

Providing Insight Onsite



Online, Non-intrusive Trouble Shooting and Process Characterization of FCCU's using Gamma Ray and Tracer Technology





Presentation Agenda



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- Introduction
- Tracerco Technology
 - Gamma Scanning
 - Tracer study
- Case study
 - Cyclone Blockages
 - Feed Nozzle performance
 - Stripping Steam Ring Damage
 - Catalyst Bed level
 - Regenerator Air Grid problems
 - Cyclone overloading problems





Technology

Veccele





Tracerco can comprise any individual element or combination of the techniques below :

•Unsealed tracer injections to follow various phases
•Gamma scanning to determine levels or detect damage
•Gamma Scanning to assess standpipe density



Applications of the Technology – FCCU's

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profile



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Residence times • Distribution ٠ Cyclone blockages • Cyclone efficiency ٠ Vapour underflow Catalyst bed level Residence times Velocities Air distribution Catalyst distribution Cyclone efficiency • Cyclone blockage detection • Catalyst bed level • Catalyst slugging Catalyst density



- Distribution
- Steam underflow
- **Catalyst Bed Level**
- **Dip-Leg Catalyst Levels**
- **Riser Density Profile**
- Coke Deposits
- Velocity slip ratios
- Residence times
- Distribution of feed, steam & catalyst





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Technology Overview



Cyclone Gamma Scan



Reactor/Stripper bed level and primary cyclone scan





Non-intrusive on-line identification of catalyst level using gamma scanning technology

- · Locate top of catalyst bed
- Identify catalyst level in primary cyclone dipleg
- Scan results help recalibrate level instruments and gather essential information to make needed repairs
- Identify problem areas to avoid shutdowns



Feed Nozzle Performance



ThruVision Scan Orientation







Tracer Study







Tracer Study













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Case Studies



Case Studies – Scan of Internal Cyclones to locate Blocked Cyclone



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The unit was operating at reduced rates due to the increase in catalyst within the slurry pump around.

- 6 Internal cyclones.
- Cyclone A was blocked.
- Catalyst level increased as circulation rate was increased.





Case Studies – Catalyst Distribution in the Riser Tracerco

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Case Studies – Catalyst Distribution in the Riser Tracerco

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JM Johnson Matthey Inspiring science, enhancing life

FCC Reactor Stripper – Catalyst/Vapor Flow Distribution



- Measures steam & catalyst distribution through the stripping section
- Identify problem areas for upcoming turnarounds to assist in scheduling maintenance, resulting in an on-time turnaround performance



FCC Reactor Stripper – Catalyst & Vapor Distribution



North Bottom- 19%

East Bottom- 20%

South Bottom- 25%

West Bottom- 36%

120

125

130



0 -70

75

80

85

90

95

100

Time (seconds)

105

110

Steam Distribution



115

TruTec™ Scanning

Case Studies – Stripper Maldistribution





TRACERCO Diagnostics FCCU Study Stripping Steam Distribution



Case Studies – Stripper Maldistribution





TRACERCO Diagnostics FCCU Study Stripper Steam Distribution - Top



Case Studies – Regenerator Bed Levels



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- Three different operating levels of the Regenerator
- Gamma Scan at each condition to optimize the bed level and reduce catalyst carryover.





Case Studies – Air Grid Problems



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Case Studies – Blockage causing cyclone overloading issues







Case Studies – Blockage causing cyclone overloading issues







Conclusion



- Scanning and Tracer injection/detection are the only techniques that allow you to effectively 'look inside' your vessels whilst in normal operating conditions.
- The perfect technology to:
 - Troubleshoot operating problems
 - Carry out a Process Optimisation Study
 - Plan a Turnaround more efficiently
 - Carry out a 'baseline' study of the unit during Commissioning or after a Turnaround
 - Measure Efficiency gains after a Retrofit
- Tracerco measurement data can also be used to enhance CFD modelling for more accurate analysis

Thank you and any Questions?







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Use our Technology Map to find out more!

