, Wash Outs.
3rd Bone Springs	7,750	Dolomite, Sandstone. Lost Circulation.
Wolfcamp Lime	8,190	Limestone Red Shale. Gas, Pressures, Sloughing, Seepage.
Strawn	9,028	Limestone, Black/Red/Green Shale. Pressures, Seepage, Water Sensitive Shale.
Atoka	9,854	Limestone, Sandstone Black/Red/Green Shale. Gas, Water Sensitive Shale.
Morrow	10,182	Sandstone, Shale. Seepage, Gas, Water, Sensitive Shale.
Morrow Clastics	10,471	Limestone, Shale. Seepage, Gas.
Barnett	10,934	Black Shale. Water Sensitive Sale, Sloughing.
5-1/2" Casing	**11,300**	

Interval 1 Summary

17 1/2" Open Hole - (0' - 325') - 13 3/8" Casing	
Drilling Fluid System	Bentonite / Lime
Key Products	Bentonite, Lime, Drilling Paper, Bulky Fibrous LCM
Solids Control	Adjustable Linear Shaker, De-sander, De-silter, Flowline Cleaner, Centrifuge
Potential Problems	Seepage Losses, Lost Returns, Hole Cleaning

Interval Drilling Fluid Properties						
Interval Depth (ft)	**Mud Weight (lb/gal)**	**Funnel Viscosity (sec/qt)**	**Plastic Viscosity (cp)**	**Yield Point ($lb/100ft^2$)**	**API Fluid Loss (ml/30 min)**	**Drill Solids (%)**
0'-325'	8.8-9.2	34-36	4-8	4-10	n/c	4-6

- Spud with a **Bentonite/Lime** type drilling fluid with a 34 - 38 sec/qt viscosity. Add 5 - 7 sacks of **Drilling Paper** to spud mud.
- **Drilling Paper** additions should be sufficient to control minor seepage losses.
- Jet and clean shale and settling pits as needed to control mud properties.
- Lost circulation may be encountered while drilling the surface hole (125' to 300'). Should losses be encountered, add up to 20 lb/bbl LCM. Mix **Bulky Fibrous LCM (ALL Seal, Cotton Fibers, ALL Case, Fiber Seal)** pills in conjunction with **ALL Poly Seal** to control mild losses to lost returns.
- Should dry drilling become necessary, mix and pump high viscosity pre-hydrated **Bentonite** pills to aid in hole cleaning.
- For corrosion control, slug the drill pipe every 4 hours with 2.5 gallons of **ALL Hib FA 30** with 2.5 gallons of **Diesel**. Slug the drill pipe before and after trips with the same 5 gallon mixture. Add 10 gallons per day of **ALL Hib 370** to minimize the effects of oxygen. Install corrosion ring in the Kelly saver sub, remove after 80-100 hours for analysis.

Interval 2 Summary

12-1/4" Open Hole - (325' - 1,590') 9-5/8" Casing	
Drilling Fluid System	Fresh Water / Bentonite Sweeps
Key Products	Lime, Caustic, Poly-Plus, MF-55, Bentonite, LCM
Solids Control	Adjustable Linear Shaker, De-sander, De-silter, Flowline Cleaner, Centrifuge
Potential Problems	Seepage Losses, Lost Returns, Hole Cleaning

Interval Drilling Fluid Properties						
Interval Depth (ft)	**Mud Weight (lb/gal)**	**Funnel Viscosity (cp)**	**Plastic Viscosity (cp)**	**Yield Point ($lb/100ft^2$)**	**API Fluid Loss (ml/30 min)**	**Drill Solids (%)**
325'-1,590'	8.34-8.4	28	1	1	n/c	< 2

- Drill out from the surface casing with **Fresh Water.** Circulate through the closed loop system.
- Maintain a 9.5 - 10.5 pH with **Lime**.
- Add **MF-55** at the flow line to flocculate drill solids while drilling with a **Clear Water** type fluid.
- Add 1.5 - 2.0 gallons of **Poly Plus** down the drill pipe every 100' - 120' or as needed to aid in hole cleaning when drilling with a **Clear Water** type fluid.
- Lost circulation may be encountered while drilling the surface hole. Should losses be encountered, add up to 25 lb/bbl LCM. Mix **Bulky Fibrous LCM (ALL Seal, Cotton Fibers, ALL Case, Fiber Seal)** pills in conjunction with **ALL Poly Seal** to control mild losses to lost returns.
- If circulation can not be restored, the decision will be made to dry drill or air drill to casing point. If dry drilling , mix and pump high viscosity pre-hydrated **Bentonite** pills to aid in hole cleaning.
- For corrosion control, slug the drill pipe every 4 hours with 2.5 gallons of **ALL Hib FA 30** with 2.5 gallons of **Diesel**. Slug the drill pipe before and after trips with the same 5 gallon mixture. Add 10 gallons per day of **ALL Hib 370** to minimize the effects of oxygen. Install corrosion ring in the Kelly saver sub, remove after 80 - 100 hours for analysis.

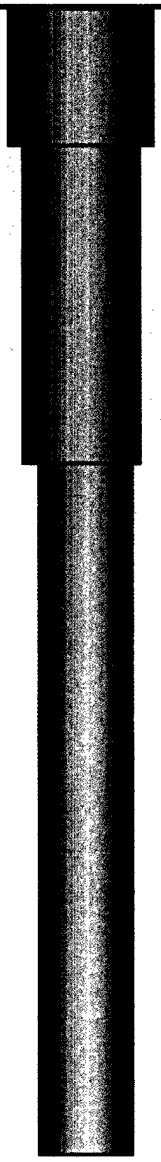
Interval 3 Summary

8-3/4" Open Hole - (1,590' - 11,300')	
Drilling Fluid System	Cut Brine / ALL-ZAN-CMS
Key Products	Lime, MF-55, Fibrous LCM, Poly Plus
Solids Control	Adjustable Linear Shaker, De-sander, De-silter, Flowline Cleaner, Centrifuge
Potential Problems	Seepage Losses, Lost Returns, Hole Cleaning, Gas Intrusion

Interval Drilling Fluid Properties						
Interval Depth (ft)	**Mud Weight (lb/gal)**	**Funnel Viscosity (sec/qt)**	**Plastic Viscosity (cp)**	**Yield Point ($lb/100ft^2$)**	**API Fluid Loss (ml/30 min)**	**Drill Solids (%)**
1,590'- 8,800'	8.7 - 9.2	28 - 29	1	1	NC	<2.0
8,800 - 10,100	10-10.5	34 - 40	6 -10	8 - 12	10-12	<5.0
10,100 -	10.0 - 10.5	38 - 42	10 - 12	12 - 18	6 - 8	<5.0

- Drill out below the 9-5/8" casing with 8.7-9.2 lb/gal **Cut Brine**. Circulate through the reserve pit.
- Maintain a 10.0 - 10.5 pH with **Lime**.
- Add **MF-55** at the flow line to flocculate drill solids while drilling with a **Clear Water** type fluid.
- Add 1.5 - 2.0 gallons of **Poly Plus** down the drill pipe every 100' - 150' or as needed to aid in hole cleaning when drilling with a **Clear Water** type fluid.
- Adjust drilling fluid weight with 10.0 lb/gal **Brine Water** as needed for well control.
- Use acid soluble **LCM (ALL Zone Seal, ALL Case, Calcium Carbonate)** pills to control any mud losses to hole.
- At 8,800', or prior to the top of the Strawn, we recommend displacing with 10.0 lb/gal **Brine Water** and returning circulation to the steel pits. Maintain a 9.5 - 10.0 pH with **Caustic Soda,** reduce total hardness to 200 mg/l with **Soda Ash**, and mud up with an **ALL ZAN/ALL CMS** type drilling fluid.
- Maintain a 10.0 - 10.5 lb/gal mud weight, 34 - 40 sec/qt viscosity and 10 - 12 cc's fluid loss after mud up.
- At 10,100', or top of the Morrow Section, lower fluid loss to 6 - 8 cc's using **ALL CMS** and increase viscosity to 38 - 42 sec/qt range with **ALL Zan**.
- If mud weights in excess of 10.0 lb/gal are required in the Strawn, Atoka and Morrow Sections, adjust drilling fluid weight with **Barite**.
- For corrosion control, slug the drill pipe every 4 hours with 2-1/2 gallons of **ALL Hib FA 30** with 2-1/2 gallons of **Diesel**. Slug the drill pipe before and after trips with the same 5 gallon mixture. Add 10 gallons per day of **ALL Hib 370** to minimize the effects of oxygen. Install corrosion ring in the Kelly saver sub, remove after 80-100 hours for analysis. Have **ALL H_2S 320** on location to treat any H_2S that may be present.

Well Summary

Casing Size (in)	Hole Size (in)	Casing Program	Depth MD (ft)	Estimated Formation Tops	Mud System	Mud Weight (lb/gal)	Interval Days	Interval Mud Cost
13-3/8	17-1/2		**325**		**Bentonite/Lime**	8.4		
9-5/8	12-1/4		**1,595**		**Fresh Water**	8.4		
			1,750	Delaware Group				
			4,495	Bone Springs	**Cut Brine**	8.8-9.2		
			7,750	3rd Bone Springs				
			8,190	Wolfcamp Lm				
			8,800	**MUD UP**	**10lb-gal Brine/ALL ZAN**	10.0-10.5		
			9,028	Strawn Lm				
			9,854	Atoka				
			10,182	Morrow				
			10,471	Morrow Clastics				
			10,934	Barnett				
5-1/2	8-3/4		**11,500**	**Casing Point (MD)**		10.0-10.5	30	

CUMULATIVE DAYS: CUMULATIVE COST:

- **This estimate does not include extensive lost circulation or major problem incidents.**

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE DRILLING FLUIDS, LLC

Reference Map

EDDY COUNTY, NEW MEXICO

PREPOSED WELL: RED

REFERENCE WELLS: BLUE

BIT RECORDS: GREEN

	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
	7	8	9	10	11	12	7	8	9	10	11	12	7	8	9	10	11	12
	18	17	16	15	14	**13**	18	17	16	15	14	13	18	17	16	15	14	13
T-22-S	19	20	21	22	23	24	19	20	21	22	23	24	19	20	21	22	23	24
	30	29	28	27	26	25	30	29	28	27	26	25	30	29	28	27	26	25
	31	32	33	34	35	36	31	32	**33**	34	35	36	31	32	33	34	35	36
	6	5	4	3	2	1	6	**5**	**4**	3	2	1	6	5	4	3	2	1
	7	8	9	10	11	12	7	8	**9**	10	11	12	7	8	9	10	11	12
	18	17	16	15	14	13	18	17	16	15	14	13	18	17	16	15	14	13
T-23-S	19	20	21	22	23	24	19	20	21	22	23	24	19	20	21	22	23	24
	30	29	28	27	26	25	30	29	28	**27**	26	25	30	29	28	27	26	25
	31	32	33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36
	6	5	4	3	2	1	6	5	4	3	2	1	6	5	4	3	2	1
	7	8	9	10	11	12	7	8	9	10	11	12	7	8	9	10	11	12
	18	17	16	15	14	13	18	17	16	15	14	13	18	17	16	15	14	13
T-24-S	19	20	21	22	23	24	19	20	21	22	23	24	19	20	21	22	23	24
	30	29	28	27	26	25	30	29	28	27	26	25	30	29	28	27	26	25
	31	32	33	34	35	36	31	32	33	34	35	36	31	32	33	34	35	36

R-25-E R-26-E R-27-E

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE DRILLING FLUIDS, LLC

Reference Wells

DRILLING FLUID RECAPS

NEWFIELD EXPLORATION
SOUTH CARSLBAD #6
SEC. 27, T-23-S, R-26-E
EDDY COUNTY, NEW MEXIC0

NADEL & GUSSMAN
CARSLBAD S 27ST COM #7
SEC. 27, T-23-S, R-26-E
EDDY COUNTY, NEW MEXIC0

LOUIS DREYFUS
McGRUDER 13 COM #1
SEC. 13, T-22-S, R-25-E
EDDY COUNTY, NEW MEXIC0

BIT RECORDS

DEVON ENERGY
CHINABERRY 5 FED #1
SEC. 5, T-23-S, R-26-E
EDDY COUNTY, NEW MEXIC0

LOUIS DREYFUS
EV ST #2
SEC. 32, T-22-S, R-26-E
EDDY COUNTY, NEW MEXIC0

LOUIS DREYFUS
HAPPY VALLEY FED 4 #22
SEC. 4, T-23-S, R-26-E
EDDY COUNTY, NEW MEXIC0

LOUIS DREYFUS
SARAGOSSA 4 FED COM #1
SEC. 4, T-23-S, R-26-E
EDDY COUNTY, NEW MEXIC0

OXY USA
OXY GOO STATE #1
SEC. 9, T-23-S, R-26-E
EDDY COUNTY, NEW MEXIC0

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE
DRILLING FLUIDS, LLC

Material and Product Applications

PRODUCT	DESCRIPTION	FUNCTION	TREATMENT
BARITE	Barium Sulfate	Weighting Agent	As Required
FRESH WATER GEL	Wyoming Bentonite	Viscosity in Fresh Water	18-22 lb/bbl
CALCIUM CARBONATE	Calcium Carbonate	Weighting Agent, Seepage Loss Control	As required
SALT GEL	Attipulgite	Viscosity in Brine Water	20-25 lb/bbl
POLY PLUS	PHPA Liquid Polymer	Sweep Material	0.5-1.5 lb/bbl
MF-55	Polyacrylamide	Selective Flocculant	0.1-.5 lb/bbl
ALL CMS	Modified Polymer	Fluid Loss Control in Fresh or Brine Water	1.5-2.5 lb/bbl
WHITE STARCH	Modified White Starch	Fluid Loss Control in Fresh or Brine Water	1-5 lb/bbl
ALL PAC	Polyanionic Cellulose	Viscosity, Fluid Loss Control in Fresh or Brine Water	0.5-1.5 lb/bbl
ALL ZAN	Xanthan Gum	Rheology Modifier, Increases Yield Point	0.25-1.25 lb/bbl
ALL TROL	Modified Gilsonite	Shale Stabilizer	1-5 lb/bbl
GEL EX	Polyacrylate Polymer	Bentonite Extender, Selective Flocculant	0.2-0.5 lb/bbl
ALL SEAL	Fine Cellulose	Seepage and Lost Circulation Control	5-25 lb/bbl
ALL CASE	Multi-Sized Particles	Seepage and Lost Circulation Control	5-15 lb/bbl
DILLING PAPER	Ground Paper Products	Seepage Control, Sweep Material	1-5 lb/bbl
ALL ZONE SEAL	Acid Soluble Fibers	Seepage and Lost Circulation Control	5-15 lb/bbl
MICA	Ground Mica	Seepage and Lost Circulation Control	1.0-10.0 lb/bbl
FIBER PLUG	Ground Wood Fibers	Seepage and Lost Circulation Control	1-10 lb/bbl
ALL DEFOAM	Blended Glycol	Defoamer	1 can/200 bbl
ALL SHALE HIB	Liquid Gilsonite Blend	Shale Stabilizer	0.75-1.0% by Vol.
MONO LUBE	Fatty Amine Blend	Lubricant	1.0-2.0% by Vol.
ANTI-FOAM	Propriety Blend	Foam Prevention	0.1-2.0% by Vol.
ALL SURFAC S	Polyol Surfactant	Shale, Clay Inhibitor, Lubricant	0.25-1.0% by Vol.
SODA ASH	Sodium Carbonate	Calcium Control	0.2-2.0 lb/bbl
CAUSTIC SODA	Sodium Hydroxide	pH and Corrosion Control	0.1-1.0 lb/bbl
LIME	Calcium Hydroxide	pH and CO_2 Control, Flocculant	0.25-1.5 lb/bbl
ALL HIB 370	Multi-Purpose Inhibitor	Corrosion Control	0.25-.05 lb/bbl
ALL FA 30	Filming Amine	Corrosion Control	0.25-0.5 lb/bbl
ALL H_2S 320	H_2S Scavenger	Corrosion Control	0.25-0.5 lb/bbl

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE DRILLING FLUIDS, LLC

Suggested Drilling Practices

SUGGESTED DRILLING PRACTICES
(PERMIAN BASIN)

- Drill Salt and Anhydrite sections with 10 lb/gal **Brine Water**. Salt stringers may cause deviation problems, ledges and washouts.

- If seepage or lost circulation are encountered, slow down the pump and if possible reduce the mud weight. Spot high viscosity **Bulky Fibrous LCM** pills at the thief zone. If returns can not be cured with **Bulky LCM** pills, then it may be necessary to **Dry Drill**. When **Dry Drilling**, pump high viscosity pre-hydrated **Bentonite** sweeps to aid in hole cleaning.

- When drilling with a **Clear Water** type fluid, add **MF-55** or **Poly Plus** at the flow line to flocculate drill solids while circulating through the reserve pit.

- The effects of acid gases (CO_2 and H_2S) can be minimized by maintaining a pH of 10.0-10.5 with **Lime/ Caustic Soda** and treating with chemical scavengers.

- Foaming and air entrapment can be minimized by turning the hopper off when not being used to mix chemicals. Try to minimize air entrapment when pumping water from the reserve pit to the steel pits. Air contains oxygen which can cause corrosion.

- If bits and stabilizers are under gauge, be prepared to ream back to bottom when going back to bottom.

- When tripping, if a tight spot is encountered, pick up the kelly and ream and work through the section. **DO NOT FORCE THE BIT TO BOTTOM.**

- **KEEP THE HOLE FULL AT ALL TIMES**

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE DRILLING FLUIDS, LLC

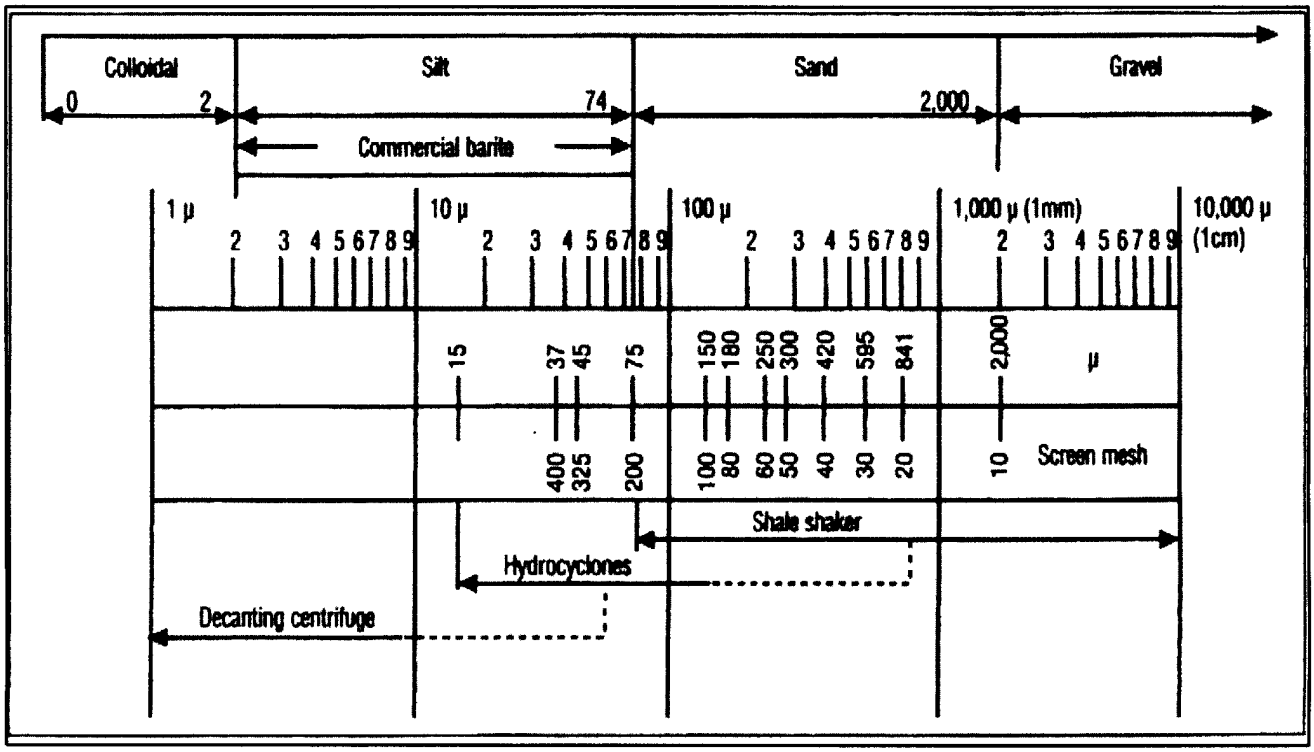
Solids Control Requirements

Mesh Size	Opening (Microns)	% Open Area	Opening (Inches)	Classification Of Particles
10	2,000	56.3	0.0787	Gravel
20	840	43.6	0.0331	Sand
30	590	40.8	0.0232	Sand
40	420	36.0	0.0165	Sand
50	297	30.3	0.0117	Sand
60	250	30.5	0.0098	Sand
80	177	34.0	0.0070	Sand
100	149	30.3	0.0059	Sand
120	125	30.9	0.0049	Sand
150	105	37.4	0.0041	Sand
200	74	33.6	0.0029	Sand
250	63	36.0	0.0025	Silt
325	44	30.0	0.0017	Sit
400	37	36.0	0.0015	Silt

MACK ENERGY CORPORATION
JOKER FEDERAL #1
SEC. 4, T-23-S, R-25-E
EDDY COUNTY, NEW MEXICO

ALLIANCE DRILLING FLUIDS, LLC

Solids Control Requirements



Category	Size	Example	Mechanical Equipment
Colloidal	Less than 2µ	Bentonite, Clays, and Ultra-Fine Drill Solids	(Chemical Flocculation)
Silt	2 - 74µ (<200 mesh)	Barite, Silt, and Fine Drill Solids	Decanting Centrifuge, Hydroclones and Shale Shakers
Sand	74-2,000µ (200 - 10 mesh)	Sand and Drill Solids	Shale Shakers and Hydroclones
Gravel	Larger than 2,000µ (>10 mesh)	Drill Solids, Gravel and Cobble	Shale Shakers

Lost Circulation Plan

Seepage losses

Losses up to approximately 10 bbl/hr are normally considered as seepage losses. Seepage type losses are frequently cured by the simple action of reducing or stopping the pump rate and allowing the formation to heal and become sealed off by the development of a filter cake. The pump rate can be gradually increased after the losses have been stopped.

If losses do not heal by themselves and the amount of loss cannot be tolerated for economical or other reasons, add **Drilling Paper** to the circulating system or pump **Drilling Paper** pills if the reserve pit is being circulated. If there is no reduction in the loss rate sweep the hole with the following pill:

When drilling with Clear Water mix and pump Bentonite or Salt Gel LCM pills as follows:

Bentonite or **Salt Gel**	15 lb/bbl
ALL Seal	4 - 6 lb/bbl
ALL Sure Seal	6 - 8 lb/bbl
ALL Case	6 - 8 lb/bbl

Partial losses

Losses from 10 bbl/hr to 100 bbl/hr are referred in this particular case as partial losses. This situation will usually require treatment. The following pill is recommended:

ALL Case	8 - 10 lb/bbl
ALL Sure Seal	8 - 10 lb/bbl
ALL Walnut Beads	4 - 6 lb/bbl
ALL Seal	6 - 8 lb/bbl
Calcium Carbonate (C)	6 - 8 lb/bbl

Lost Circulation Plan - Continued

Total loss of returns

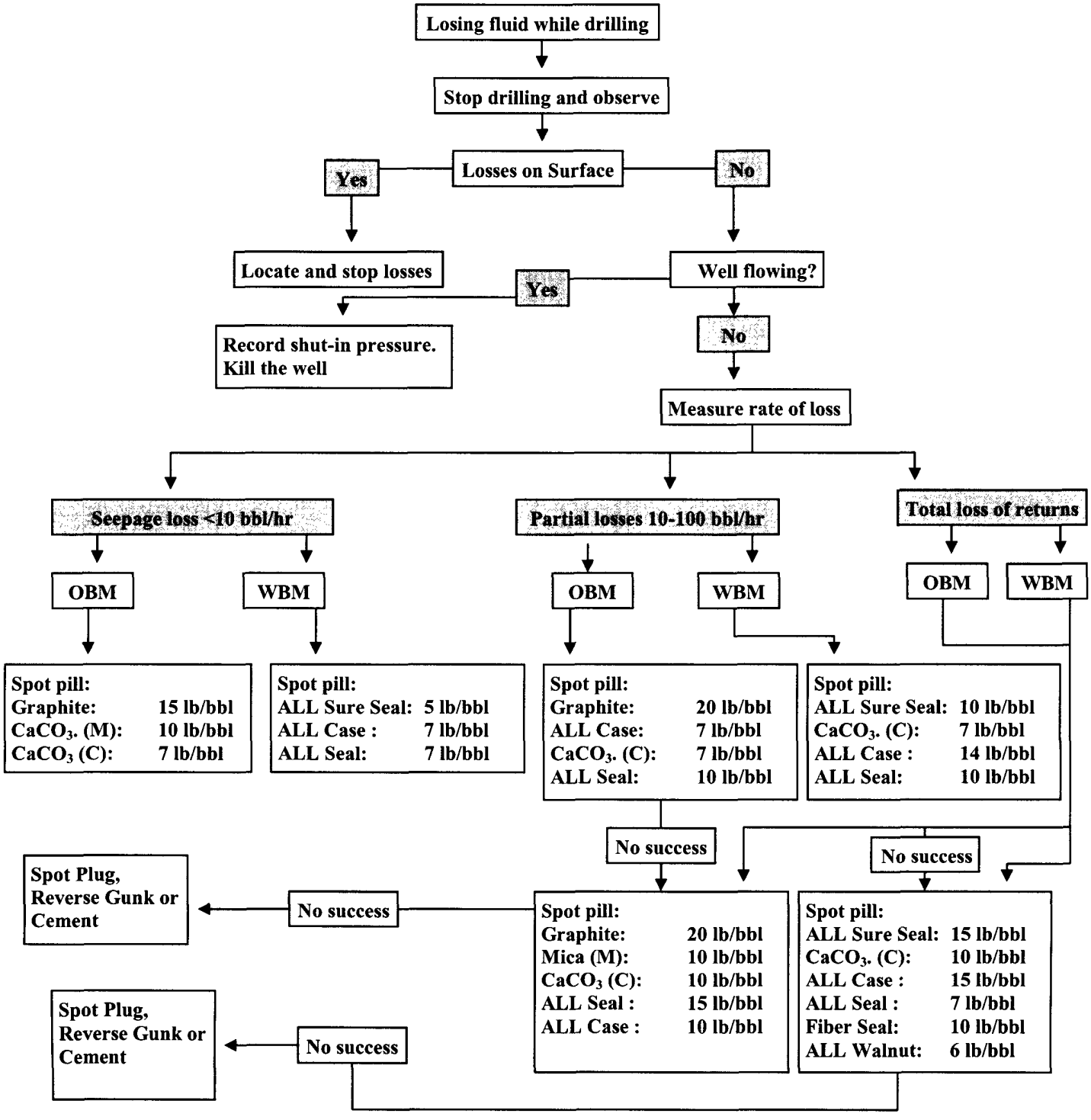
The priority will usually be well control, so the annulus must be filled from the top with either drilling fluid or other light weight liquid. Unless the fracture is induced, losses can normally be stopped by pumping conventional LCM pills. The alternative then is a soft plug or reinforcing plug (gunk).

However, a LCM pill is often the first choice since it gives quick response if it works and is easy to do. Recommended pill to pump should contain as much LCM as possible, **but not more than 100 lb/bbl total LCM concentration**. A standard formulation would be:

ALL Case	12 - 15 lb/bbl
ALL Sure Seal	10 - 15 lb/bbl
Fiber Seal	10 - 12 lb/bbl
ALL Walnut Beads	6 - 8 lb/bbl
ALL Seal	8 - 10 lb/bbl
Calcium Carbonate (C)	8 - 10 lb/bbl

These recommendations are for use after mud up. The product selection and quantity will depend on drilling assemblies, tools and nozzle sizes at the time of losses.

Lost Circulation Plan - Continued



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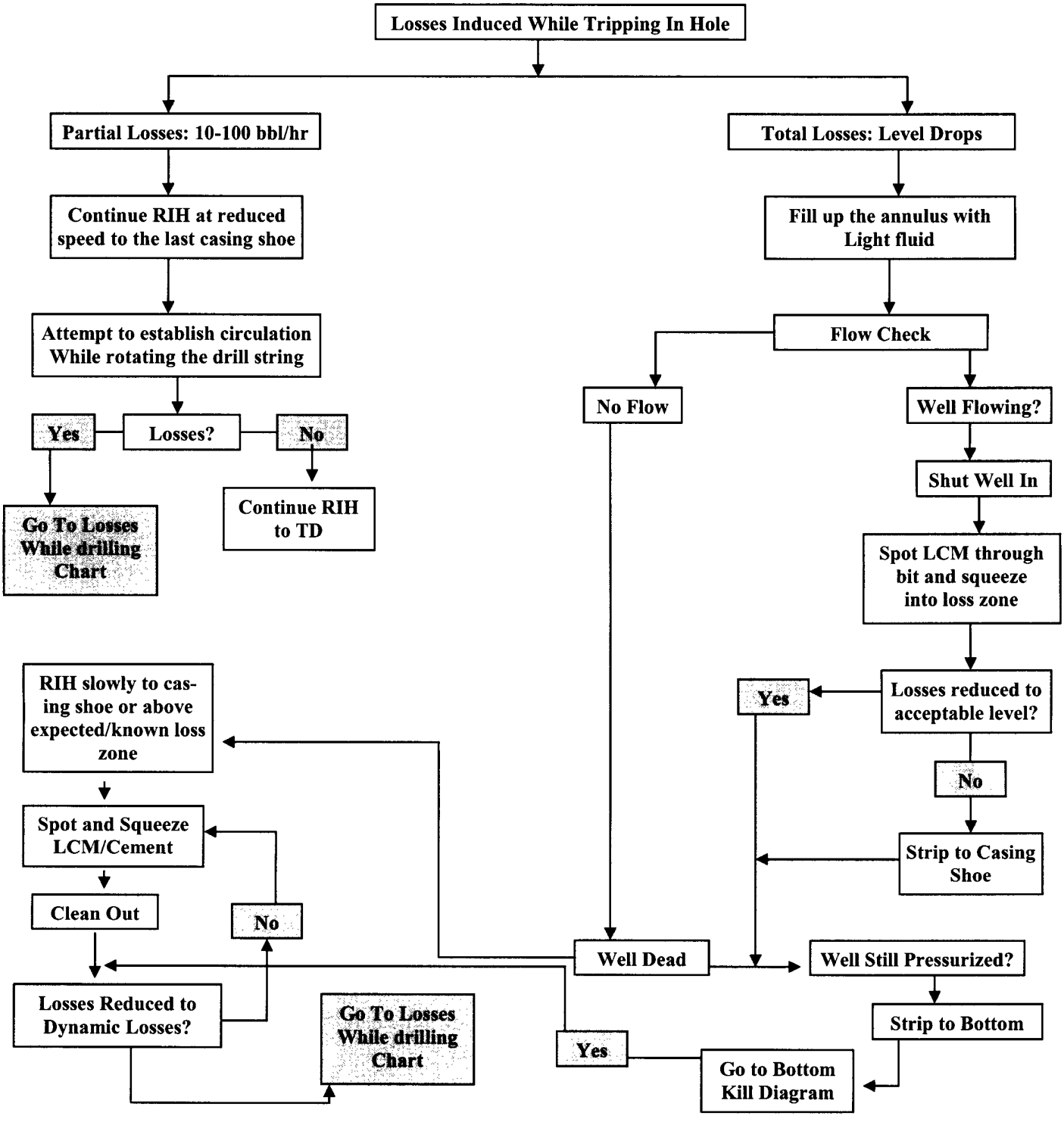
Lost Circulation Plan - Continued



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