UTM

UNIVERSITI TEKNOLOGI MALAYSIA

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FINAL PRESENTATION

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Course: Chemical-gas engineering

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PRESENTATION OUTLINE

1. OBJECTIVES
2. BACKGROUND
3. DRILLING FLUID
4. LESSON LEARNED
5. CONCLUSION

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INTERNSHIP OBJECTIVES

- To expose student to the working environment
- To practice ethical and professional work culture
- To implement Health Safety and Environment (HSE) practices at work place
- To achieve skills in communication, management and team-work.

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HOST COMPANY PROFILE

- Formerly known as KMC Oiltools
- Two core division
  - Drilling fluid
  - Drilling waste management

COMPANY PROFILE

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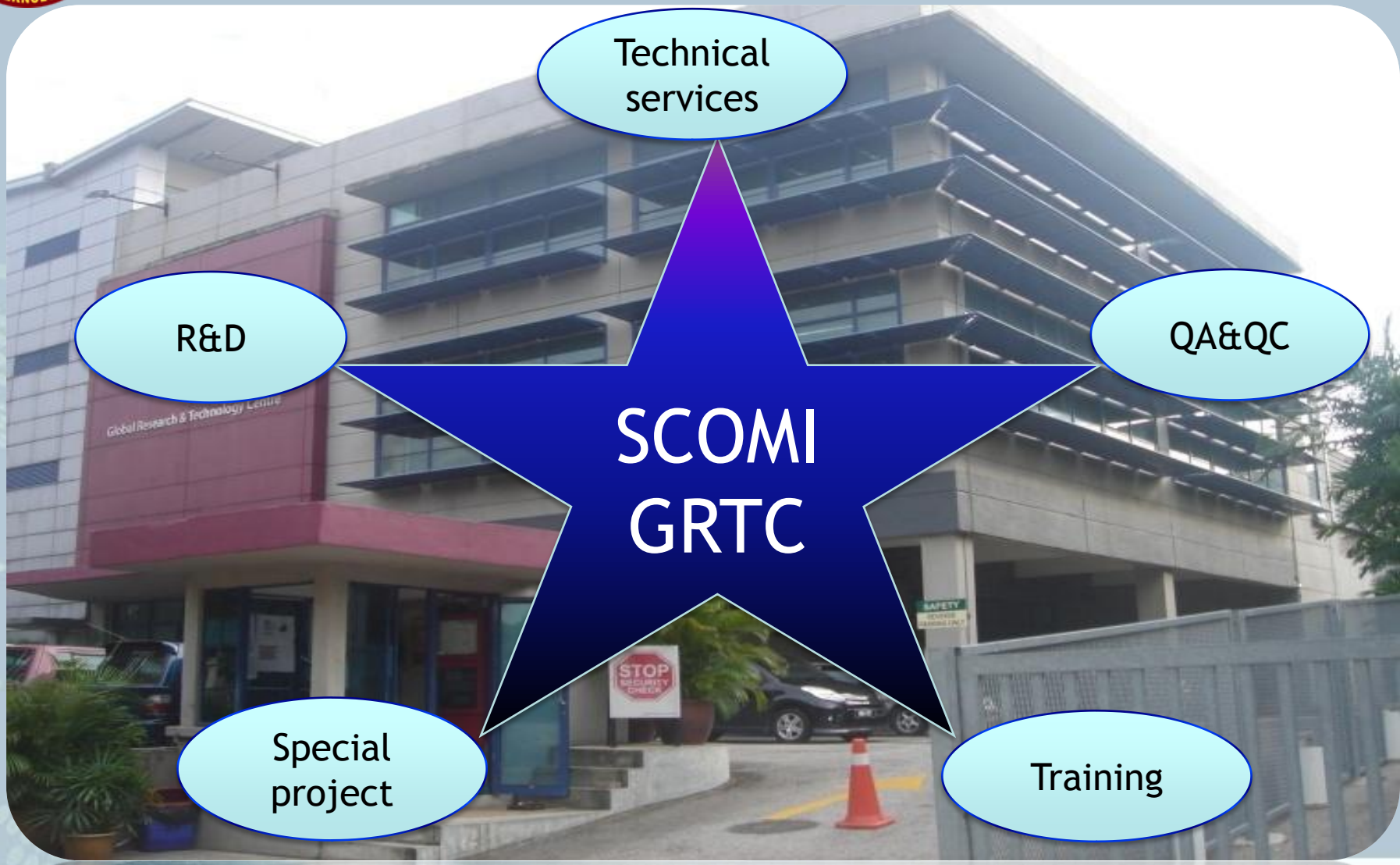


DRILLING FLUID

DRILLING FLUID

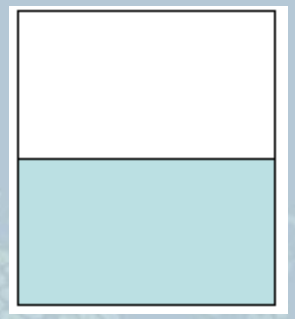
- Fluids used to drill boreholes into the earth
- Also know as muds
- Types of mud system:

water-base mud

synthetic-base mud

MIXING MUD

What is mud?



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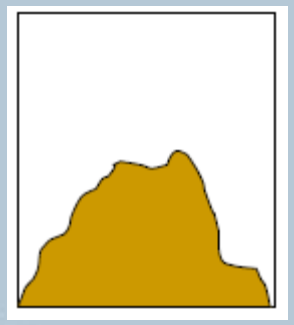

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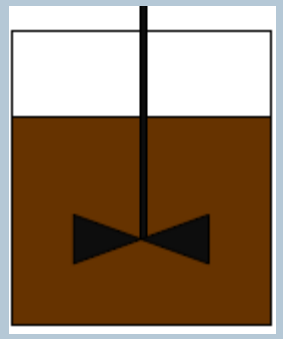

LIQUID	SOLID	MUD
water	bentonite	water-base mud
oil	barite	oil-base mud
	chemicals	

FUNCTION OF DRILLING MUD

- Remove cutting from well
- Control formation pressure
- Lubricate & cool the drill bit
- Maximize the rate of penetration (ROP)

RHEOLOGY

- Plastic Viscosity (PV)
  - The resistance of fluid to flow
  - Low PV-mud capable drilling rapidly
  - High PV-mud too viscous, have to dilute the mud
    - Calculated from 600rpm-300rpm dial reading.

- Yield Point (YP)
  - Ability of the drilling mud to carry cuttings to surface.
    - Calculated from PV-300rpm dial reading.

- Gel Strength
  - the shear stress of drilling mud that is measured at low shear rate after the drilling mud is static for a certain period of time

  - ability of the drilling mud to suspend drill solid when circulation is stop

MUD COMPONENT

1. Base fluid
2. pH control
3. Viscosifier
4. Filtration control
5. Weighting agent
6. Additional product

- shale control additive
- corrosion inhibitor
- lubricants

MUD TESTING

&

EQUIPMENT

Mixer

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Silverson

Hamilton

Mud balance

Pressurized mud balance

Non-pressurized mud balance

Viscometer

API filter press

HTHP

COMPACTOR


R&D
OFITE COMPACTOR
OFI TESTING EQUIPMENT
34TH STREET
TEXAS 77018
ON
OFF
ON

SWELL METER

DISPERSION TEST

OBJECTIVE

- To test inhibition performance between formulated of KCl polymer, HyPR-DRILL and CONFI-DRILL

PROCEDURE

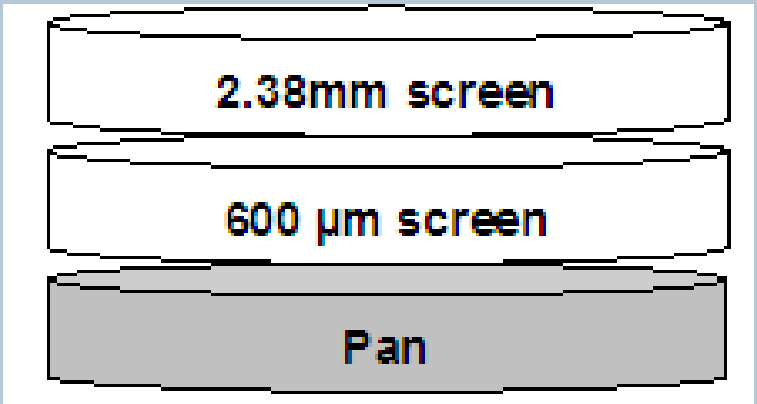
1. Prepare drilling fluids
   - **Fluid 1: 12.5 lb/gal bentonite polymer**
   - **Fluid 2: 12.5 lb/gal KCl polymer**
   - **Fluid 3: 12.5 lb/gal HyPR-DRILL**
   - **Fluid 4: 12.5 lb/gal CONFI-DRILL**
2. Report initial properties
3. Adjust all YP to 30-40 lb/100ft^2
4. Place into aging cell

5. Weight approximate 10g of the remaining clean sample retained on 2.38mm screen

6. Roll in the oven for 16 hours at temperature of 218° F

7. Pour the mud pass through 2.38mm and 600µm screens.

8. Wash the sample through 2.38mm and 600µm screens



9. Weight the retained sample on 2.38mm and 600μm screens.

10. Next, dry the retained sample on 2.38mm and 600μm screens at 105° C in oven until the weight is constant.

11. Weight the cool dried sample retained on 2.38mm and 600μm screens. Record the weight.

Formulation

- 12.5 lb/gal KCl polymer system

No.	Products	SG	Conc., lb/bbl	Vol., ml	Silverson mixer		
					mixing order	mixing speed, RPM	mixing time, minute
1	fresh water	1.00	291.6	291.6	1	-	-
2	soda ash	2.51	0.25	0.10	2	6000	2
3	potassium chloride, 95% purity	2.12	9.5	4.5	3	6000	2
4	HYDRO-STAR HT	1.60	6.0	3.8	4	6000	5
5	HYDRO-ZAN	1.52	1.0	0.7	6	6000	5
6	DRILL-BAR	4.39	216.8	49.4	7	6000	2
7	caustic soda	2.13	0.1	0.05	8	6000	2
	Total	1.50	525.2	350.0	Additional time		27
					Total time		45

- **12.5 lb/gal HyPR-DRILL system**

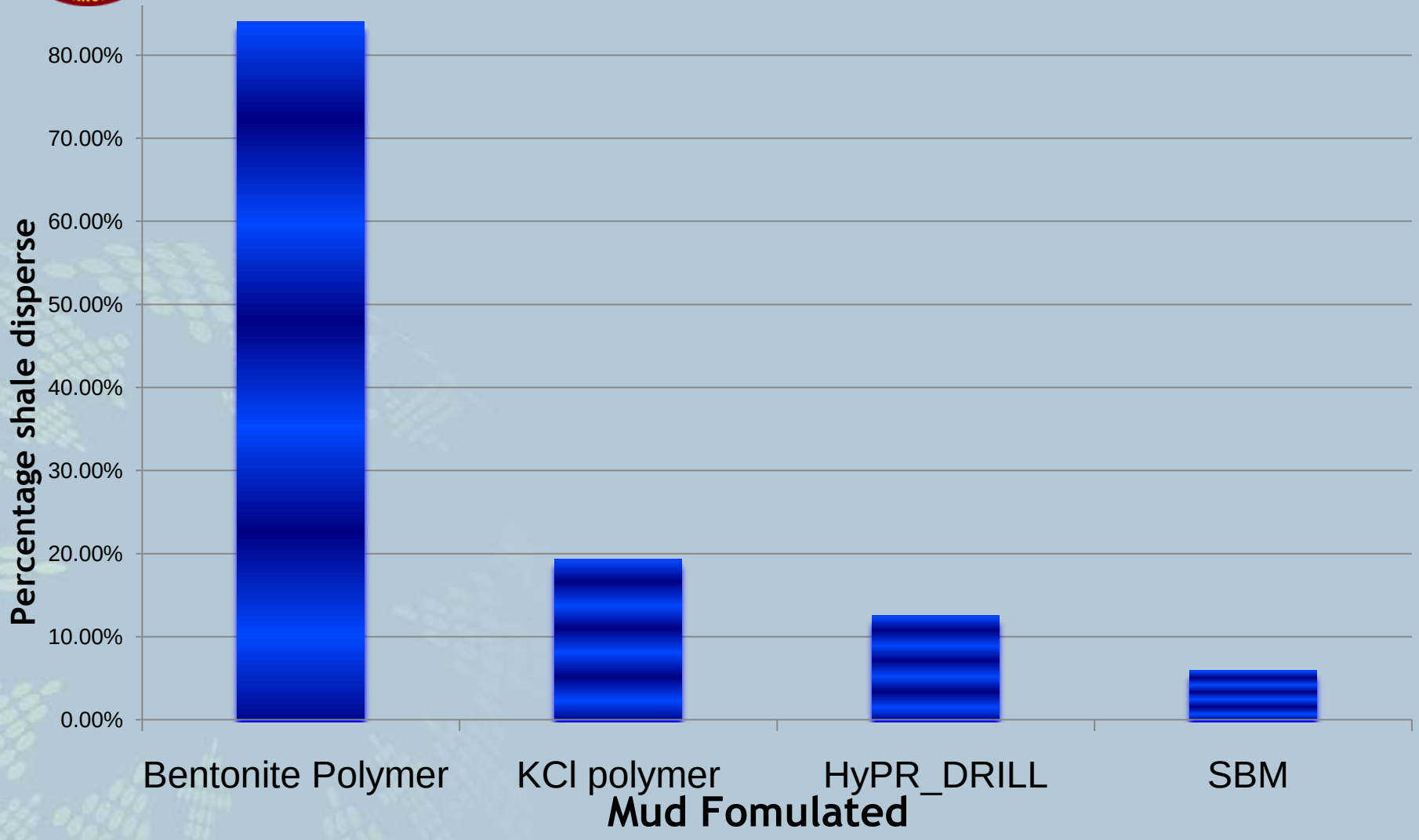
No.	Products	SG	Conc., lb/bbl	Vol., ml	Silverson		
					mixing order	mixing speed, RPM	mixing time, minute
1	Fresh water	1.00	269.4	269.4	1	6000	-
2	soda ash	2.51	0.25	0.1	2	6000	2
3	potassium chloride, 95% purity	2.12	8.8	4.1	3	6000	2
4	HYDRO-STAR HT	1.60	6.0	3.8	4	6000	5
5	HYDRO-ZAN	1.52	0.4	0.3	5	6000	5
6	HyPR-CAP	1.44	3.0	2.1	6	6000	5
7	HyPR-HIB	1.18	12.5	10.6	7	6000	2
8	HyPR-DRL	0.90	9.5	10.6	8	6000	2
9	DRILL-BAR	4.39	215.2	49.0	9	6000	2
10	caustic soda	2.13	0.1	0.05	10	6000	2
	Total	1.50	525.2	350.0	Additional time		18
					Total time		45

- 12.5 lb/gal CONFI-DRILL system

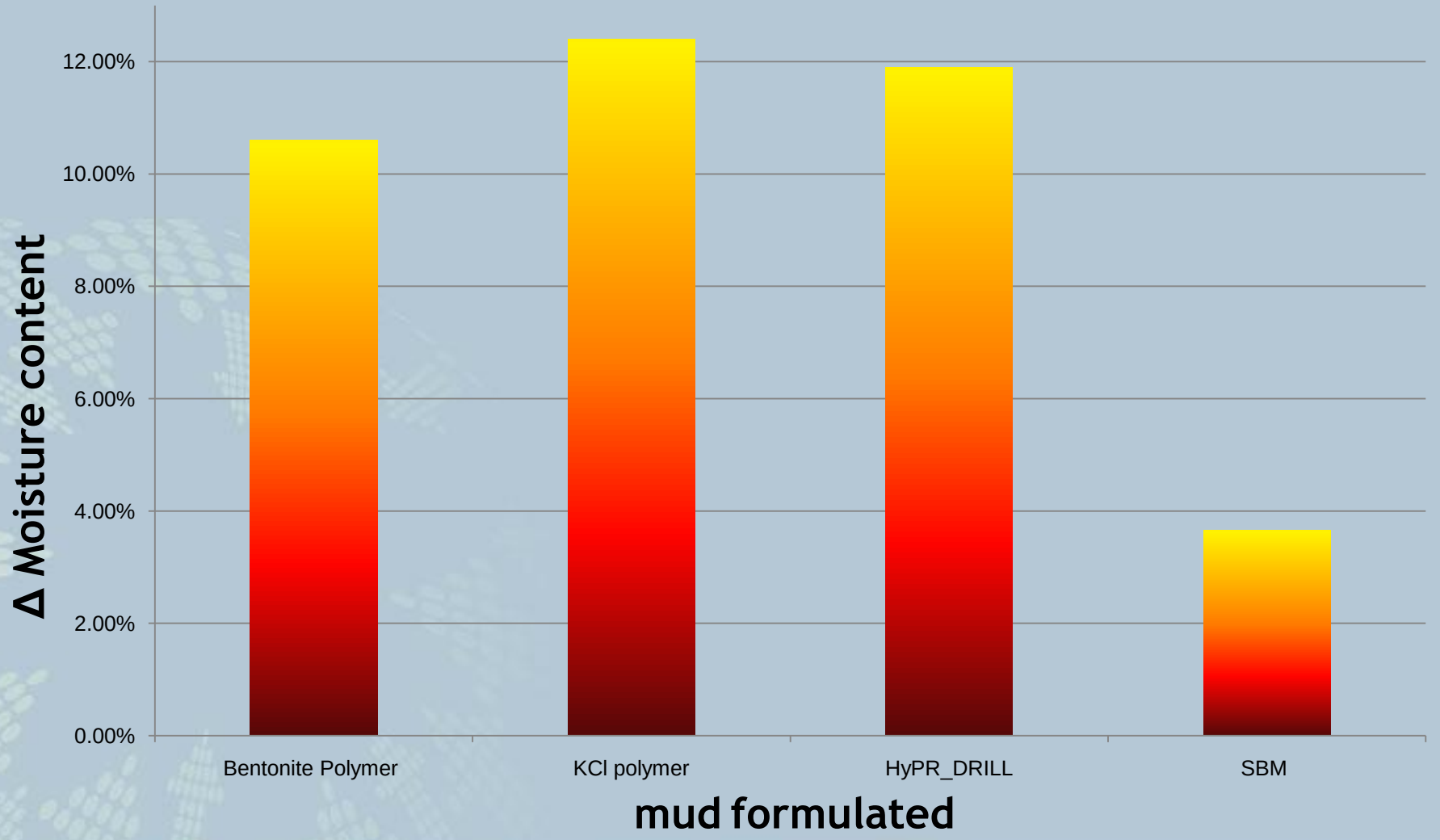
No.	Products	SG	Conc., lb/bbl	Vol., ml	Silverson		
					mixing order	mixing speed, RPM	mixing time, minute
1	Saraline 185V	0.78	164.7	211.1	1	6000	-
6	CONFI-MUL P	0.87	3.0	3.4	2	6000	2
7	CONFI-MUL S	0.88	6.0	6.8	3	6000	2
3	CONFI-GEL HT	1.70	10.0	5.9	4	6000	5
8	CONFI-TROL HT	1.05	2.0	1.9	5	6000	2
2	lime	2.30	8.0	3.5	6	6000	2
4	Freshwater	3.49	52.8	52.8	7	6000	
5	calcium chloride, 95% purity		17.8	5.1			15
9	DRILL-BAR	4.39	260.9	59.4	8	6000	2
	Total	1.50	525.2	350.0	**Additional time**		30
					Total time		60

Shale Recovery Test (AHR 218 °F @ 16 hr)	Bentonite Polymer	KCl polymer	HyPR-DRILL	SBM
Weight retained sample on 2.38mm screen AHR, g (wash & blot dry only)	1.80	9.28	9.97	9.80
Weight retained sample on 600µm screen AHR, g (wash & blot dry only)	0.48	0.03	0.03	0.28
Total weight of retained AHR, g (calculated)	2.28	9.31	10.00	10.08
Total weight of dehydrated retained sample, g	2.00	8.00	8.64	9.54
Calculated average moisture content after hot roll, %	12.28	14.07	13.60	5.36
Corrected shale recovery > 2.4mm, %	16.00	80.64	87.46	94.07
Corrected shale recovery > 600µm, %	4.27	0.26	0.26	2.69
Δ sample moisture AHR %	**10.58**	**12.37**	**11.90**	**3.66**
Corrected total sample recovery %	**20.26**	**80.90**	**87.72**	**96.76**
Percentage shale disperse (< 2.4mm), %	**84.01**	**19.36**	**12.54**	**5.93**

Percentage shale disperse %



Δ Moisture content



LESSON LEARNT

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- Enhance communication skill
- Self learning
- Time and work management

RECOMMENDATION

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Site visit

- Kemaman, labuan

CONCLUSION

- Gain supplemental knowledge in drilling fluid
- Achieved skills in communication and work management
- More prepared for real working life

REFERENCES

- Drilling Fluids Technology Course by Training Department
- SCOMI Oiltools Manual Handbook
- Technical service staff

ACKNOWLEDGEMENT

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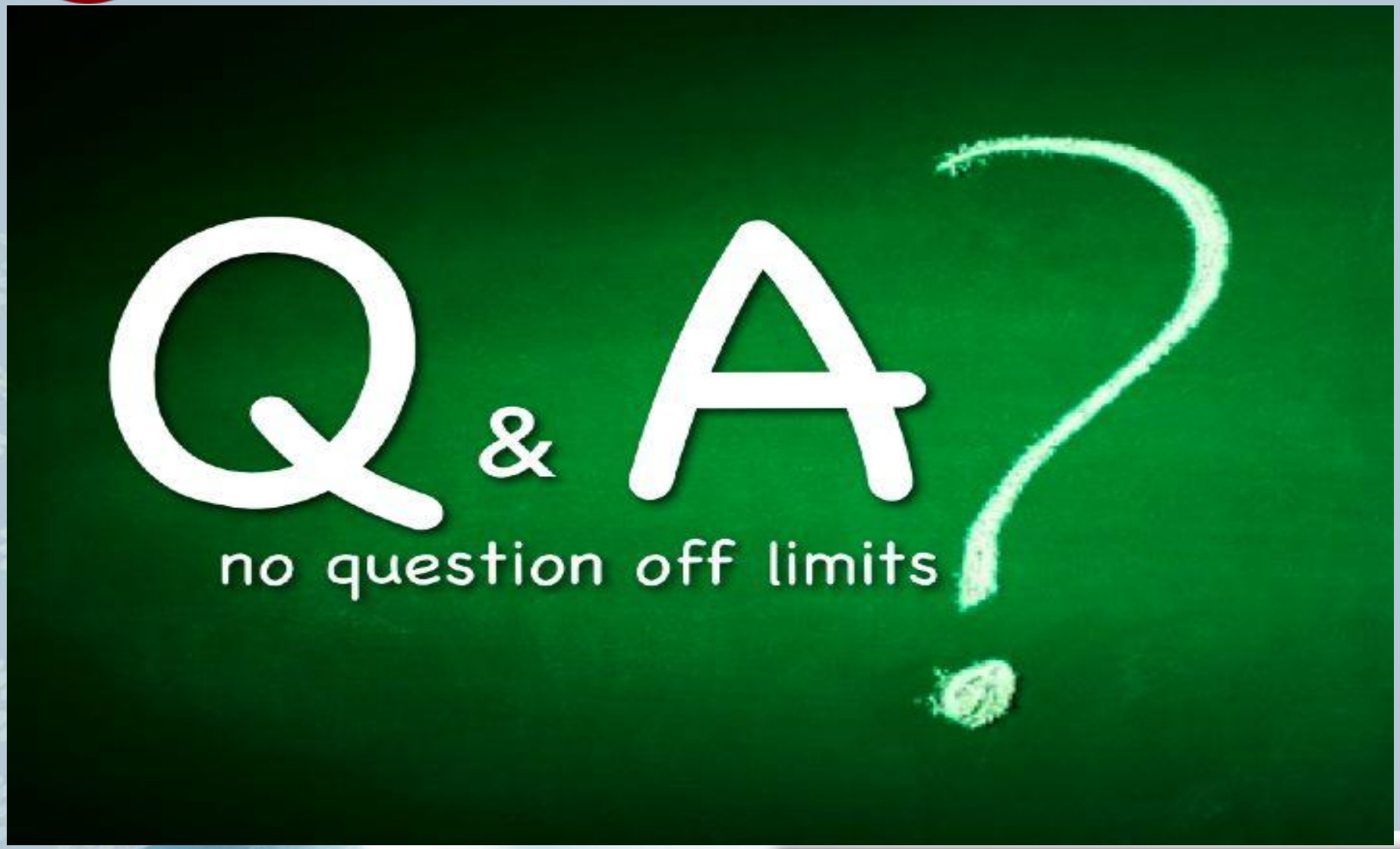
A big thank to:

- Yon Azwa (former TS team leader)
- Erwin Ariyanto
- Raj & Vig
- All GRTC staffs
- Interns


Q & A
no question off limits