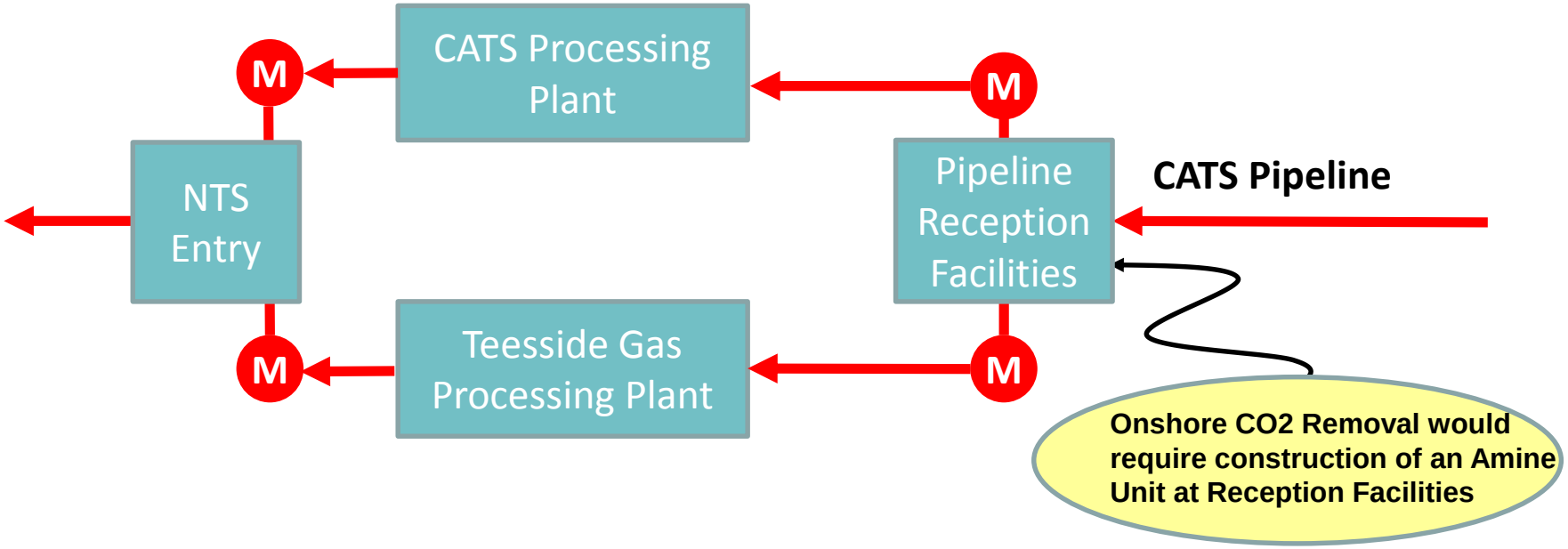
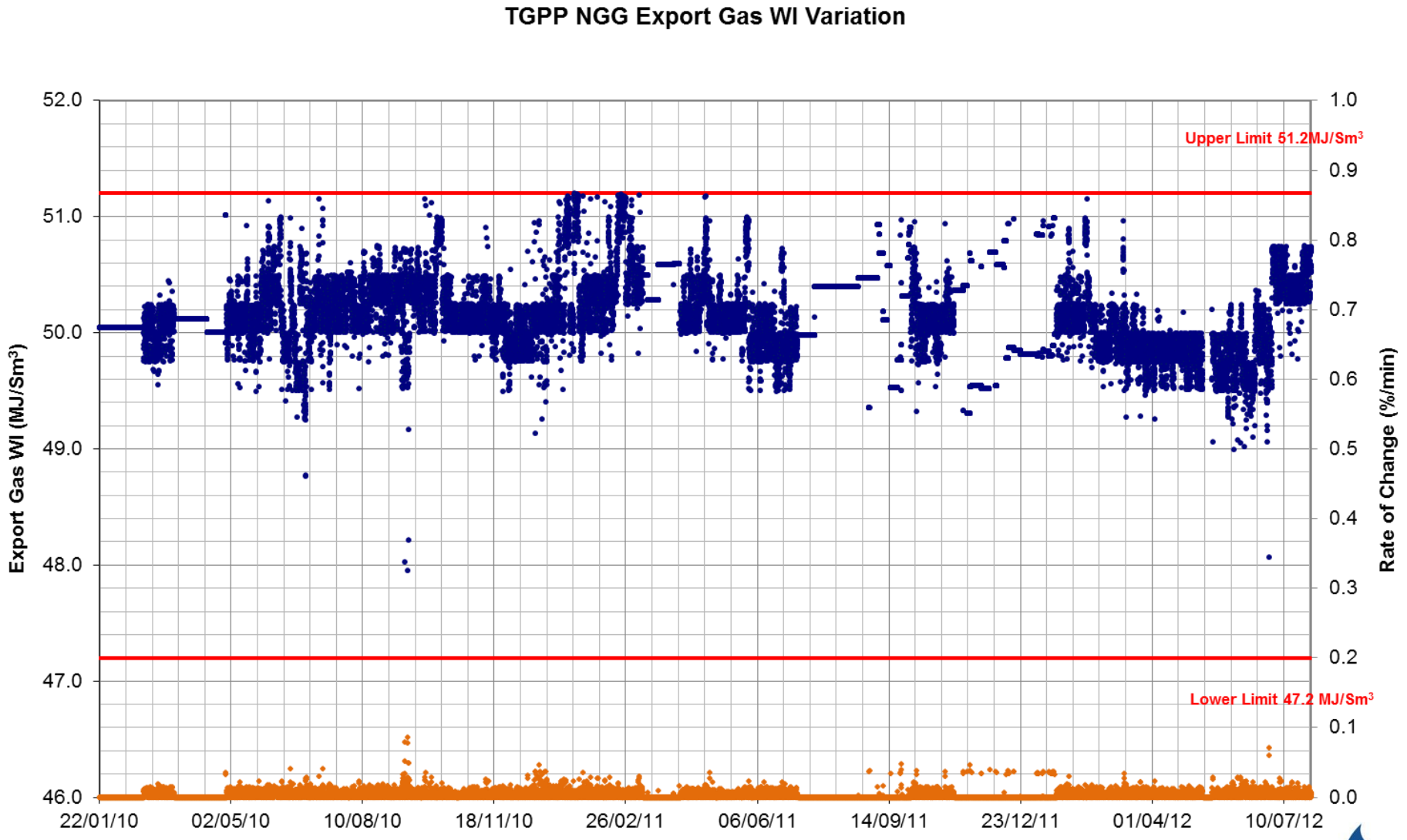
ACTION 808: CATS/TGPP Terminal Schematic



Gas in dense phase is carried from offshore oil and gas fields to Teesside by the CATS Pipeline. The reception facilities contain flow & pressure control equipment, metering and H2S & Hg guard beds. Gas is then processed in either the CATS terminal of Teesside Gas Processing Plant. Water and NGL is removed and NTS specification gas exported via metering equipment to the NTS entry points

Action 807 – TGPP Variation in WI (Jan-10 – Jul 12)



Teesside Gas Processing Plant

Summary of changes to report & carbon impact assessment

- Amendments made to report per the recommendations from last meeting
- Added section on alternatives to CO_2 removal or spec relaxation
  - Existing high CO_2 fields – continued occasional short-term shut-in
  - New developments – Owners will take view on economic provision of CO_2 technology &/or risk on certainty of export route. May or may not decide to progress with development
- Confirmation that an onshore amine unit could be located at CATS Pipeline reception facilities
- Single amine unit simplifies carbon impact assessment
  - Offshore CO_2 removal – Jackdaw flow forecast with amine unit in constant operation
  - Onshore CO_2 removal – Jackdaw flow forecast with amine unit operational when blending cannot be provided (30 day/yr)
  - 4 mol% to NTS – Jackdaw flow forecast when blending cannot be provided (30 day/yr)
- Onshore removal may require continuous amine unit operation – would increase CO_2 impact

Carbon impact assessment update

Assessment of CO_2 Impact from Teesside Gas (2019-2030)	Scenario 1 NTS Delivery at 4 mol % CO2	Scenario 2 Offshore CO2 Reduction	Scenario 3 Onshore CO2 Reduction
CO_2 Removed by Amine unit (4 mol% to 2.9 mol%) (te)	0	462,881	38,045
CO_2 in fuel gas consumed by Amine unit (te)	0	213,510	87,497
CO_2 above 2.9 mol% emitted by consumers (te)	38,045	0	0
Total additional CO_2 emissions (te)	**38,045**	**676,391**	**125,542**

Cost Assessment of CO_2 from Teesside Gas (2019-2030) (£ NVP10 1/1/15)	Scenario 1 NTS Delivery at 4 mol % CO2	Scenario 2 Offshore CO2 Reduction	Scenario 2 Onshore CO2 Reduction
CO_2 Total ETS Traded Cost	£24,728	£1,690,905	£304,418
CO_2 Total Traded Cost with Carbon Price Support	£161,371		
Total CO2 Cost (Traded & Price Support)	**£186,099**	**£1,690,905**	**£304,418**
CO_2 Total Non-Traded Cost (£/yr) (non-ETS consumption)	£559,424	£0	£0
Total Estimated Emissions Cost	**£745,523**	**£1,690,905**	**£304,418**
Estimated Fully Installed Cost of Amine Unit		£147,189,400	£129,089,543
Estimated Abatement Cost for additional CO2 prior to NTS entry		**£148,880,305**	**£129,393,961**
Cost per tonne	**£20**	**£220**	**£1,031**

Teesside Gas Processing Plant