

L.A.C.T. WITNESSING AND MEASUREMENT

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WHAT DOES A L.A.C.T. UNIT OR METERING SYSTEM DO FOR YOU?

A L.A.C.T. unit is a *Lease Automatic Custody Transfer* unit that:

- 1) transfers oil from the lease to the truck, pipeline, or other tankage;
- 2) monitors and samples the amount of sediment and water in the oil (non-merchantable oil);
- 3) eliminates air or gas from the liquid as long as it is not entrained in the liquid;
- 4) pulls a representative sample of the liquid going through the L.A.C.T. or A.C.T.;
- 5) measures the volume of liquid going through the L.A.C.T.;
- 6) maintains constant back pressure and flow rate; and
- 7) operates automatically or semi-automatically.

Although this list does not cover everything a L.A.C. T. or metering system does for you, it does give you an idea of the basic sections of a L.A.C.T. or meter system, and its function.

WHAT ARE SOME OF THE ADVANTAGES OF A L.A.C.T.?

- 1) It reduces the manpower requirements of a gauger.
- 2) Reduces tankage requirement over conventional hand gauging.
- 3) Offers flexibility for 24-hour operation.
- 4) Reduces human error, if properly maintained.

- 5) Eliminates measurement error due to tank bottom buildup or clingage on tank walls.
- 6) Allows for complete, remote operational capabilities by dispatcher, etc.

The benefits of a L.A.C.T. or meter system are priceless for you and your company. However, their use can be compared to using a computer. If you set them up with the wrong equipment, they won't meet your needs. If you don't adjust and test the equipment for operational conditions, errors and operational problems will persist.

In order to fulfill the requirements of a witness, you must understand how all of the equipment on the L.A.C.T. unit works. This will enable you to check the equipment to make sure it works.

The following is a list of equipment checks that should be done on initial start-up:

- 1) The **pump** should be checked for pressure and flow rate output. Pressure should be greater than 20 PSI to meet the minimum meter requirements. Pressure should not exceed the maximum pressure rating of the lowest rated device on the L.A.C.T. Flow rates should be between 20% and 80% of the maximum rate of the meter.
- 2) **BS&W Monitor** should be calibrated to the BS&W going through it. Set point is normally left at 1%.
- 3) The **strainer** should be opened and checked to make sure the basket is correct mesh. For crude application, 40 mesh is normally used.

The **air eliminator** should evacuate the air upon start up. If liquid comes out of the air eliminator, it should be cleaned or repaired.

- 4) **Samplers** used on L.A.C.T. units consist of a container, sample mixer, and probe.

The **sample container** is usually internally coated with epoxy. It should be checked for corrosion or blistering. The bottom of the container should be sloped to provide for complete withdrawal. The cover should allow for this inspection. It should be built so that it prevents external water (rain) from entering the sample container.

Sample probes should be located according to the manufacturer's recommendations. The tubing from the probe to the sample tank should be sloped to allow for complete withdrawal.

Normal sample frequency is one sample per barrel. Usual desired sample volume is calculated so that the container is 75% full at the end of the month. It should also be determined that the sampler is not pulling a sample (or leaking) when the divert valve is returning bad oil back to the tank or separator.

- 5) The **divert valve** can be checked by lowering the BS&W monitor set point from 1% until it trips at the actual BS&W point. The meter should stop flowing. At this point, all the crude is going through the divert line.
- 6) **Meters** used on L.A.C.T. units are $\pm .25\%$ accuracy or better. They are set up with temperature compensators or gross measurement with data averagers. Right angle drives are used to operate portable photo pulsers. Counters have stack monitor switches that drive meter fail, SCADA systems and sample probes. There are many other accessories available, but these are the main ones used.

The only way to check the meter is by proving and establishing a meter factor. If conditions permit running an accuracy curve, it should be within .25%. An initial counter check should be made to assure correct gears.

- 7) The **meter outlet** should have pressure and temperature indicators. Both should be checked against a certified gauge or thermometer.
- 8) The **block valve** should be double block and bleed so that leakage on seats can be detected. It should be checked each proving.
- 9) **Prover connections** should have same size pipe and valves (full port) so that flow rate at proving is the same as operational.
- 10) Back pressure control should be set at a minimum of 20 PSI so that flow rate is controlled.
- 11) The control panel should be checked out initially by a qualified electrician as high voltages can be present.
- 12) Upon initial flow test, all the above equipment should be checked. After successful check-out, all equipment on the L.A.C.T. unit should be sealed for security. Any device that can be tampered with that would affect quantity or quality measurement should be security-sealed.

At the end of the month, a close-out (finish) is made. The following procedure is usually followed:

- 1) At 7:00 a.m., the L.A.C.T. is stopped so that the meter ticket can be closed out.
- 2) The monthly sample in the sample tank is mixed up so that gravity and BS&W content can be determined and documented on the meter run ticket.

- 3) All seals that are broken must have numbers recorded as “off” and “on” numbers.
- 4) All valves that are open must be closed and sealed.

Naturally, the heart of the L.A.C.T. unit is its meter. It is checked out at the time of proving. There are a few simple things to remember as a witness:

- 1) Be sure that the flow rate at which you operate the L.A.C.T. unit is the same as what you prove at.
- 2) Check the temperature out of the meter against the data averager, if used. Also check it against the prover system temperature.
- 3) Witness the runs obtained on the prover counter. Be sure these are the runs put on the prover report.
- 4) Make sure that the 4-way valve seal is checked, along with the block and bleed valve. It should be noted that the block and bleed valve bleeder could be plugged.
- 5) Be sure that all air is bled off of the prover before starting, and that there are no leaks on hoses, etc.
- 6) All calculations should be re-checked before turning the prover reports in to the main office.