



# Nelgar Oilfield Services Ltd.

**Presents the following  
instructional slide show:**

**“Operating Procedures  
for the  
Sure Shot Acoustic Fluid  
Level System.”**

# Sure Shot Acoustic Fluid Level System

Complete Sure Shot System



Well head attachment  
and accessories



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# Purpose of Performing a Fluid Level

A fluid level is the distance from the surface (wellhead) to the gas-liquid interface. An accurate fluid level is used for the following purposes:

- Estimate bottom-hole pressure
- Evaluate pump performance
- Determine additional production; and
- Assess operating changes

# Fluid Level Techniques

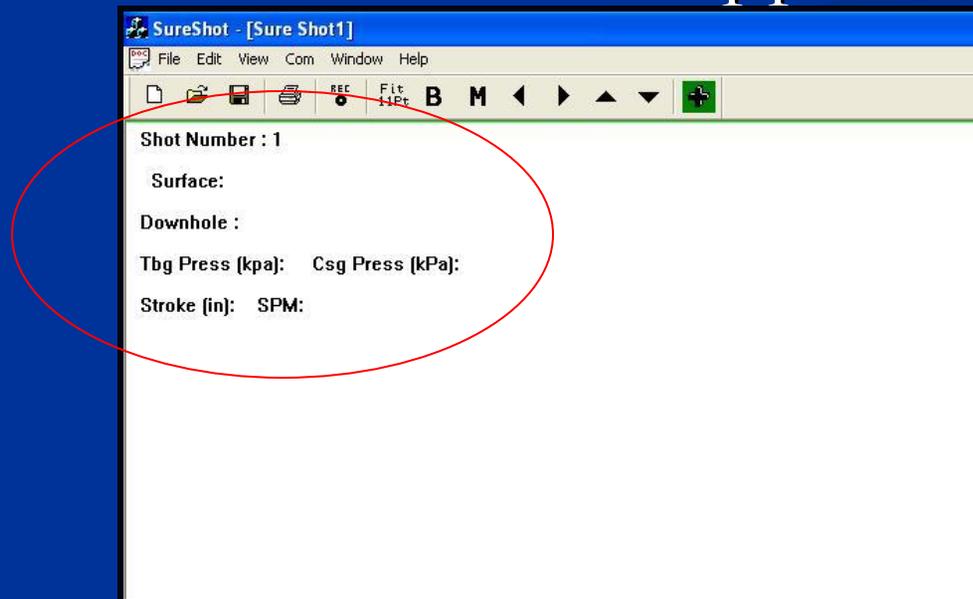
- The Sure Shot system consists of a digital sound processor and a well head attachment which includes a sound generator and a sensor (microphone).
- The sound generator is used to create a sound wave by discharging a blank cartridge or compressed gas into the casing, or in some situations the tubing. The sound can also be generated by releasing the annulus gas into the empty chamber.

- The sound wave travels down the annulus from surface until it reaches the gas-liquid interface and is then reflected back to the surface.
- Upon returning to the surface, the sound wave is sensed by the microphone and then relayed to the processor.
- After the filtering and amplifying process, the processor receives the signal and sends it to the laptop.
- The depth of the fluid level is determined by reference to obstructions in the annulus space such as tubing joints (collars), anchor, liner, perforations etc.

# Fluid Level Procedures

- 1. If at any time during the Sure Shot fluid level procedure you feel that yours or anyone else's safety is at risk please stop all operations until the situation has been resolved.
- 2. Contact operator to inform them on what work you will be carrying out, as a work permit may be required.
- 3. Always be sure to wear your Personal Protective Equipment (PPE) including steel toed boots (sneaker style not recommended), hard hat, gloves, safety glasses, 4 gas monitor, and coveralls.

- 4. Locate the well that needs to be tested using the Legal Land Description (LLD).
- 5. Park vehicle at least 3.5 meters upwind from the well.
- 6. Open the Single Shot program on the laptop; go to File, New or Ctrl N. This will bring up a blank sheet with comments in the upper left hand corner.



- 7. Go to Edit, then Comments; the Sure Shot fluid level information dialog box will appear. Begin by entering in the company name, surface and down hole locations, and the field name.

Fluid Level Information

Company:	Golden Company
UWI:	100/08-15-036-04 w4M/00
Surface Location:	100/08-15-036-04 w4M/00
Fieldname	Sylvan Lake
Csg Pressure (kPa):	944.0
Tbg Pressure (kPa):	1030.0
SPM:	403
Stroke Length(in):	91.0
Shot Number:	1

Well Tapping

OK Cancel

- 8. Take the tubing pressure and record this value in the corresponding field in the Sure Shot fluid level information dialog box.
- 9. Observe the casing pressure as this will help to determine what method should be used to generate the sound wave i.e. blank shell, CO<sub>2</sub>, nitrogen, or implode.

- 10. If necessary, fill in comments in the large blank area on the Sure Shot fluid level information dialog box. Things that are unusual go here, such as the stuffing box leaking, well tapping, beam compressor setups etc. Once the comments have been filled out click okay at the bottom of the Sure Shot fluid level information dialog box.

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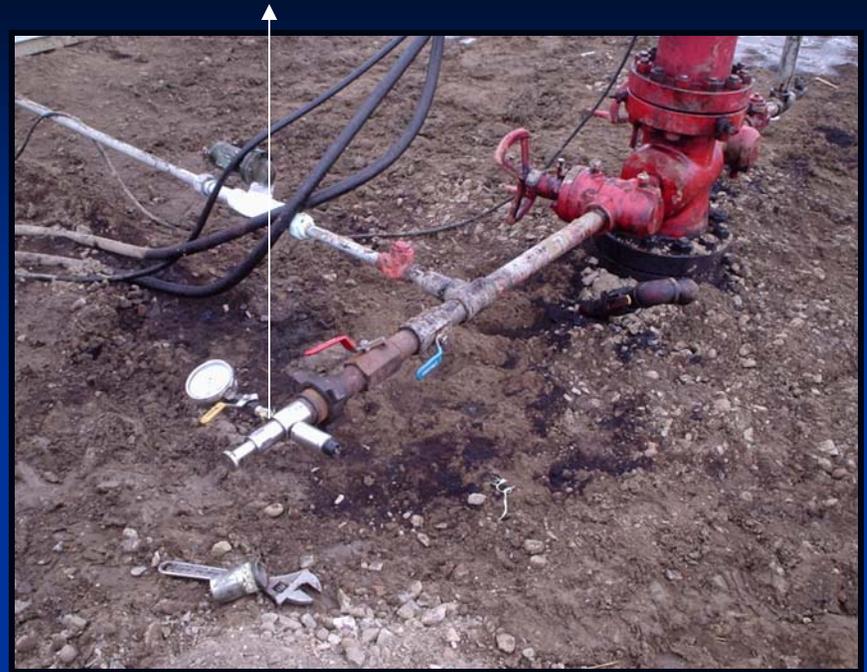
Well Tapping

OK Cancel

- 11. Using the Sure Shot gun tie into the casing. To decide where to tie into, examine the set up of the well. The Sure Shot gun cannot shoot through check valves, needle valves, or any hole less than  $\frac{1}{4}$  inch in diameter. The tie in spot

should be easy to isolate and should have a one way path to the casing. A nipple with a 90° elbow or a different size swedge may be required. **Note:** Ensure the well pressure is below the Sure Shot gun ratings (must not exceed 3000psi using gas charges, 1000psi using black powder).

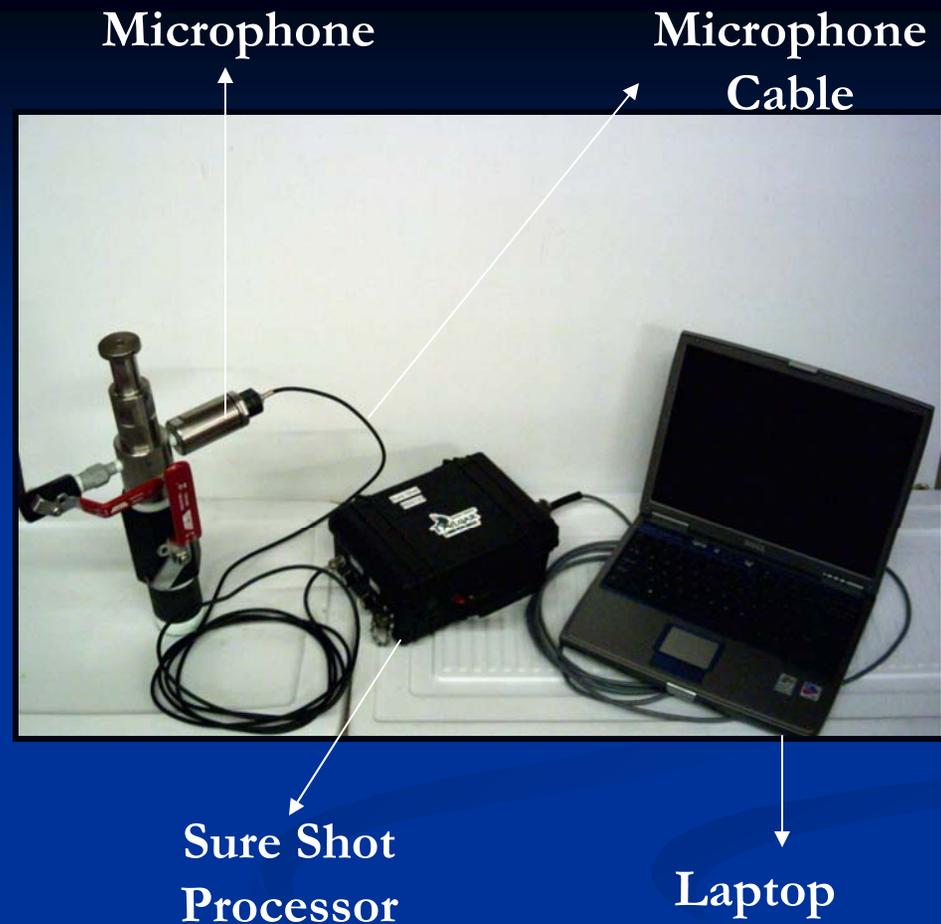
Sure Shot Gun



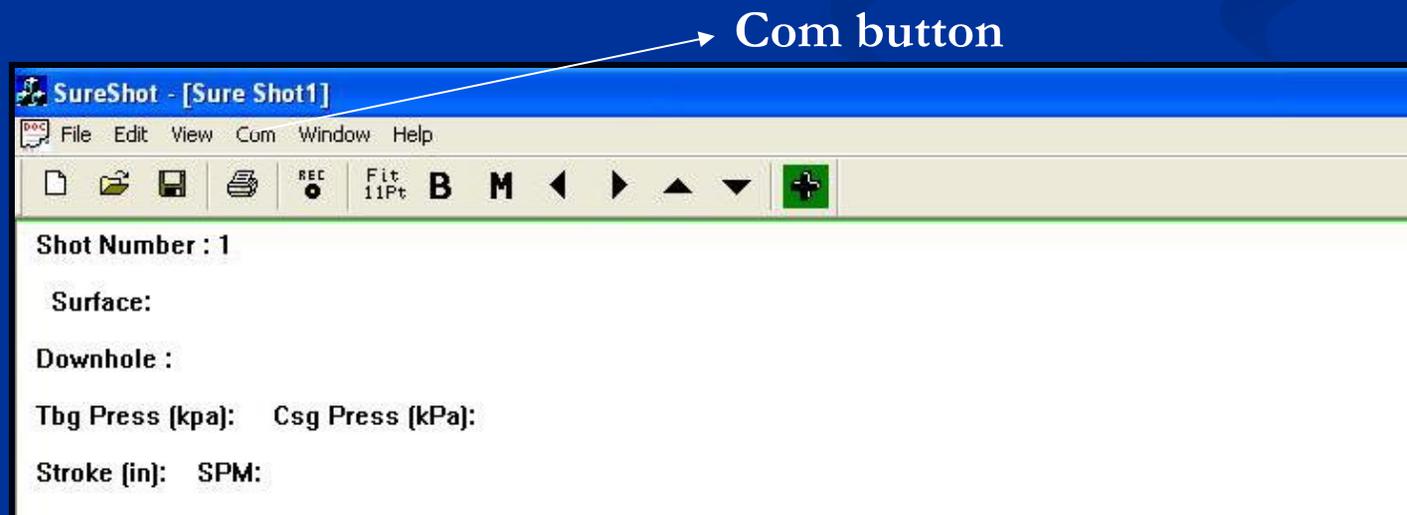
- 12. Connect the microphone cable to the microphone and the Sure Shot processor. Turn on the processor and make sure the LED starts to blink.

Connect the data

cable to the computer and the Sure Shot processor. Make sure the power inverter is turned off. Also be sure to refrain from disturbing the microphone cable as it will pick up exterior noise.



- 13. Go to Com and then Connect; the fluid line (green) and collar line (red) should now be running across the screen.

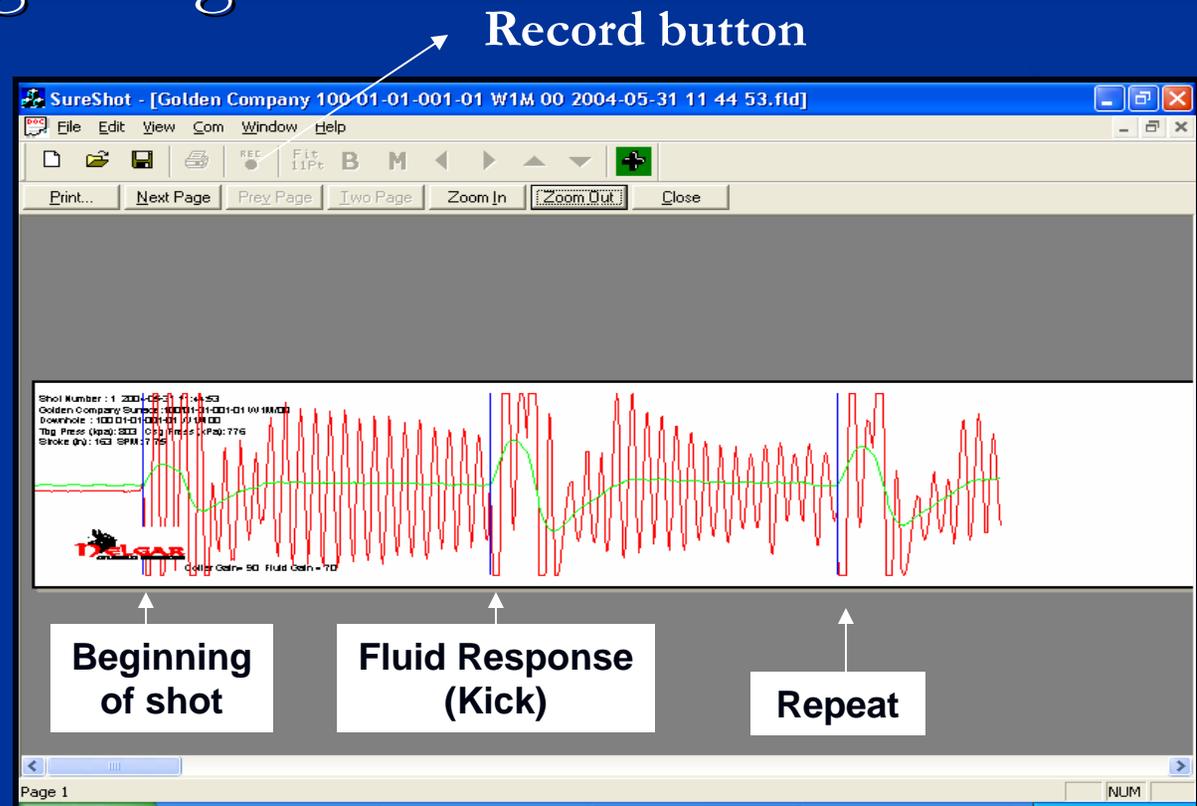


- 14. The sensitivity of the processor can also be adjusted to filter out the noise by adjusting the fluid and collar line dials on the Sure Shot processor.



- 15. When ready for the shot, press the record button on the screen and discharge the sound wave into the annulus. The fluid and the collar lines should jump at the same time on the computer screen indicating the beginning of the shot.

Watch the screen for the fluid response (kick). Keep recording and watch for the repeat of the kick.



- 16. Once the repeat of the kick has been seen click record again to stop recording. A fluid level has now been successfully taken.  
**Note:** With wells that are fueled by annulus gas, the casing valve that leads to the gas motor will have to be opened after every shot to ensure the motor does not shut down.

- 17. If no more fluid levels are required, the Sure Shot system may now be taken off the well.
- 18. Prevent oil from spilling when removing the gun and always be sure to leave the well the same way it was upon arriving.

# Different Methods of Generating a Sound Wave

# Implode

The implode method utilizes the casing pressure to create a differential pressure in the Sure Shot gun, thus allowing a sound wave to be created.

The implode method can be used when:

- Well pressure is high (above 700 psi)
- Well is quiet, as the sound wave is not as distinct when using the implode method

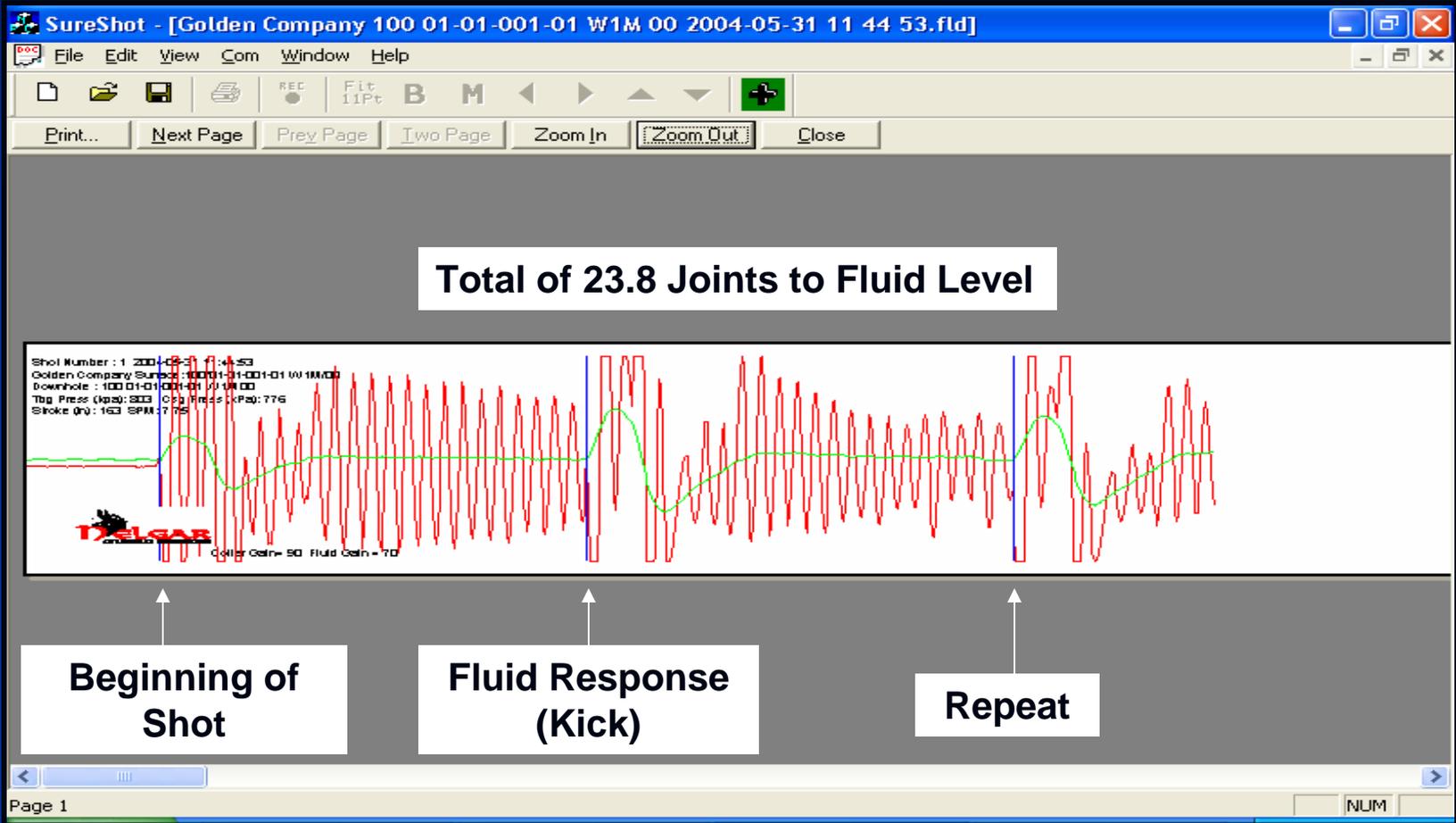
# Explode

The explode method uses an alternate pressure source (blank cartridge/compressed gas) to create the sound wave.

The following observations should be noted before using the various methods of explode.

- Blank Shells -must be approved by the owner of the well
  - there must be a positive casing pressure
  - well pressure must not exceed 1000psi
  - the well must be free of oxygen
- Compressed Gas -well pressure must not exceed 3000psi

# Counting Fluid Levels

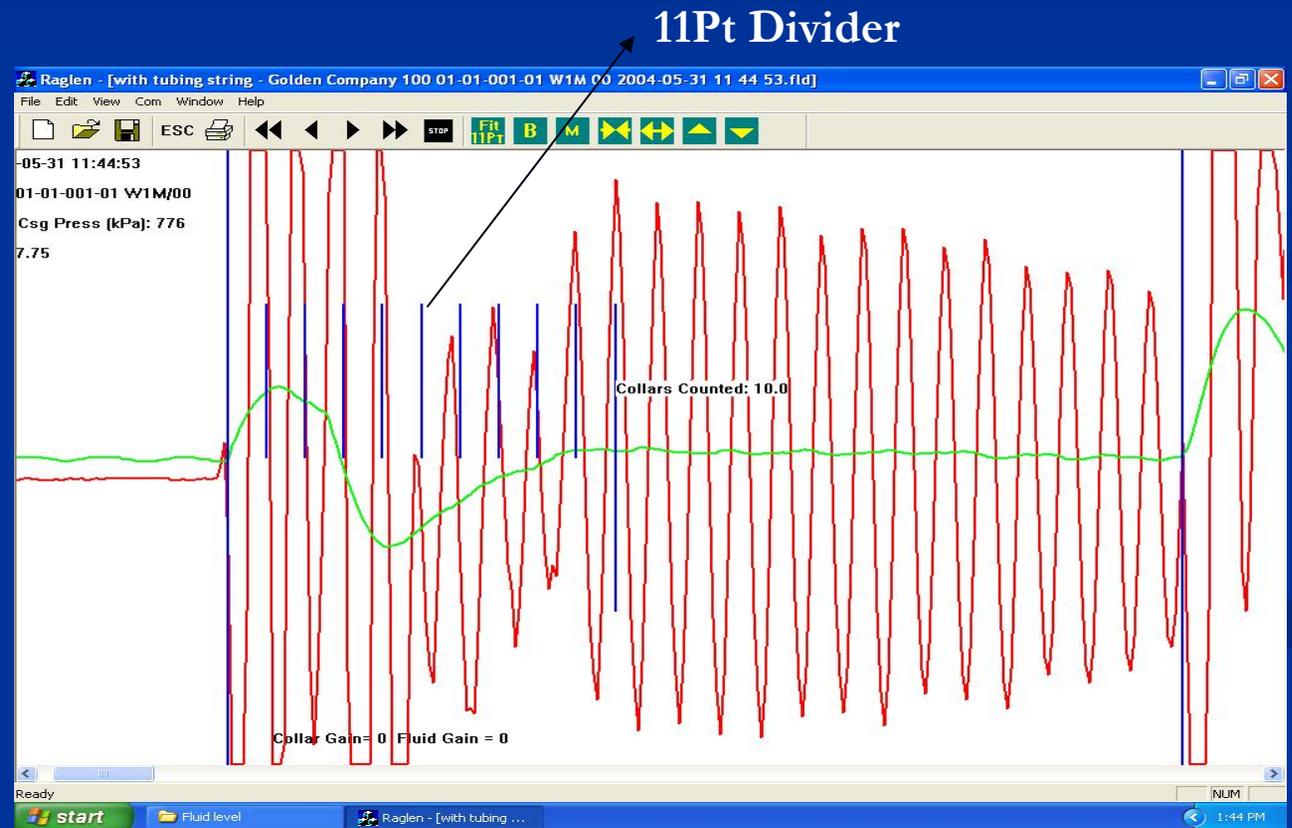


- 1. To count the number of joints to the fluid, scroll to the beginning of the shot and click the left mouse button to mark the beginning of the shot. A vertical blue line will appear at this point (see chart on the previous slide).

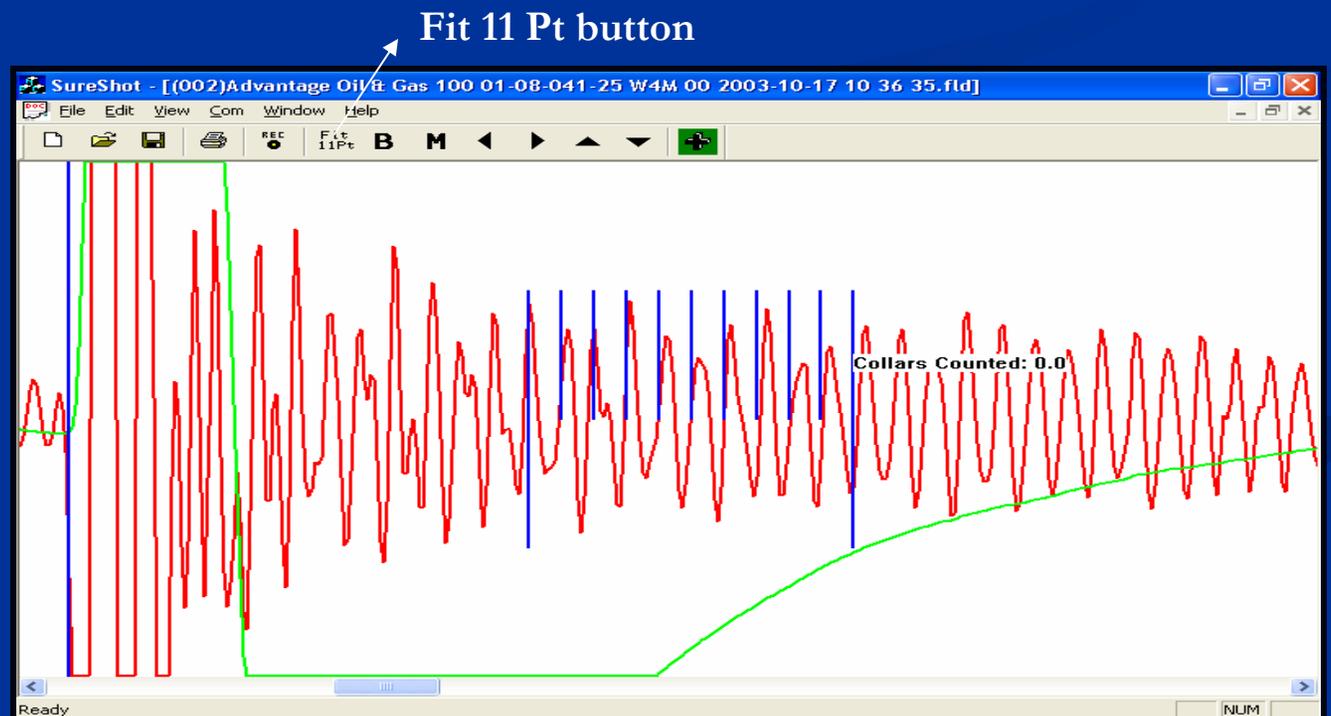
- 2. Scroll forward to the fluid response (kick) and click the right mouse button to mark the kick; a vertical blue line will appear at this point. Continue scrolling and a blue line will automatically appear at the repeat of the kick (see chart on the previous slide).

**Note:** To ensure that the beginning of the shot and the kick are marked correctly, print the fluid level strip and fold it at the kick; the beginning and the repeat of the fluid level should line up.

- 3. Now click on button B to position the 11Pt divider at the beginning of the shot. The width of the divider may need to be adjusted by using the left and right arrow buttons. The vertical position of the divider may also need to be adjusted by using the up and down arrow buttons at the top of the screen.

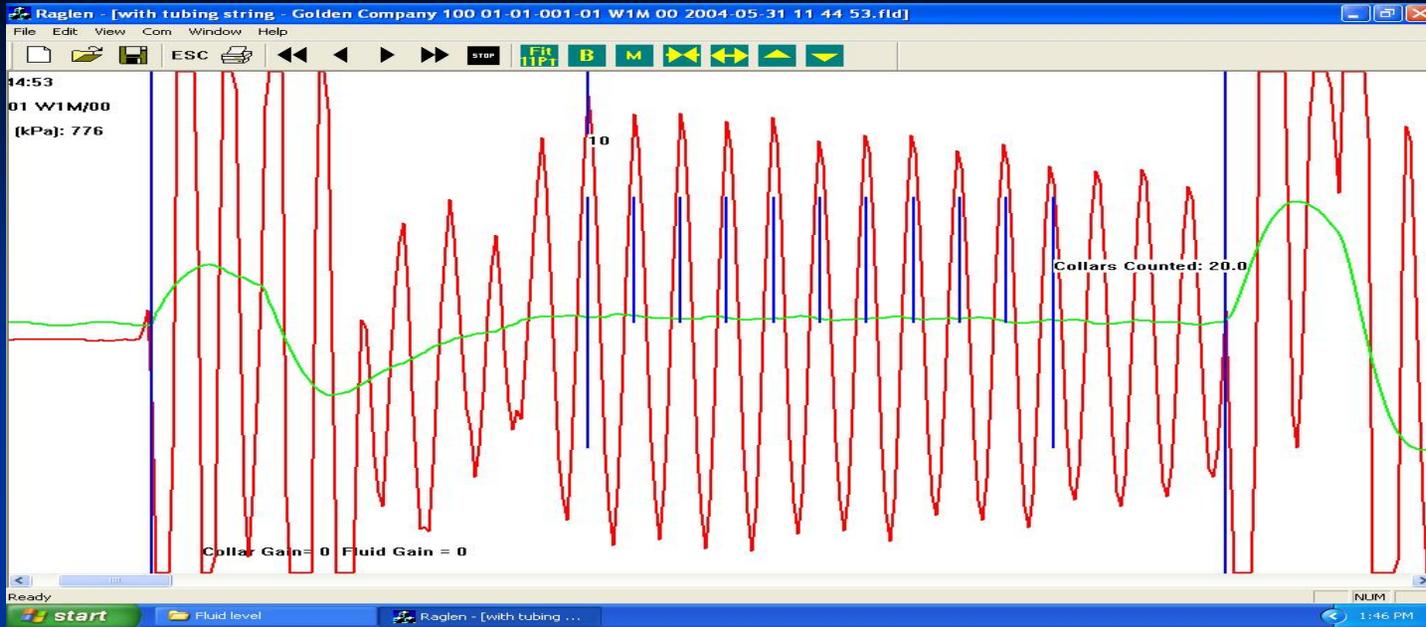


- 4. When collar responses are poor, a section of the fluid level with good collar responses may need to be located in order to adjust the divider accurately. Place the divider on the collars by clicking on the Fit 11 Pt button and then click on the collar that the divider should be placed on. The divider may need to be adjusted to line up with the collars. When the divider has been adjusted, click on the B button to move the divider to the beginning of the fluid level.

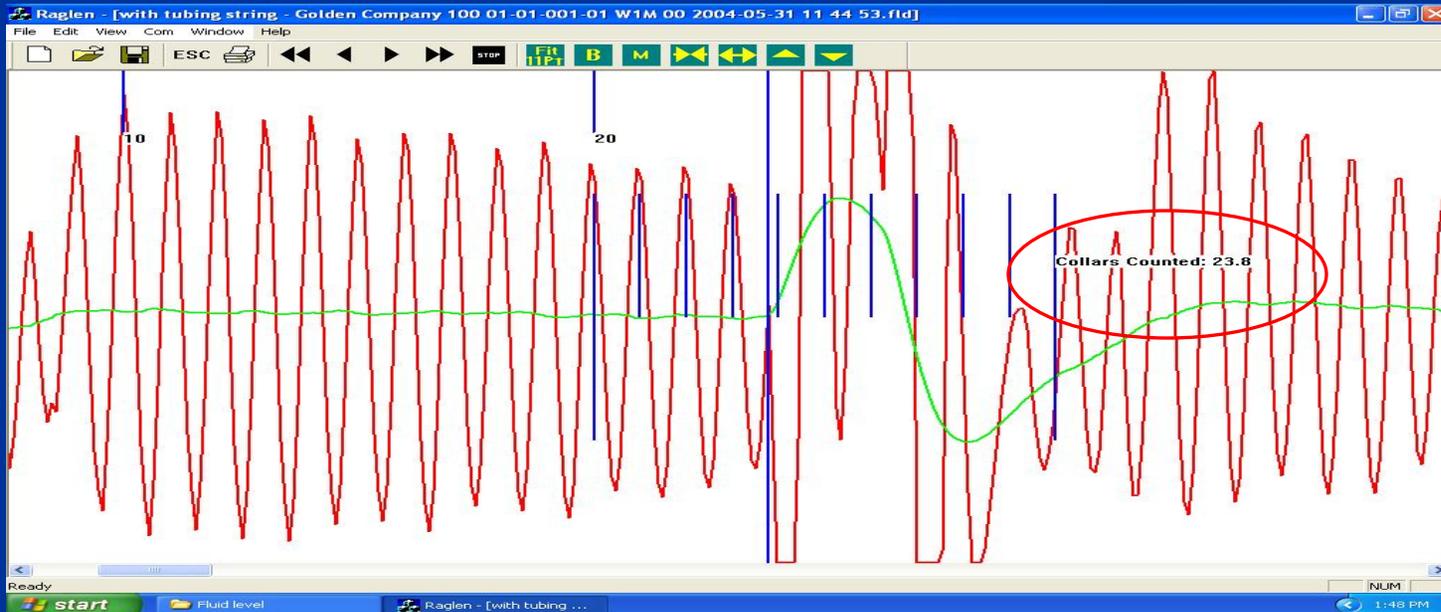


- 5. Click the M button to move the divider along the fluid level (see photo A on next slide). Continue clicking until the kick has been reached. The divider width may have to be adjusted when moving along. As the divider moves along the fluid level, the number of joints counted will appear at the top of the screen. Upon reaching the kick, the total number of joints to fluid will appear (see photo B on the next slide).

# Picture A



# Picture B



DO NOT HESITATE TO CONTACT  
NELGAR IF YOU ARE UNSURE OR  
HAVE ANY QUESTIONS.