



## **Hewett-Bacton Field Infrastructure**

This document details technical information relevant to potential third party access to the Hewett Field Infrastructure, the Hewett Pipeline and the Hewett Bacton Gas Terminal and is published by Eni UK Limited for and on behalf of the Hewett-Bacton Owners. This document is not legally binding and does not constitute an offer capable of acceptance. Any offer of services is subject to:

- Availability of capacity, to be confirmed by a FEED study
- Competition Law analysis and advice
- Management approval by each of the Hewett-Bacton Owners.
- The proposed Users entering into agreements with the Hewett-Bacton Owners relating to the transportation, processing and allocation of gas.

**ANY QUESTIONS RELATING TO THE CONTENT OF THIS DOCUMENT SHOULD BE ADDRESSED TO:**

**Eni Hewett Ltd  
Bacton Gas Terminal  
Bacton  
Norwich NR12 0JG**

**tel: 01263 725315**

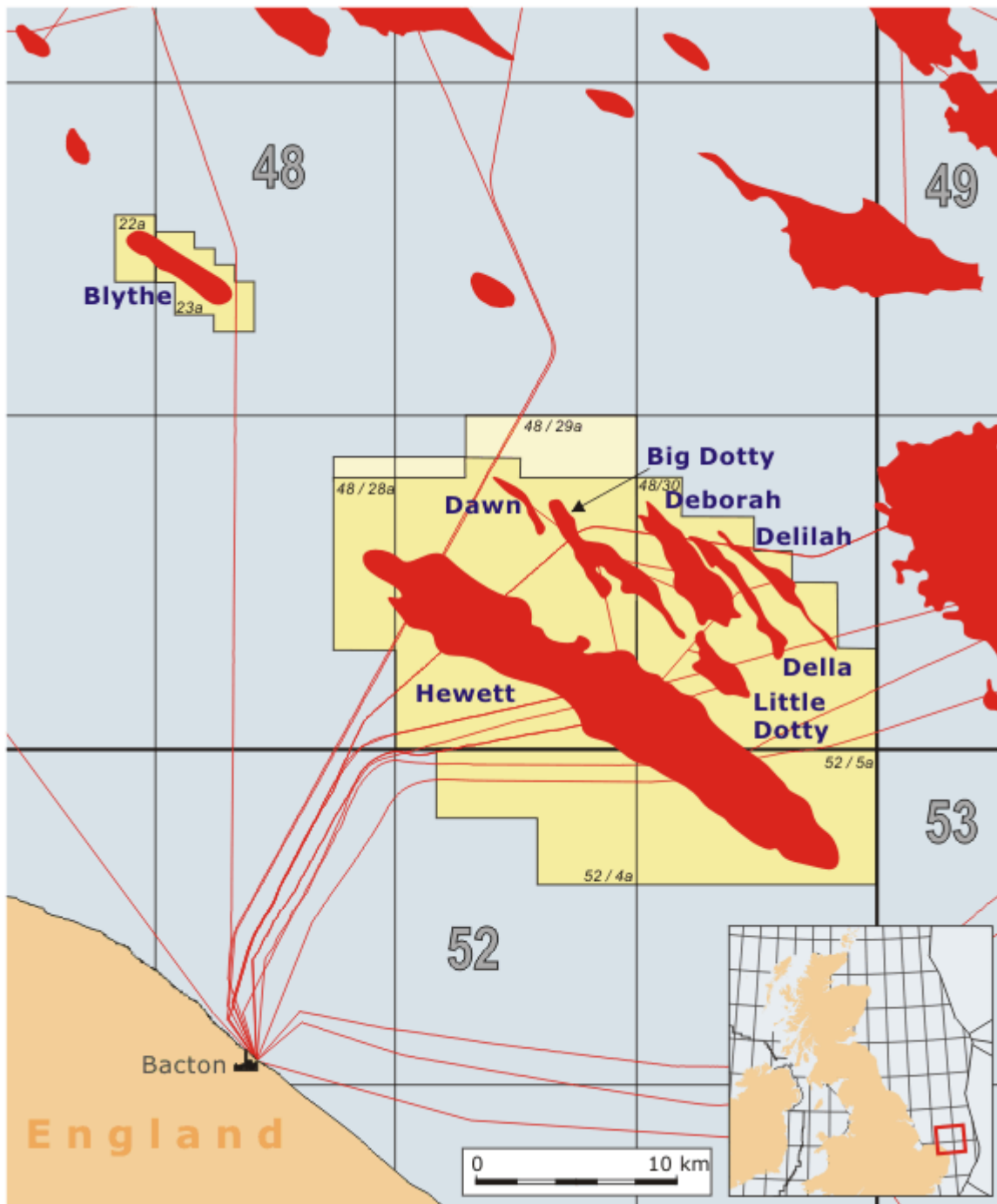
**Attn: Operations Manager**

**with a copy to:**

**Eni UK Limited  
Eni House  
10 Ebury Bridge Road  
London SW1W 8PZ**

**tel: 020 7344 6000**

**Attn: Commercial Manager**



## Hewett

### Introduction

Eni UK Limited (Eni), through its subsidiary, Eni Hewett Limited, operates the offshore Hewett gas field complex, the export pipelines and the associated onshore processing terminal at Bacton on the East Anglian coast.

Co-venturers in Hewett/Bacton are currently:

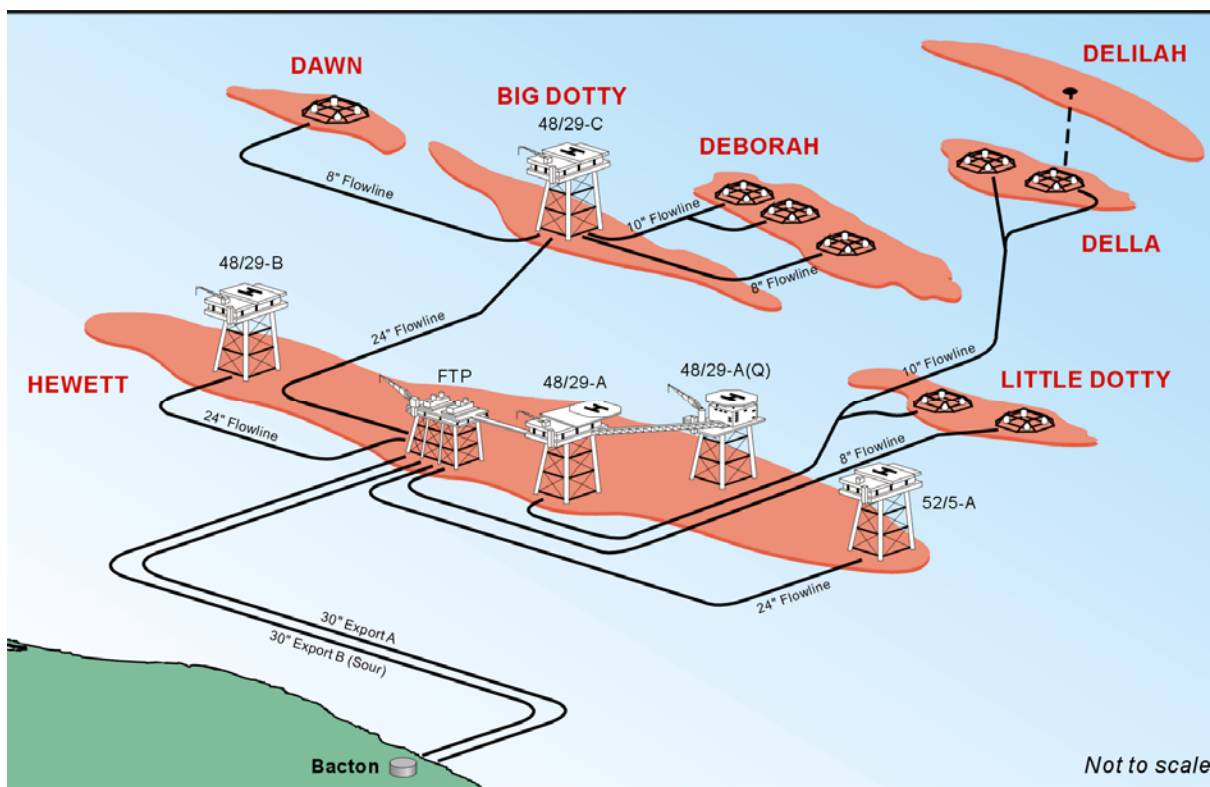
Eni Hewett Limited (Operator)	51.69%
Eni UK Limited	24.65%
Eni LNS Limited	12.97%
Perenco Gas UK Ltd	10.69%

### Hewett-Bacton Infrastructure Assets

The Hewett/Bacton infrastructure comprises six offshore installations, two gas export pipelines and an onshore receiving terminal at Bacton. The terminal also processes gas from other fields, including the Thames Area and LAPS.

#### Hewett Offshore Installations

The Hewett field offshore installations comprise six offshore installations, three of which a central processing complex which exports gas to the Bacton terminal.



Several in-field offshore pipelines and umbilicals owned by the Hewett/Bacton coventurers also exist in the area. A list of these is included below:

## **In-Field Offshore Pipelines and Umbilicals - Operated By Eni**

<b>Name</b>	<b>Description</b>
PL1323	HEWETT 48/30-11 CONTROL UMBILICAL
PL1630	HEWETT 48/30-16 FLOWLINE TO DELLA PLEM
PL1325/PL1324	HEWETT 48/30-15 FLOWLINE TO MTM TEE
PL1177	HEWETT 48/30-14 FLOWLINE TO 48/29C
PL1173	HEWETT 48/29-9 FLOWLINE TO 48/29-C
PL87	HEWETT 48/30-9 FLOWLINE TO 48/29-A
PL86	HEWETT 48/30-8 FLOWLINE TO 48/29-C
PL85	HEWETT 48/29-C FLOWLINE TO 48/29-A
PL84	HEWETT 48/29-B FLOWLINE TO 48/29-A
PL83	HEWETT 52/5-A FLOWLINE TO 48/29-A
PL584	HEWETT 48/30-11 FLOWLINE TO 48/29-A
PL21	HEWETT GAS EXPORT NORTH
PL20	HEWETT GAS EXPORT SOUTH

The Eni operated Hewett field complex began production in 1969 and is located approximately 28 kilometres north-east of the Eni operated Bacton Gas Terminal in Norfolk, England.

The Thames facilities at the Hewett Bacton terminal consist of a sphere receiver, slug catcher, filter separator and inlet metering. The LAPS facilities are similar but also include a compressor (brought online in 1998) and MEG separation and regeneration facilities.

### **Hewett Pipeline System**

The Hewett pipeline system carries gas from the Hewett, Dawn, Delilah and Della fields. Gas is landed at the Bacton Gas Terminal where it is treated to meet Transco's National Transmission System (NTS) gas specification.

No third party gas currently flows through the Hewett Pipeline System – as such there will be no capacity bookings for the Hewett System. However there is capacity available within the Hewett System. No send-or-pay obligations are in place because all of the equity participants in the fields are identical to those in the pipeline.

The current maximum throughput in the Hewett Pipeline System is ca 50 mmscfd, compared to a design capacity of 900 mmscfd, and there is therefore considerable spare capacity in the pipeline system. There are no planned tie-ins to the Hewett infrastructure, although it is anticipated that this may change with the development of various prospects around the Hewett field.

## **Bacton Gas Terminal**

The Eni operated Bacton Gas Terminal is itself situated on the coast in Norfolk, approximately 32 kilometres northwest of Great Yarmouth.

Gas arrives at the Bacton Gas Terminal from:

- the Hewett offshore field complex via the two 30 inch Hewett pipelines
  - the Thames field via the 24 inch Thames pipeline
  - the Lancelot Area fields via the 20 inch LAPS (Lancelot Area Pipeline System) pipeline.
- Each pipeline has its own separately owned reception facilities within the Eni Bacton site. All are operated by Eni.

The maximum capacity at the Bacton Gas Terminal is currently around 800 mmscfd. All the pipeline systems feeding into Bacton are operating at less than their original production capacities, leaving significant spare capacity through the terminal.

In the Bacton Gas Terminal various facilities are owned by the Hewett Unit. Hewett gas arrives at Bacton at around 30 psig. The fluids flow into the slug catcher and the gas flows on to the compressors. Export to the NTS then meets the entry pressure requirement of approximately 1000 psig.

There are currently 3 compressors at Bacton (2 in the Hewett compression train and one (two-stage) compressor in the LAPS compression train). Previously, sweet and sour gas were commingled while flowing through the Hewett compression train and, after compression, the entire gas stream flowed through the sour gas amine treatment plant. There is currently no sour gas production at the terminal and the sour system is no longer utilised.

The Hewett gas is commingled with the Thames and LAPS gas. It is then cooled in a propane refrigeration unit and is exported through the sales gas meters to the Transco delivery point.

Condensate is exported to the Condensate Disposal System (CDS) via a pump station at the Bacton terminals and piped to the nearby North Walsham rail terminal – which is part of the CDS. CDS is operated by the British Pipeline Agency, from whom further information regarding CDS can be obtained directly.

## **Natural Gas Quality Specification**

Natural gas delivered to the Bacton Plant at the Gas Delivery Point shall

- (a) be commercially free from objectionable odours and materials and dust or other solid or liquid matter waxes gums and gum-forming constituents which might cause injury to or interference with the proper operation of the lines meters regulations or other appliances through which it flows.
- (b) have a water dewpoint not greater than fifteen degrees Fahrenheit (15OF) at one thousand (1000) lbf/in<sup>2</sup> gauge.
- (c) have a hydrocarbon dewpoint which at any pressure does not exceed twenty-nine degrees Fahrenheit (29OF).
- (d) contain not more than thirty-five (35) parts per million by volume of total sulphur expressed as hydrogen sulphide

- (e) contain not more than three decimal three (3.3) parts per million by volume hydrogen sulphide
- (f) contain a maximum of two mol per cent (2%) of carbon dioxide
- (g) contain a maximum of zero decimal one mol per cent (0.1%) of oxygen
- (h) have a Wobbe Index which is not more than one thousand three hundred and fifty one (1351) Btu per cubic foot and not less than one thousand two hundred and seventy two (1272) Btu per cubic foot.
- (i) Have a Gross calorific Value not less than nine hundred and seventy-three (973) Btu per cubic foot and not more than one thousand one hundred and fifteen (1115) Btu per cubic foot.
- (j) Have a temperature which is not less than thirty-three degrees Fahrenheit (330F) and not more than one hundred degrees Fahrenheit (1000F)

#### Hewett Bacton Available Capacity

	2010	2011	2012	2013	2014
Hewett Offshore Facilities	●	●	●	●	●
Bacton Onshore Plant	●	●	●	●	●

>25% Ullage	●
5% to 25% Ullage	●
<5% Ullage	●

## **Commercial Terms**

A listing of typical Hewett-Bacton agreements needed for access to offshore and associated onshore infrastructure is presented below:

**Confidentiality Agreement (CA)** – normally required before detailed discussions can commence

**Transportation and Processing Operations Services Agreement (TPOSA)** – the core commercial terms of any third party deal will be contained in this document, specifying the level of service to be provided and associated commercial terms

**Construction and Tie-in Agreement (CTA)** – normally required to facilitate physical tie-in of a new field group to the offshore or onshore infrastructure

**Allocation Agreement (conforming to existing Allocation Agreements)** – the new incoming field group will be required to join the existing allocation arrangements which regulate the allocation of gas and liquids between all users at the Eni Bacton plant

## **Summary of Key Commercial Terms**

Information on executed agreements will use pro-forma Summary Templates 1 and 2 of ICOP (Annex H), examples of which follow this section.

### **INDICATIVE TARIFF LEVEL**

Processing of raw gas which falls within the Bacton Gas Terminal raw gas acceptance specification, and the delivery of both sales quality gas at the Bacton terminal sales gas export point, and commingled gas liquids (referred to as condensate) at the condensate export point will be charged on a cost share basis plus a 10% mark up. This shall be billed and paid monthly on the basis of the total monthly cost of operating Hewett and Bacton and the gas volume received from the third party as a percentage of the total volume as determined by the relevant allocation agreements. Cost share does not cover the provision of compression services or fuel gas, nor does it cover payment for the processing of raw gas that does not comply with the Bacton acceptance specification. Cost share does not cover transportation services to the Bacton gas Terminal.

**It is important to note that no third party gas currently exists within the Hewett Pipeline System and the associated capacity at the Bacton Gas Terminal. No capacity booking system currently exists for purely third party gas services.**

## KEY COMMERCIAL TERMS FOR TARIFF ENTRANTS

Priorities	All firm bookings shall have equal priority
Ownership	Hewett and existing field owners retain full ownership of the Hewett-Bacton plant facilities and individual field trains within the Bacton Gas Terminal respectively. Ownership of any new incoming field facilities will be a matter for discussion.
Voting rights	None
Confidentiality	All discussions and resulting agreements
Governing Law	England and Wales
Termination Rights	Bankruptcy or Insolvency Failure to pay within 30 days of invoice Prolonged FM event (expected or actual) exceeding 18 months
Liabilities Indemnities Off-Specification Gas or Liquids	Joint and Several Mutual Hold Harmless Any party causing off-specification gas/liquids shall be liable for direct damages
Technical/ Operating Requirements	See ICOP data and refer any enquiries to Eni Bacton New field entrants shall be subject to a process flow modelling review to ensure compatibility with the Bacton Gas Terminal
Force Majeure	Either party shall be relieved from any failure to perform if an event beyond its control affects Hewett-Bacton or the new field and prevents compliance by that party
Tie-in	New field tie-in costs plus Hewett-Bacton operator management fees shall be borne by incoming field owners – these shall include any production or tariff losses to other field owners
Payment Terms	10 days after receipt of invoice
Commitment	The new field shall provide a life-of-field commitment to Hewett-Bacton owners
Allocation	Owners of a new field will be required to sign existing allocation arrangements adopted by all Hewett-Bacton terminal users

## **Hewett-Bacton Gas and Condensate Allocation Rules**

Gas supplied to the National Transmission System (NTS) from the Hewett-Bacton Gas Terminal is exported in a commingled stream following the commingling of sales quality gas from the Hewett, Thames and LAPS systems. The exported gas is allocated back to each contributing party in proportion to its ownership of that gas. This is achieved by the application of the Hewett Bacton Allocation Agreement (known as “HBAA”) (as amended), by staff at Bacton Gas Terminal. Every user of the Bacton Gas Terminal is required to sign up to this agreement as a necessary condition prior to acceptance of its gas for processing at the Bacton Gas Terminal.

The HBAA rules are based upon a mass component principle. In order to apply these rules, a number of measurements are carried out at each entry point and delivery point within the Bacton Gas Terminal. The following list contains material measurements currently used as input data to HBAA:

- 1) the volume and composition of the commingled stream of sales quality gas redelivered at the Delivery Point;
- 2) the volume and composition of the commingled stream of condensate redelivered at the condensate Delivery Point;
- 3) the volume and composition of each input stream of gas at its respective entry point into the Bacton Gas Terminal;
- 4) the volume and composition of each input stream of condensate at its respective entry point into the Bacton Gas Terminal;
- 5) the volume and calorific value of each stream of fuel gas required for operating plant processes contributed to the Bacton Gas Terminal

This data is collected in relation to each of the Hewett pipelines, LAPS pipeline and Thames pipeline. It is used to determine, in accordance with HBAA, pipeline shares of fuel gas used for plant processes, and the entitlements of each system to sales quality gas and condensate in accordance with HBAA.

The initial HBAA allocation for each contributing system is calculated as follows:

- 1) the mass in kilograms of each component of sales quality gas to be allocated back to each contributing system is determined;
- 2) from the mass of each component allocated back to each contributing system is determined the total mass, total volume and total energy of sales gas allocated to each system, and the total energy and volume of sales quality gas redelivered at the Delivery Point

The aggregate quantities of sales quality gas and condensate shall be allocated back to each of the pipelines as above, after which the respective Thames and LAPS system operators shall allocate back to individual contributing fields and field owners according to the allocation system of their particular pipeline system.

For the Hewett pipeline system, a mass component based allocation (HSAA) is in place to allocate export gas and condensate back to individual contributing fields, and further allocated to field owners under individual gas lifting agreements.

The units of measurement used are:

Volume	million cubic metres
Mass	Kilograms
Energy	Megajoules

## Infrastructure Access Agreement Summary 1

This data is provided in accordance with the disclaimer conditions noted below:

Provided in relation to the voluntary Industry Infrastructure Code of Practice. To be used in summarising construction and tie-in and transportation and processing agreements by the owner/operator for inclusion in the publication of key commercial terms (refer to Paragraph 13 (1)).	<b>Ref:</b>
<b>Agreement Title and Date:</b>	

Scope of Agreement/Responsibilities (refer to Note 1):

<b>Key Provisions (refer to Note 2)</b>	
Commencement Date	
Entry Point	
Redelivery Point (s)	
Capacity/variation rights (Y/N) and timing (refer to Note 3)	
Send or Pay/carry forward provisions (Y/N)/Duration	
Priority rights during periods when service provision is reduced	
Technical Requirements (refer to Note 4)	
Payment Structure (refer to Note 5)	
Tariff range for service provided (refer to Note 6)	
Range of any separate contribution to capex and opex	
Any other payment(s) with range and timing (refer to Note 7)	
L&I/Risk Regime fundamentals	

**Important Additional Data (refer to Note 8)**

- Notes:**
- (1) Include key provisions and services that have a material impact on risk-reward.
  - (2) Include any important and unusual elements that materially impact risk-reward.
  - (3) For each main stream eg oil, gas etc.
  - (4) Should include relevant entry specifications and any important and unusual technical issues.
  - (5) The ranges should reflect the type of service provided (price range should be within a 15% band).
  - (6) Include summary of indexation principles with floors and ceilings.
  - (7) Include any fee in kind type payments relating to single component streams, or production deferral in a CTA.
  - (8) Include any key provisions that materially impact risk-reward not mentioned above (eg hydrocarbon accounting, risk, property, title, extension of terms, assignment (incl. limitations), security provisions, metering, termination, ownership and decommissioning in a CTA etc).

### **Disclaimer**

The summary information provided above is provided by [ ] as the service provider:

- (1) In good faith and without any liability.
- (2) Without warranty, implied or express as to its accuracy or relevance of use by any other party.
- (3) Without obligation to provide any further information in respect of the agreement/transaction to which the summary information relates.
- (4) Without any obligation to provide access to infrastructure or services on the same terms and conditions.

## Infrastructure Access Agreement Summary 2

This data is provided in accordance with the disclaimer conditions noted below:

<b>Ref:</b>	Provided in relation to the voluntary Industry Infrastructure Code of Practice. To be used in summarising construction and tie-in and transportation and processing agreements by the owner/operator for inclusion in the publication of key commercial terms (refer to Paragraph 13 (1)).
<b>Infrastructure Access Summary for:</b>	

<b>Field Development:</b>
---------------------------

Suite of Main Agreements (refer to Note 1)	
<b>Ref:</b>	Commercial Arrangement/Agreement title

Field Details:	
Field Name	
Licence	
Block Number	
Operator	
Partners	

Field Streams/Characteristics:					
Stream	Crude oil	Gas	Condensate	NGLs	Produced Water
Relevant (Y/N)					
Unique characteristics (refer to Note 2)					
Reserves					
Initial Rate					
Plateau					
Plateau/Peak production					

- Notes:**
- (1) Other agreements may exist eg pipeline crossings, confidentiality, but they do not materially impact risk-reward.
  - (2) For example – low API, high H<sub>2</sub>S, High CO<sub>2</sub>, significant sand production etc.

### **Disclaimer**

The summary information provided above is provided by [ ] as the service provider:

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- (3) Without obligation to provide any further information in respect of the agreement/transaction to which the summary information relates.
- (4) Without any obligation to provide access to infrastructure or services on the same terms and conditions.

## **Eni Bacton Gas Terminal – Outline description of Facilities**

- Typical Plant Reception Facilities
  - Sphere Receiver
  - Gas/Liquids Separator
  - Liquid Accumulators
  - Filter Separators
- Inlet Reception (Four incoming pipelines)
- Fiscal Metering and Allocation
- Compression (Hewett & LAPS)
- Sour Gas Treatment (Hewett Compression Train) – Currently unused
- Dew Point Conditioning (Propane Refrigeration, Glycol System)
- Hydrocarbon Condensate Stabilisation
- On-site Power Generation
- General Services (Steam, Comp. Air, Warehouse, Workshops etc)
- Safety Systems (ESD, V&I, Fire & Gas Detection, Firewater etc)
- Large Green-field Plot Areas
- Design Pressure, Shared Gas Facilities: 82.8 barg (1200 psig)

### **Gas Compression Capacity**

**Hewett Train:** ca 280 mmscfd peak based on 65 psig suction pressure

- Onshore Compression Facilities
  - 3 centrifugal compressors
  - Currently arranged as a single train
  - Two 11MW (14,500hp) Frame 3 turbines
  - 1 3.7MW (5,000hp) Frame 1 turbines
  - Compression Pipework Flexibility
  - Overall compression from 2 to 72 barg

**LAPS Train:** ca 230 mmscfd peak

### **Gas Lift Capacity**

Not applicable

### **Produced Water Handling Capacity**

Approximately 500 cubic metres/day

### **Dehydration Capacity**

Dehydration is achieved via dew point control (hydrocarbon and water), using refrigerated condensation with glycol injection

### **Water Injection Capacity**

Not applicable

## **Eni Bacton Gas Terminal Transportation and Processing Specifications**

### **Definitions**

- Entry Point (Gas)* - *Entry to Dew Point Control Facilities*
- Entry Point (Condensate)* - *Entry to Hydrocarbon Stabilisation Facilities*
- Delivery Point (Gas)* - *Sales Gas to Export Pipelines to National Transmission System*
- Delivery Point (Condensate)* - *Sales Condensate to Export Pipeline to BPA*

### **Processing Capacity**

Gas Processing – Estimated Available Capacity.

The Bacton Plant design capacity was initially 1,200 mmscfd, which has been reduced to 800 mmscfd as part of a series of planned maintenance cost reductions. This and future reductions are currently planned to be reversible, therefore for all future years the spare capacity is expected to be over 25%.

<b>Year</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Pipeline	●	●	●
Separation	●	●	●
Compression	●	●	●

### **Colour Code:**

- *no capacity*
- red *<5%*
- yellow *5% to <25%*
- green *>25%*

## **Specifications**

### **Sales Gas Specification to National Transmission System, ex- Eni Bacton Gas Terminal**

Gas entering the National Transmission System from the Bacton Gas Terminal must meet National Grid Transco's entry specification. More details of this can be provided to any bone-fide third party seeking access to the Bacton Gas Terminal.

The specification for any new entrant field into the National Transmission System requires agreement with the Shipper chosen by the Operator of the new entrant field.

### **Sales Condensate Specification via BPA, ex- Eni Bacton Gas Terminal**

Specific Gravity	0.7 – 0.75
Total Sulphur	0.15 wt% max
Mercaptan Sulphur	10 ppm max
Reid Vapour Pressure	14.5 psia
Initial Boiling Point	30 – 35 °C
50% Boiling Point	110 – 115 °C
Dry Point	200 – 220 °C

### **Entry Point Specification**

The entry point specification will be decided upon the basis of the interaction between the new entrant gas and liquid specification with the Bacton Gas Terminal and combination of services requested. More details of this can be provided to any bone-fide third party seeking access to the Bacton Gas Terminal.