



## Real-time solutions to measure interface levels, optimise emulsion and foam breaking chemicals and determine flow characteristics.

### What does a Tracerco Diagnostics™ Separator study reveal?

Tru-Scan™ and PhaseFinder™ applications performed on separator's will reveal the liquid level, the presence and height of any foam, the oil and water interface position and extent of emulsion band as well as the presence and extent of sand deposits within the vessel. The technologies may also detect internal hardware issues such as inlet device damage. The scans are carried out whilst the vessel is operating so real-time information is obtained about how the vessel is performing at specific operating conditions. The technology "sees through" the vessel wall allowing a determination of what is happening inside without the need to shut down. The results provide detailed information about the interface qualities and can be used to assist in trials of anti-foaming or emulsion breaking chemicals to determine the best type and concentration to use.

Tracerco Diagnostics™ Separator studies provide information on separator performance and will help establish residence time, carry over/carry under, and identify flow characteristics. Results from the study assist plant personnel to identify problematic operations, maximise chemical usage and help plan for modifications to increase efficiency.

### What preparation is needed to the separator before Tracerco's services are performed?

Tru-Scan™ or PhaseFinder™ applications are generally performed without any preparation to the vessel. A Tracerco crew will need access to the top of the vessel or above the section to be scanned either by ladders to the platform or scaffolding. Our scan equipment is very portable.

Separator tracer study requirements include a suitable injection point on the inlet into which a pulse of appropriate tracer can be injected. Sensitive detectors are placed at predetermined locations on the inlet and the vapour, oil and water outlets.

Good drawings of internals are needed prior to performing work and appropriate injection points can be determined for the tracer studies.

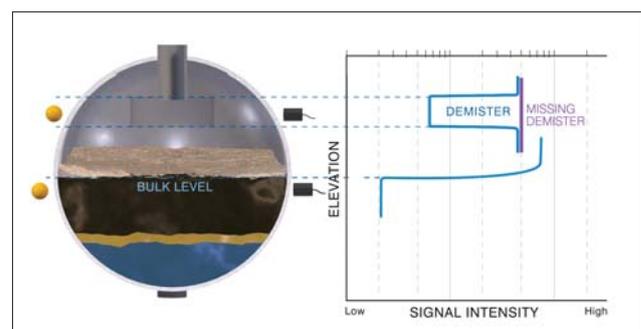
### How will all the equipment be transported to the platform or FPSO?

The most common mode of transportation for the equipment to be deployed is by boat. In some cases the transportation of the isotope source can be by helicopter. In a preliminary job discussion with the customer Tracerco will need to identify the mode of transportation for the equipment to be deployed.

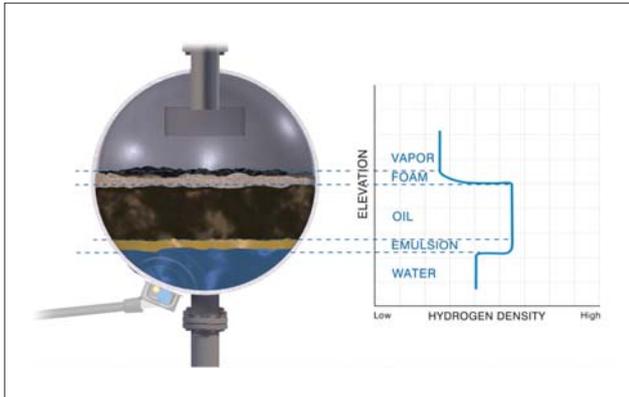
On the boat or platform, provisions must be made for a location to store the radioactive source whilst not in use. Tracerco offshore personnel have completed offshore survival and helicopter flight training.

### How are the different scans of a separator performed?

A Tru-Scan™ measurement is typically performed using a very small (activity) sealed radioactive source and a sensitive radiation detector aligned on opposite sides of the separator. The scan is performed whilst the vessel is online and operating at normal, test or upset conditions. Any external obstructions are noted to make sure they do not affect the scan interpretation.

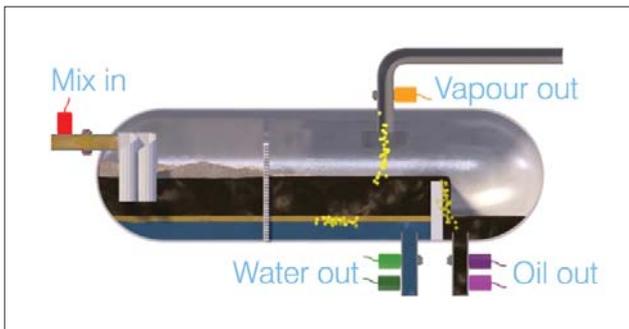


The PhaseFinder™ is a combination of a specialist signal emitter and detector in one non-intrusive piece of hardware which emits a signal and directs it into the separator and detects the signal rebounding from a particular chemical structure. Different molecules and phases respond in a different manner enabling Tracerco to accurately detect the position of individual phases from the outside of a vessel.



### How is a separator tracer study performed?

The basic principle of a tracer investigation is to use a phase specific radiotracer to mimic phase flow and then follow it through the separator. The technology requires a number of sensitive detectors to be located on the inlet and outlets of the vessel under investigation and possibly on the body of the separator. The radiotracer is injected into the process and if the tracer material flows past a detector position it will register as a response versus time. Analysis of each detector response provides information on flow distribution and timing allowing flow dynamics within the separator to be determined. Tracerco has gas, water, oil and sand type tracers available enabling every phase flow to be measured.



### How safe are these procedures? What about radiation protection?

We offer the safest, highest quality and most accurate Process Diagnostics™ service available. The features of our scanning system include:

- Our in-house multi-channel detector system provides a more focused diagnosis, detecting subtle but important problems that might be missed using other detector technology

- Low-voltage scanning detectors and electronics to minimise risk
- Wireless systems mean's minimising the danger of spark production

Compared to industrial radiography (X-rays of welds and piping) we use much weaker radiation sources - typically a thousand times smaller in terms of source activity. We strictly abide by our radiation license requirements to segregate an area around the equipment we are working on to provide a safe boundary for all site personnel. Practically speaking this usually means restricting access onto the equipment currently being tested.

When conducting tracer studies, we segregate a small area around the injection point, but do not need to restrict access to the equipment being tested. Our procedures ensure we comply with regulatory requirements to protect all plant personnel. Tracerco employs fulltime Radiation Professionals to ensure regulatory and license compliance. Tracerco is licensed by appropriate agencies worldwide. Most field staff are trained to the Radiation Protection Supervisor (RPS) level.

Our crew members are always very willing to explain these procedures with everyone potentially affected and to be sure we do not block access to critical areas. There is no danger to plant personnel working around process equipment.

### What information will a Tracerco Diagnostics™ Separator study provide?

A Tracerco Diagnostics™ Separator study provides a non-intrusive quick diagnosis of production issues in real time, eliminating the guess work when trying to resolve separation challenges.

After the separator study has been completed the lead crew member will provide a preliminary report with the customer before leaving the site. A formal report will be sent soon afterwards.

Benefits the study provides include:

- Detect problems such as oil in water, water in oil, gas undercutting, or liquid carryover. It can also detect the effect of blockages in perforated plates, flow distribution and accurately measure individual phase residence times.
- Measure the overall liquid level and any existing intermediate layers, such as foam or emulsion, allowing customers to test the effectiveness or determine the best suited effect chemical for their process.
- Detect missing or broken components to vessel internals which could have a serious impact on the ability of a vessel to separate materials.

For further details email: [process.diagnostics@tracerco.com](mailto:process.diagnostics@tracerco.com) or visit: [www.tracerco.com/processdiagnostics](http://www.tracerco.com/processdiagnostics)

For our worldwide offices: [www.tracerco.com/processdiagnostics/our-people](http://www.tracerco.com/processdiagnostics/our-people)

Enabling you to make the right decision

