Drill Rig Safety
Topics of the Presentation

• Personnel safety and monitoring
  – PPE
  – Health (Drugs and Alcohol)

• Safety related accidents
  – Electrocution
  – Rig Rollovers
  – Fires
  – Falling Objects
  – Moving Parts
  – Transportation

• Drill Rig operation
  – Safe set up procedures
  – Safe operation of machine

• Transportation
  – Walk around and safety check
  – Rig Transport Mode

• Maintenance and Repair
  – Safe repair procedures
  – Safe testing Procedures
PPE
Personal Protective Equipment

- Safety head gear
- Safety shoes or boots
- Gloves
- Safety glasses
- Hearing protection
- Other protective equipment
  (Site Specific)
Personnel Monitoring

• Maintain Personal Hygiene
  – Hair
  – Clothing
  – Jewelry

• Implement a Drug and Alcohol testing program
  – Work related accidents
  – Pre-Employment screening

• Operator Knowledge
  – Make sure operator has been trained to use specific piece of equipment and can operate it safely
Schramm Part #
0231-0065
Safe Drilling Operation

- Start-up Check List
  - Lubrication
  - Filter Condition
  - General Inspection of Wires, Hoses, Cables etc.
- Rig Set-up
- Safety Check
  - Fire extinguisher
  - Emergency Stops
Start up Checklist

• Site Condition
• Rig Walk Around
• Check Fluids and Filters
• Loose Objects
  – Tree branches
  – Tools
• Leaks
  – Air
  – Fluid
• Safety Check
Rig Lubrication

• Check oil level daily
  - engine oil & coolant
  - compressor air/oil tank
  - hydraulic tank
  - pump oil (water injection, mud, etc.)
  - pump drive gearboxes

• Grease daily (must purge dirt)
  - Floating Sub
  - Rollers
  - Air Swivel
  - Rotation gear box seals
  - Chain/Cable Sheaves
  - Fan Bearing
Inspect Rig to Truck Frame Mounts Monthly
Site Set-up

- Safe Location
- Soil Stability (geological conditions,
- Weather (rain, snow, frost etc)
- Cribbing
- Overhead Obstructions

Poor Soil Stability
It could mean your life!!!
Rig Rollovers

- Rig Set-up: Site set-up, soil stability, proper cribbing practice
- Outrigger Failure: Anti-rollover Features
- Pull Down (Down Feed) Limit Control
- Drilling Operation and Drilling Fluid Control
- Hydrofrac methods
No Cribbing
Hydrofrac Methods
Safety Checks
Annular Velocity
Annular Velocity
RIG SET UP

- Rig Set-Up
  - Cribbing
  - Platforms/ Walkways (secured and locked properly)
  - Location/ Grade
Use Proper Cribbing Practices
Drive-up Sub Base
Use Caution When Raising Mast

- Watch for falling objects
- Watch for hoses snagging
- Lock Mast when raised
Engage Mast Locks

Mast Locks
Rig Fires

- Compressor Flash
- Fuel and Oil Leaks
- Hose Leaks and Failures
- Electrical
- Smoking
Schramm Electrical Safety Circuit

- Typical engine (low fuel, low oil pressure, high temp., low coolant)
- Typical compressor (high oil discharge temp.)
- Typical hydraulic (high oil temp.)
Compressor High Temp Shut-down
A team drilling for natural gas hit oil yesterday, sending smoke and flames hundreds of feet into the air near Mason-town. Authorities were letting the fire burn while awaiting a team from Texas that specializes in extinguishing oil fires.

Drill team strikes oil, setting off huge blaze
Just needs a little paint!!
Inspect & Install Heat Blankets and Exhaust Covers
Falling & Moving Objects

- Inspect Fasteners Monthly- Replace chronic loose fasteners with anti-vibration washers
- Tighten To Spec All Overhead Equipment
- Inspect All Rotation Drive Components – winches, pump drives, fan drives, including fan balance
- Inspect all Feed System Components- chains, sprockets, cables, sheaves.
- Use caution when raising mast
Fan Failure due to Flow Imbalance
Clean Cooler Regularly
Inspect Cooling System & Fan
The Most Injury Related Activity

Handling Drill Pipe
Tools
Casing
What is unsafe?
Proper Drill Rod Handling
Hands Free Carousels

15 Pipe for 300 Feet
Automated Loading Arms w/ Radio Remote Controls
Automatic Pipe Handling System
w/ Tilt Out Top Head
Inspect All Cables
Feed, Winch, Sling
Feed Cable Replacement Criteria

- Minimal tension cylinder stroke remaining after max adjustment
- 3/32 loss of diameter (1 ½ cable)
- Wire Break Determination (ASME B30.5)
  6 broken wire strands in one rope lay
  3 breaks in one strand in one rope lay
Inspect Sling Cables & Latches
OSHA “Below-the-hook”

- 3 x safety factor
- 1.25 certified testing
- Nameplate
Use caution when welding!!
While we are on the topic of welding!!
Use Properly Clamped Cables
The Right Way to Clip Wire Rope

The Wrong Way to Clip Wire Rope
Winch Line Spooling
Is this good?

No

Winch manufacturers require 5 wraps minimum!
Winch Cable Installation

\[\frac{7}{8} - \frac{1}{6} \text{ in. (11-13 mm)} \text{ wire rope.} \text{ Insert large end first.}\]

\[\frac{5}{8} - \frac{5}{8} \text{ in. (14-16 mm)} \text{ wire rope.} \text{ Insert small end first.}\]
Winch Wedge Applications
Maintain Minimum Recommended Wraps on Drum
Moving or Potentially Moving Objects

- Rig Controls
- Pump & Fan Drives
- Chain & Cable Drives
- Air Hose Failure
- Mast & Top head
- Winch
Drive Guards
Drive Coupling
Chain & Sprocket Guards
Air/Fluid Line Components

- Valves
- Hoses
- Hard plumbing
- Swivels
- Subs
- Drill rod and Tools
Air Hose Whip Checks
Hydraulic Hose Inspection

Hydraulic Pressures to 5000 psig
Use proper Personal Protection Equipment (PPE)
Warnings are there for a reason!!

Please read them!!
Do Not Climb Mast or Pipe Deflector

WARNING
Do not climb mast. Can cause severe personal injury or death.
Lower mast before servicing.
Great View..... Big Fall!!!!
Do as we say… not as you do!!!
Personnel Fall Protection

• Handrails on platforms over 4 ft
• Personnel Fall Arrest System: ANSI Z359.1 over 6 ft
Ladder with Fall Arrest
Transportation of Equipment

• Always make sure rig is roadworthy
  – Brakes
  – Lights
  – Seat belts
  – Tires
  – Mirrors
  – Windshield wipers

• Make sure equipment meets weight and Height requirements for the road
Transportation of Drill Tools Too
Summary

• Implement formal inspection and Preventative Maintenance Program
• Read and Follow, Drilling Safety Guide, and the Manufacturer’s Drill Rig Operation and Maintenance Instructions.
• Wear proper Personnel Protective Equipment (PPE): Hard hat, gloves, ear plugs, steel toed shoes, fall protection, etc.
• Maintain good personal grooming- hair and clothing
• Perform Manufacturers Recommended Maintenance
• Contract Qualified Service Personnel to Maintain, Repair, and Monitor Rig
• Use Manufacturer’s OEM Parts

• Work Safe……Be Safe!!!!
QUESTIONS?