# Forecasting, Allocation & Reconciliation Business Model

## GMOWG PROPOSAL

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# Approval for Release

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**Abstract**

This document sets out the processes relating to FAR that will underpin the new market arrangements.

# Forecasting Allocation & Reconciliation – Business Model

Version Version 1.0 GMOWG Proposal
Date 19th December 2003

**Contents**:

# 1 Overview Of The Forecasting Allocation & Reconciliation Business Model

The extent of gas industry business affected by market opening has been separated into five different business areas:

- Forecasting, Allocation and Reconciliation
- Gas Point Register
- Metering Data Services
- Siteworks
- Transportation

This paper captures a Business Model for the Forecasting Allocation & Reconciliation (FAR) business area. The draft processes contained in this document are a development of the GMOWG Summary of Proposed Principles and reflect the comments made during the Consultation on the Proposed Principles.

The processes set out in this paper are intended to reflect the views of all GMOWG participants. BGE Transportation recognises, nonetheless, that the CER may, amend the proposals contained herein but that such amendments will only take place following consultation with the appropriate parties. It is also recognised that the proposals may be amended as a result of experience and/or further industry consultation.

## 1.1 MOP Glossary of Terms

In order to avoid any misunderstandings the following terms have been expanded upon:

| **Term** | **Interpretation** |
|---|---|
| Adjusted Weighted Degree Days (AWDD) | The WDD value adjusted to take account of all variations in demand (e.g. weekend/weekday). It is calculated by back solving the WDD-Demand relationship. AWDD is used in the apportionment of the total NDM forecast or in the allocation of the total NDM demand among the gas points. |
| Alteration | Any change made to an existing service pipe and/or associated equipment on a premise. |
| Annual Consumption | In respect of each Shipper's offtake at an Exit Point, the Shipper's actual offtake for the previous Gas Years or the anticipated offtake by the Shipper for the following Gas Year; |
| Annual Quantity (AQ) / Annual Load | Estimated Annual Quantity expressed in Kilowatt-hours. Calculated from the Demand for the gas point. |
| BGT Systems | IT Systems used within Bord Gais Transportation to facilitate transportation and network related activities. |
| Cancellation Charges | Charges to be made where the Transporter has been unable to carry out work requested due to inaccurate information or non-access. |
| CER | Commission for Energy Regulation. |
| Commodity Charge | A charge that is levied on the Shipper based on actual gas throughput. It applies for both the Transmission and Distribution systems. |
| Connection Costs | A range of standard connection services and associated charges. |
| **Term** | **Interpretation** |

| | |
|---|---|
| CoS | Change of Shipper. |
| Cyclical read | Cyclical, or systematic, meter reads are system driven and are undertaken by meter readers using electronic data capture terminals to collect reads. |
| Daily Metered Off-take (DM) | Off-takes deemed to have consumption greater than or equal to 5,550,000 kWh (0.5mscm) per annum but less than 57,500,000 kWh (5mscm) per annum. |
| Degree Day | A measure of the variation of one day's temperature against a standard reference temperature of 15.5$^{o}$C. |
| Development Site | New Housing Development/Local Authority refurbishment where the number of premises is greater than three. |
| Disconnection of Meter | Removing meter from site. |
| Domestic Connection | A connection for the supply of gas to a premises with an AQ of [< 73,000] kWh. |
| Domestic Supply Point | Those supply points with Annual Quantity less than [73,000] kWh. |
| Economic Test | The economic viability of connecting End Users to the gas network. |
| End User | A third party who has entered into an agreement with a Shipper to purchase and/or utilise Natural Gas to be offtaken from the Transportation System. |
| End User Contribution | The amount payable by the End User for the connection to the gas network following application of an economic test. |
| Framework Agreement | The document that Shippers are required to sign in order to ship gas under the terms of the Code of Operations |
| Gas Flow Nominations | The means by which Shippers inform the Transporter of their intended gas flows on a day |
| Gas Point | A metered point at which gas may be off-taken from the Transportation System for the purposes of supply direct to an End User premises. |
| GPR | Gas Point Register - the catalogue of gas points and their assignment to shippers. |
| GPRN | Gas Point Registration Number - each gas point has a unique reference number all communications concerning a gas point should contain this reference number. |
| GPRO | Gas Point Register Operator |
| GTMS | Gas Transportation Management System |
| Industrial and Commercial Supply Point | Those supply points with an Annual Quantity greater than or equal to [73,000] kWh. |
| IUS | Integrated Utility System. |
| JMS | Job Management System is the sub function of the IUS that process Distribution work order and NDM metering requests. |
| Large Daily Metered Off-take (LDM) | Off-takes deemed to have consumption greater than or equal to 57,500,000 kWh (5mscm) per annum. |
| Load Factor | The ratio of the average daily demand (AQ/365) to the Peak Load. The average domestic load factor is used to calculate the Supply Point Capacity for Domestic Supply Points. |
| NDM | Non Daily Metered |
| **Term** | **Interpretation** |

| | |
|---|---|
| NDM Exit Allocation | An after-the-day figure produced by the Transporter that reflects deemed gas consumption by Shipper for the NDM sector |
| NDM Exit Capacity | Capacity required to off-take gas from the Transmission system either to an Offtake Zone. |
| Non Domestic Connection | A connection for the supply of gas to a premises whose primary use of gas will be for industrial or commercial purposes and has an AQ of [> 73,000] kWh. |
| Non Scheduled Meter Read (NDM) | There are three types of Non-Scheduled meter read. These are 1: Opening Meter Read, 2: Closing Meter Read, 3: Special Meter Read. Non Scheduled Meter Reads exclude customer cyclic reads and estimates. Whenever Shipper requests a Non-Scheduled meter read, a charge will be generated for each request. This process will be formalised in the Code of Operations between the Transporter and the Shipper. |
| Non-daily Metered Off-take | Off-takes with consumption less than 5,550,000 kWh (0.5mscm) per annum, such meters will have their daily off-takes estimated by algorithms. |
| Offtake Zone(s) | A grouping of all DM and NDM offtakes from the Transportation system for the purposes of Nominations, Allocations, Balancing and Exit Capacity bookings |
| Peak Day | The design condition under which total gas demand is at a maximum. The Irish transmission system is designed to meet a 2% or '1 in 50' requirement. The peak day's demand has a 2% probability of occurring and, as such, would be expected to be exceeded only once in 50 years. |
| Peak Load | The estimate of demand at a gas point on the Peak Day. Calculated from the WDD-Demand relationship for the gas point applying the degree-day value corresponding to the design peak condition. |
| Premise Point | A discrete residence or place of business that may or may not have a gas installation. |
| Premises | The identified location to which gas off taken at a Supply Point may be supplied. |
| Scaling Factor | A factor, typically close to 1, which is applied to the Bottom Up estimates so that in total they match the Top Down total forecast (before or during the day), and the Top Down Actual NDM demand (after the day). The Scaling Factor is the ratio of the total Top Down forecast (or actual demand) divided by the total Bottom Up estimate. |
| Scheduled Read | The scheduled meter read process is responsible for delivering systematic meter reads to the registered Shipper associated with each gas point held on the BGT system. |
| Scheduling Charges | Penalty charges that are imposed on the Shipper where the gas Allocation differs from the Nomination |
| Service Disconnections | Cutting off gas service at the main. |
| Shipper | Any person having entitlement by way of contract with the Transporter to transport natural gas through the transportation system (we note that this definition will be updated following the conclusion of the consultation on Licenses). |
| Siteworks | Siteworks can be defined as the process required to facilitate Shippers to arrange for changes or upgrades to the connection of an existing gas point or connection of a new gas point. |
| Siteworks Agreement | Contractual Arrangement between the Transporter and the Shipper for Siteworks activities for End Users < 735,000Kwh. |
| Siteworks Contract | Contractual Arrangement between the Transporter and an end user (consumption > 735,000 kWh) and/or builder developers / Local Authorities/Shippers. |
| SPRN | Supply Point Registration Number - each Supply Point has a unique reference number all communications concerning a Supply Point should contain this reference number. |
| **Term** | **Interpretation** |

| | |
|---|---|
| Standard Transportation Agreement (STA) | Contract between Transporter and Shipper that permit transportation of gas between specific entry and exit points |
| Supply Point | A DM or NDM exit point within the Distribution System serving a single end user of one or more gas points registered in the name of a single Registered Shipper pursuant to a Supply Point registration (or the subject of a Proposed Supply Point Registration). |
| Supply Point Capacity | The capacity at a Supply Point which is deemed to be reserved for the peak day. It is used for the purposes of transportation charging and Exit Capacity bookings |
| Supply Point Capacity for new connections | Determined by BGT and based upon Maximum Annual Quantity at the site. |
| Unread Gas Account | A file of estimated consumption is calculated from date of last reading to the (calendar) month end. |
| Weighted Degree Day (WDD) | A measure of one day's temperature used in the regression analysis of demand. The WDD for a day is calculated from a weighted average of the Degree-Day value for the day and the average Degree-Day for that particular day of the year over the most recent 30 years. |
| Work Day | All meters in a read cycle are divided into one of 42 workdays. A workday is made up of a number of gas points in the same geographical location. |

## 1.2 Overview Assumptions

In developing the processes set out in this document, and in considering the implementation of these processes as part of the MOP, a number of important assumptions have been made. These include:

- market opening in 2004 and 2005 will, in the first instance, be supported by logically rather than physically separate IT systems within Bord Gáis;
- the eligibility threshold for market opening in July 2004 is currently under review, but for the purposes of this document will be considered as [73,000]kWh;
- full market opening will take place in 2005;
- BGE Transportation's costs associated with the development and ongoing operation of all aspects of Market Opening, as agreed with the CER, will be recovered in full through transportation tariffs
- the existing Bord Gáis process for estimating daily consumption of NDM sites will be used to facilitate market opening;
- the existing point-to-point transmission arrangements will be replaced by arrangements based on Entry/Exit principles for full market opening, the development of the detail of the Entry/Exit principles will be conducted in consultation with the CER and the GMAG forum;
- market opening will, wherever appropriate, be a development of the principles set out in the Code of Operation;
- there will be no changes to the wider gas market arrangements within Ireland which divert effort either within Bord Gáis or the industry as a whole from the programme of work required to implement market opening; it may be acceptable to prioritise system development work such that some (non-core) system functionality related to market opening becomes available after July 2004, such prioritisation will be discussed within the I.T. work stream of the MOP; and
- data provision to Shippers will be in line with Irish data protection guidelines
- The unit of measure for issue of consumption-related data will be kWh.

## 1.3 Overview Of FAR

FAR (Forecasting, Allocation and Reconciliation) is responsible for defining the processes associated with the apportionment of NDM demand between Shippers for both forecasting and allocation purposes; with reconciling the differences between gas point allocations and actual metered consumptions; and also for the estimation of NDM supply point capacity.

NDM apportionment essentially requires:

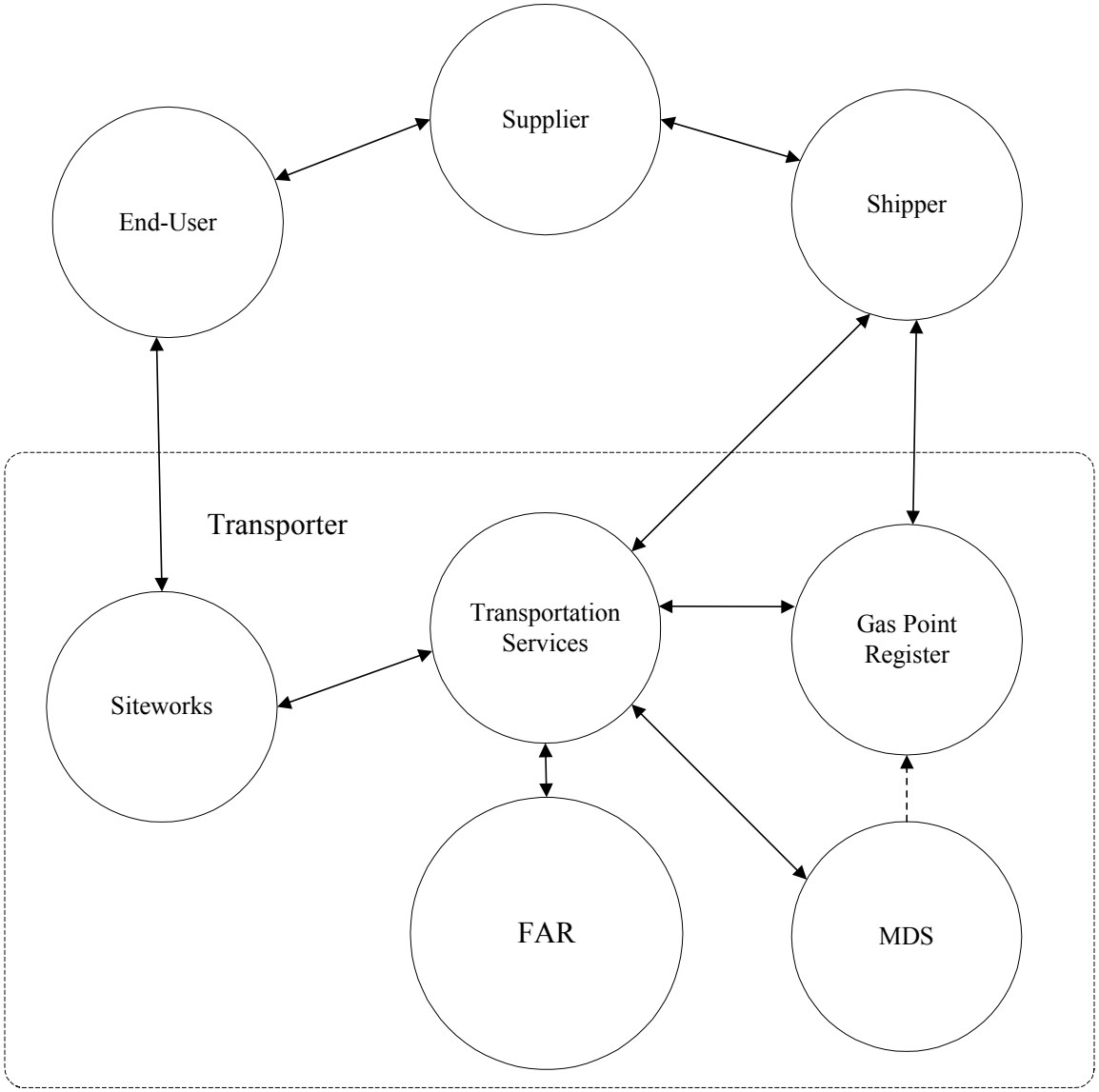
- a means of establishing total NDM demand by a "top down" calculation, and
- the calculation of "bottom-up" estimates of consumption for each NDM gas point, which are then adjusted to ensure that the total of all the gas point consumptions matches the required total.

The top down calculation of total NDM demand is made by subtracting DM demand (by definition daily metered) and a shrinkage estimate from total demand.
The relevant high level principles have been laid down at the start of each section.

## 1.4 Interaction Between Roles

The following Roles have been identified as interacting with the FAR area:

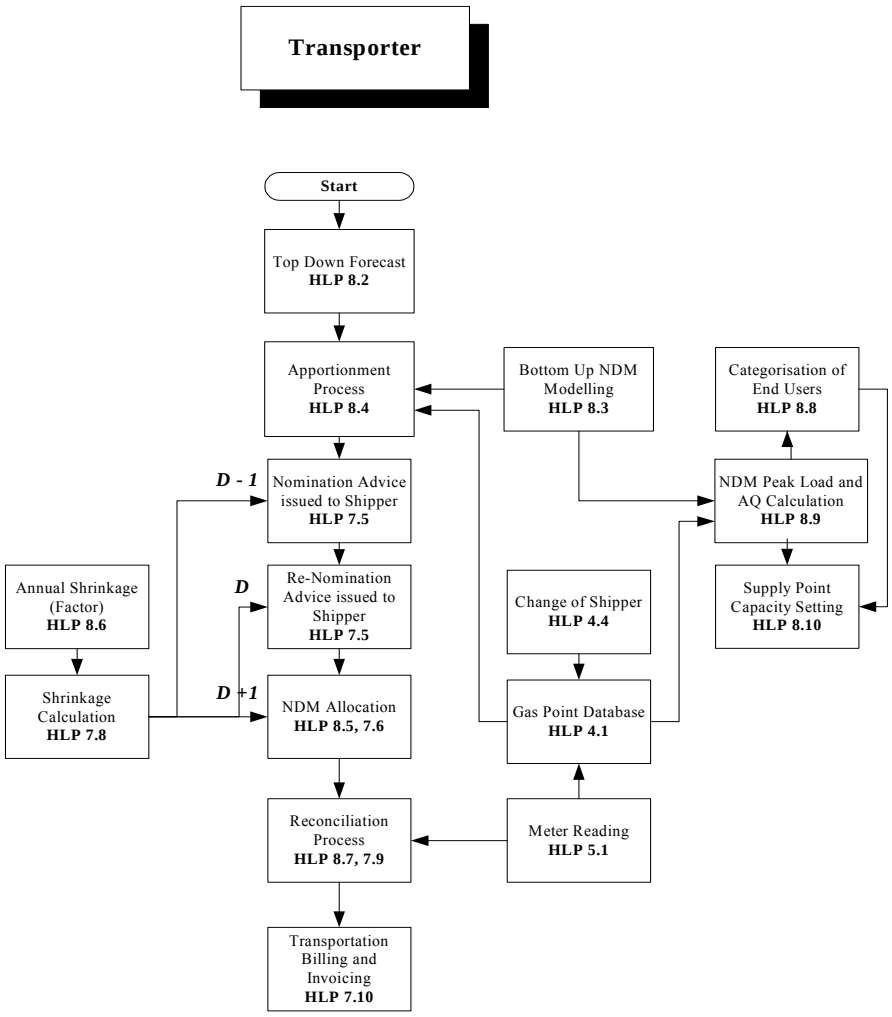
- Transporter
- MDS
- GPR
- Siteworks



## 1.5 High-Level Principles Mapped

The interactions between the High-Level Principles underpinning the FAR area are outlined below:

**Process Title:** FAR Principles Mapping **Process ID:** FARH-PM



# 2 Business Processes

The following Business Processes are described:

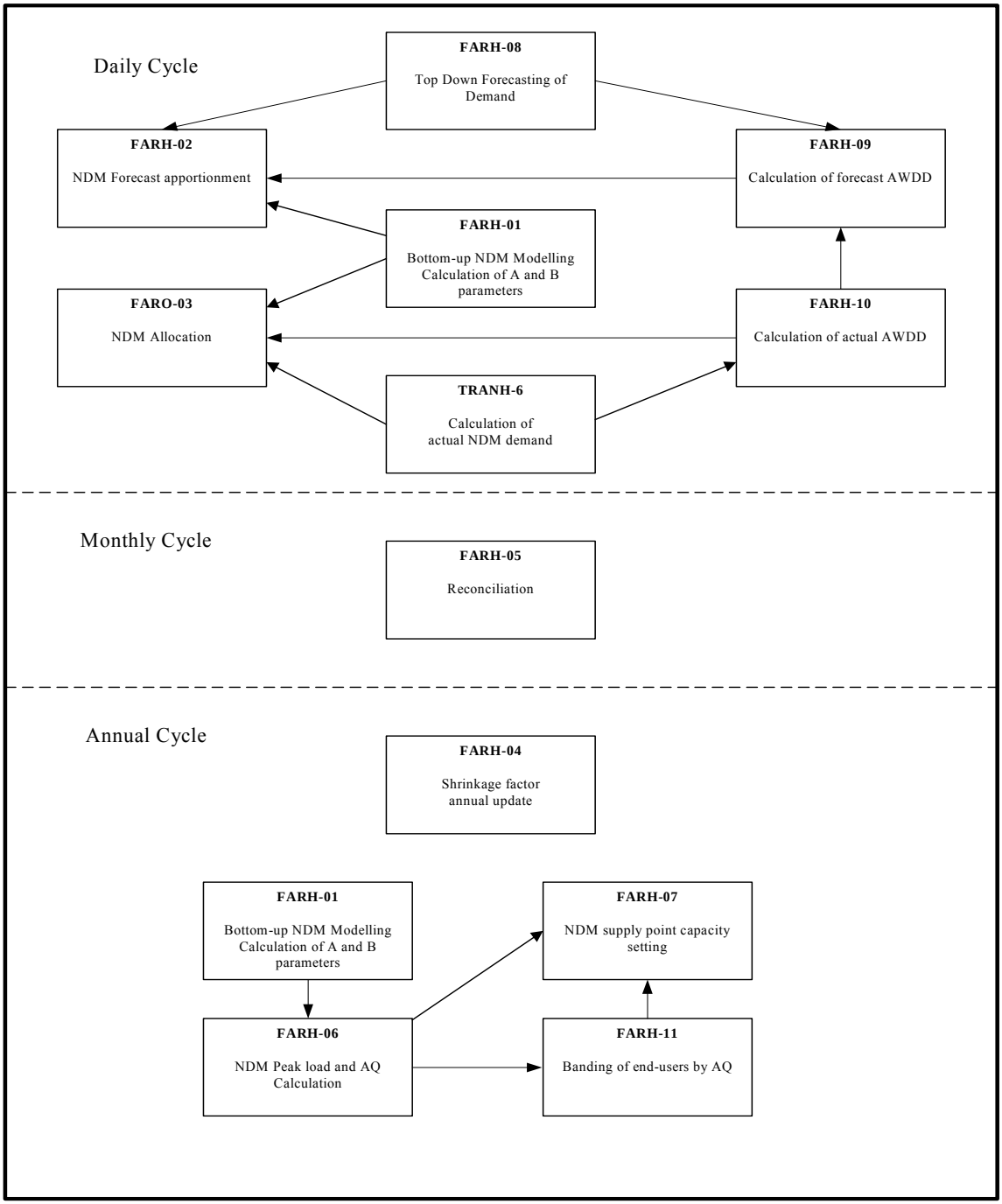
2.2 FARH-1 Bottom-up NDM modelling: Calculation of A & B parameters
2.3 FARH-2 NDM Forecast Apportionment
2.4 FARH-3 NDM Allocation
2.5 FARH-4 Shrinkage factor: annual update
2.6 FARH-5 Reconciliation
2.7 FARH-6 NDM Peak Load & AQ calculation
2.8 FARH-7 NDM Supply Point Capacity setting
2.9 FARH-8 Top-down Forecasting of demand
2.10 FARH-9 Calculation of forecast AWDD
2.11 FARH-10 Calculation of actual AWDD
2.12 FARH-11 Banding of end users by AQ

## 2.1 Summary Process descriptions

| High Level Principle Ref. | Process No. | Process Title | Process Description |
|---|---|---|---|
| **8.2:** Top down forecast of total demand | **FARH-08** | **Top down forecast of demands** | This process provides a forecast of total daily NDM demand for each offtake zone |
| **8.3**: Bottom up NDM modelling | **FARH-01** | **Bottom-up NDM modelling: Calculation of A & B parameters** | This process results in the estimation of the A & B parameters which are used to model the demand characteristics at each NDM gas point |
| **8.4:** NDM forecasting | **FARH-02** | **NDM Forecast Apportionment** | This process provides for the apportionment of forecast NDM demand between Shippers, resulting in the NDM exit nomination advice |
| **8.4:** NDM forecasting | **FARH-09** | **Calculation of forecast AWDD** | This process provides for the calculation of a forecast AWDD value, based on the top down forecast of NDM demand |
| **8.5:** NDM allocation | **FARH-03** | **NDM Allocation** | This process provides for the apportionment of actual NDM demand between Shippers, resulting in NDM allocations, and also for each NDM gas point |
| **8.5:** NDM allocation | **FARH-10** | **Calculation of actual AWDD** | This process provides for the calculation of an actual AWDD value, based on the actual NDM demand |
| **8.6:** Shrinkage | **FARH-04** | **Shrinkage factor: annual update** | This process reviews and updates the percentage shrinkage factor |
| **8.7:** Reconciliation | **FARH-05** | **Reconciliation (monthly process)** | This process reconciles metered energy calculated from meter readings at a gas point, against NDM allocations for a gas point, and provides for the variances to be cashed out to Shippers |
| **8.8:** Categorisation of end users | **FARH-11** | **Banding of end users by AQ** | This process determines the group to which each supply point will be allocated; these bandings determine the approach to the setting of supply point capacities |
| **8.9:** NDM peak load calculation | **FARH-06** | **NDM peak load & AQ calculation** | This process provides for the calculation of peak load and AQ for each NDM supply point, based on the relevant A & B parameters |
| **8.10:** Supply point capacity setting | **FARH-07** | **NDM Supply point capacity setting** | This process provides for the calculation of NDM supply point capacities, used as the basis for transportation capacity charging |

The FAR processes follow daily, monthly and annual cycles. The interactions between the FAR Processes are outlined below:

**Process Title:** FAR Business Process Mapping **Process ID:** FARH-BPM




| | | | | | |
|---|---|---|---|---|---|
| **Process Title:** | FAR Business Process Mapping | **Team:** | FAR | **Prepared By:** | BGT |
| **Revision:** | GMOWG Proposal Version 1.0 | **Release Date:** | 19 December 2003 | **Approved By:** | |

## 2.2 FARH-01 Bottom up NDM modelling

### 2.2.1 Related High Level Principles:

This process describes the derivation of the A and B parameters which are used to model the demand characteristics at each NDM gas point. The process adheres to high level principles as follows:

- The adjusted weighted degree-day (AWDD) series will capture relevant weather/temperature variations and provide a good linear relationship with gas point demand.
- Parameter estimation for individual gas points will be based on consumption data derived from meter reads and make use of linear regression as follows: Consumption over period = A * number of days + B * degree days over period
- The A and B parameters will be updated periodically for each gas point on the basis of new actual meter readings
- The statistical significance of the A and B parameters and of the overall 'goodness-of-fit' will be tested using standard statistical tests and the validity of the parameters thus established.
- In cases where the parameter estimates are not established as being reliable, group average values (appropriately scaled) will be applied.
- Parameters for new gas points (for which no consumption history is available) will be established based on information to be provided by the appropriate Shipper.
- An annual quantity (AQ), being an estimate of annual consumption in normal weather conditions, will be derived using the same principles outlined above or, in the case of a new customer, be provided by the Shipper.

### 2.2.2 Process Scope:

The process is run following receipt of a meter reading (which has passed validation checks performed by Metering and Data Services, MDS); when a new customer is connected, following the unlocking of a meter and after a meter refit.
The A and B parameters are used in other FAR processes for: forecasting demand (FARH-02), allocating demand (FARH-03), peak load and AQ calculation (FARH-06), supply point capacity setting (FARH-07), and for the calculation of the actual AWDD (FARH-09).

### 2.2.3 Process Background / Preconditions:

In the case of new supply points, the process requires the provision of gas point peak load and AQ by the Shipper at the time of supply point registration or following an application for a new connection. For household gas points, the AQ and peak load will be determined by reference to a look-up table specifying these quantities for different types of dwelling (see Table 1, page 16).

### 2.2.4 Issues from Phase 1 addressed:

**F7**
The current proposal is to revise the A and B parameters in the light of meter readings. We would like to see examples of the extent to which the profile could change. On the basis of these revisions, will the Annual Quantity be revised at the same time?

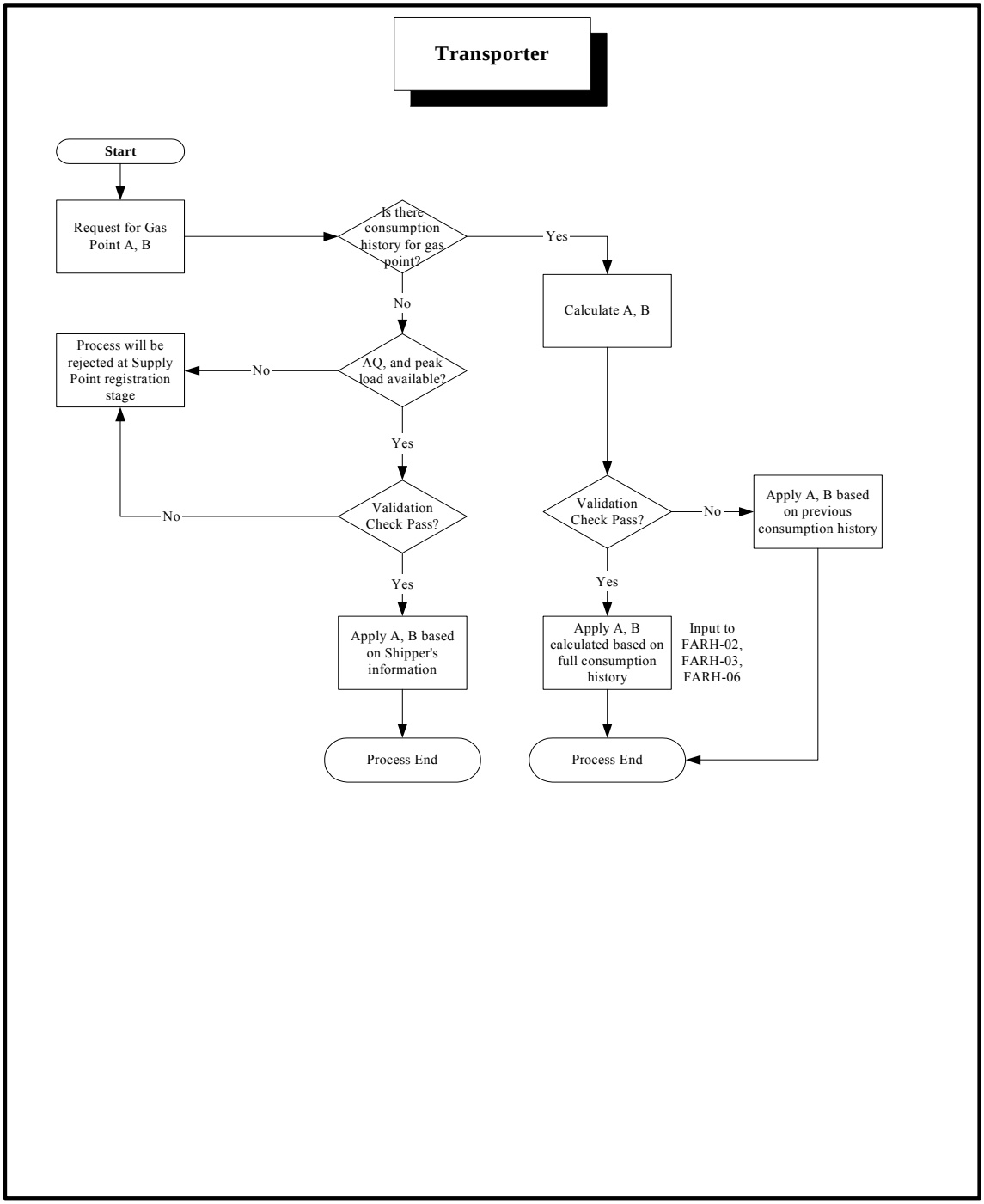
BGE Transportation response: The revision of the AQ is an annual process (see FARH-06). Examples of the A and B parameter calculations are given in a separate excel file (AB_Calculation_V1_0.xls).

### 2.2.5 Step through of process:

The diagram below shows the FARH-01 process.

**Process Title:** Bottom Up NDM Modelling, Calculation of A and B Parameters

**Process ID:** FARH-01




| Process Title: | Bottom Up NDM Modelling, Calculation of A and B Parameters | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The process is run at the gas point when a new customer is connected, following the unlocking of a meter and following receipt of a meter reading (which has passed validation checks performed by meter reading).

Firstly there is a test to see if there is any recorded consumption history for the gas point.

In the following cases there will be no valid consumption history:

a) when a new connection has been set up,
b) where the meter has been locked for over [2] years, or
c) where there has been a meter refit following a change of use i.e. different meter type or refit after [2] years of no consumption

In the above cases the AQ and peak load entered as part of the supply point registration process/new connection process will be used as the basis for calculating A and B. (In the case of a meter unlock in less than [2] years, the A and B values prior to the meter locking will be used and will ignore the period of the locking, for which the consumption will have been zero.) The supply point registration process will require the Shipper to provide an AQ and a peak load before a meter can be fitted at that gas point (see GPR Business Model Revision 2.0, GPRD-3.4). The AQ and peak load provided will be based on a lookup table. Table 1 gives an example lookup table (note that the figures in the table are indicative only):

**Table 1 – Default values of AQ and Peak Load to be used for gas points where there is no valid consumption history**

| **Property/Premises Type** | **AQ (kWh)** | **Peak Load (kWh/day) See Note 1** |
|---|---|---|
| 1 Bed Flat, Bungalow, Terraced, Detached | [9,200] | [78] |
| 2 Bed Flat, Terraced | [11,100] | [94] |
| 2 Bed Bungalow, Semi-detached, 3 Bed Terraced / Town House | [12,400] | [105] |
| 3 Bed Bungalow, Semi, 4 Bed Terraced / Town House | [14,000] | [118] |
| 3 Bed Detached | [17,100] | [144] |
| 4 Bed Semi, Detached | [20,700] | [174] |
| 5 Bed Terraced House, Detached, 6 Bed Detached | [31,400] | [265] |
| Non residential, AQ<[73,000]kWh | Shipper provides | Calculated |
| AQ≥[73,000]kWh | Shipper provides | Shipper provides |

Note 1: Peak Load determined by applying the domestic group average load factor to the supply point annual quantity as follows: Peak Load = (AQ/365)/average domestic load factor.
For calculating the peak load for the market with an AQ<[73,000] kWh an indicative load factor of [32.5]% has been assumed.

Validation of the initial AQ and Peak Load will check that the AQ and Peak Load figures provided by the Shipper at supply point registration are at least as high as the AQ and Peak Load registered with Site Works for the purpose of obtaining the new connection (and used in calculating the connection allowance).

Validation of the initial AQ and Peak Load including a range check will take place prior to calculation of A and B. For example the Peak Load must be greater than or equal to AQ/365.

The values of A and B are determined by solving a pair of simultaneous equations:

1. AQ = A*365 + B*total degree days in an average year;
2. Peak Load = A + B*$DD_{peak}$, where $DD_{peak}$ is the degree-day value corresponding to the design peak condition (see FARH-06).

In the case where there has been a period of consumption history recorded for the gas point then three possible situations arise for the purpose of recalculating A and B.

- Where there is a single period of consumption history for the gas point, there is insufficient data to update A and B.
- Where there are 2 or 3 periods of consumption history for the gas point, or where the consumption period covers a period of less than 8 months, then there is insufficient data for a regression analysis. In this case the initial A and B parameters derived from the information provided by the Shipper will be scaled to generate the consumption recorded for the period.
- Where there are 4 or more periods of consumption history covering a period of 8 or more months then A and B will be recalculated from a regression analysis. The recorded consumptions are regressed (ordinary least squares method) against the number of days in the period and the number of AWDDs for a maximum elapsed time of 1000 days. The estimated coefficient for the numbers of days variable is the A parameter; that for the AWDD variable is the B parameter. The Coefficient of Variation (CoV) for the regression will also be calculated. The CoV is the ratio of the Standard Error of the regression divided by the average consumption and is expressed as a percentage. Depending on the number of observations there is a 60-70% probability that the estimated consumption will fall within the range defined by the CoV.

When there are more than 4 consumptions recorded, the most recent consumption will be compared with the estimated consumption using the existing A and B parameters. If the new consumption is within or equal to the estimated consumption +/- the CoV, a new set of A and B parameters will be generated. If the new consumption falls outside the estimated consumption +/- the CoV, a new set of parameters and a new CoV will be generated. If the new CoV is less than or equal to the existing CoV, the new parameters will be used. If the new CoV is greater than the existing CoV, the existing A and B parameters will continue to be used.

## 2.3 FARH-02 NDM Forecast Apportionment

### 2.3.1 Related High Level Principles:

The following high level principles underpin this process:

- Aggregate values of gas point A and B parameters will be generated for each Shipper portfolio based on individual Gas Point A and B parameters.
- This aggregation will be revised each day to reflect changes of Shipper and new supply points.
- The apportionment of NDM ***forecast*** demand on day D will be based on the register of gas points on day D-1.
- A forecast AWDD value for day D will be derived from the NDM forecast;
- The aggregate A and B parameters for each Shipper's portfolio will be applied to the forecast AWDD value to generate an estimate of NDM demand by Shipper by ~~DZ~~ ***Offtake Zone (OZ)*** and express as percentage of the total NDM estimate.
  These percentages will be used to apportion the forecast of NDM demand among Shippers and provide the basis for advised NDM nominations;
- The total NDM forecast will be subject to revision in the light of changes in the ~~DZ~~ ***NDM*** forecast demand ~~or the DM nominations~~. Such a revision may precipitate a renomination advice.

### 2.3.2 Process Scope:

NDM forecast apportionment is the term used to describe the NDM apportionment process as carried out before the day (at D-1), and also on day D when a renomination occurs. The timing of the day-ahead nominations and the timings for within-day renominations are set out in the Transportation paper. NDM forecast apportionment covers all NDM supply points and covers the NDM component of any mixed DM/NDM supply points.
The output of the NDM forecast apportionment process is a forecast of each Shippers NDM demand by offtake zone. This is the basis of the nomination advice which will be issued to Shippers via the BGT systems.

### 2.3.3 Process Background / Preconditions:

This is a new process and is required to apportion forecast NDM demand among Shippers.

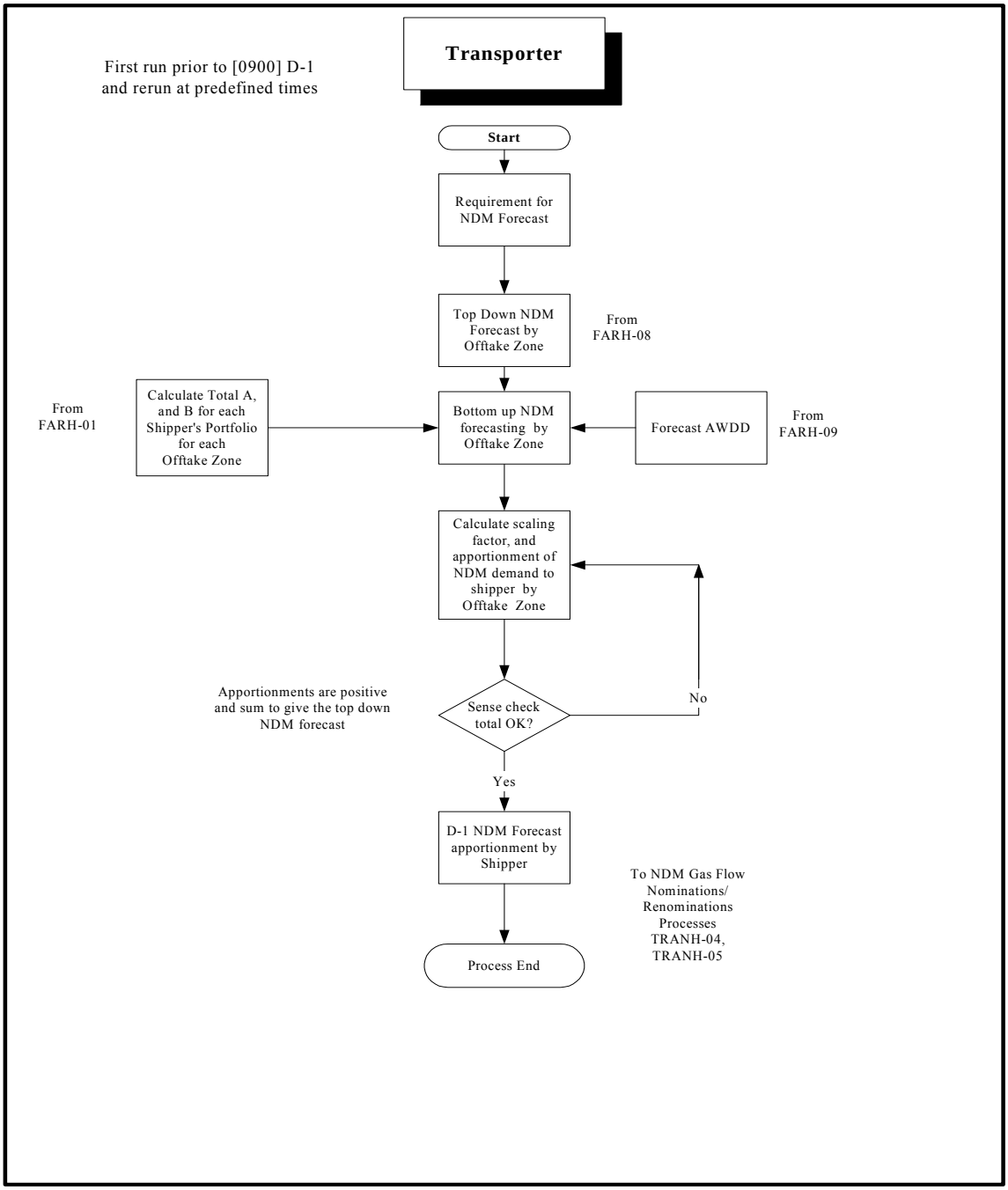
### 2.3.4 Issues from Phase 1 addressed:

No issues with regard to NDM Forecast Apportionment.

### 2.3.5 Step through of process:

The diagram below shows the FARH-02 process.

**Process Title:** NDM Forecast Apportionment **Process ID:** FARH-02




| Process Title: | NDM Forecast Apportionment | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The process is run daily and is first run for gas day D prior to [0900] hours on day D-1.

The process takes the forecast AWDD (FARH-09) and the total A and total B for each Shipper's NDM portfolio as recorded on the gas register at day D-1. These are used to produce a bottom up forecast of the NDM demand for each Shipper's portfolio (Demand = A + B*AWDD).

The bottom up forecasts of demand are scaled so that in total they match the top down NDM forecast (FARH-08). This produces the NDM forecast apportionments.

A sense check is performed that the apportionments are positive and sum to give the top down NDM forecast. If the check fails the cause is determined and the process is repeated.

The output is an NDM forecast for each Shipper which is used in the transportation NDM flow nominations/renominations processes.

The total NDM forecast is subject to revision in the light of changes in the forecast weather or actual demand through the day. Such a revision may precipitate a renomination advice in which case the process will be rerun to produce updated forecasts. The timing of the renomination will be in accordance with the timings set out in the Transportation paper.

## 2.4 FARH-03 NDM Allocation

### 2.4.1 Related High Level Principles:

This process adheres to the following high level principles:

- Total NDM actual demand for each ~~distribution zone~~ ***offtake zone*** (~~DZ~~***OZ***) will be calculated (top down) as metered actual demand for that OZ less DM metered consumption less shrinkage
- The actual AWDD value (see FARH-10) for gas day D will be derived from the total NDM send-out for gas day D to the ~~DZ~~***OZ***;
- The actual AWDD and the gas point register on D will be used to generate percentage allocations among Shippers for NDM demand on D.
- Total ~~DZ~~***OZ*** actual demand, total DM actual demand and the allocation percentages may be subject to revision up to close out (D+7) at which time the Allocation will be final.

### 2.4.2 Process Scope:

This process allocates the NDM demand in the offtake zone (total metered demand into the offtake zone, less metered DM demand, less shrinkage) to all the gas points. Following receipt of DM figures there is an initial allocation at D+1 and final close out is at D+7.
The output of the NDM allocation process is an aggregate allocation (in kWh) for the Shipper's NDM portfolio. This aggregate allocation is required for transportation charging and for imbalance calculations. Aggregate allocations cover all NDM supply points and the NDM component of any mixed DM/NDM supply points. The allocation is also broken down to gas point level, giving the estimates for gas points which are reconciled to meter readings in the reconciliation process (FARH-05).
The aggregate allocations will be issued to Shipper via the BGT systems.

### 2.4.3 Process Background / Preconditions:

This is a new process and is required to allocate total NDM demand among Shippers and to the NDM gas points.

### 2.4.4 Issues from Phase 1 addressed:

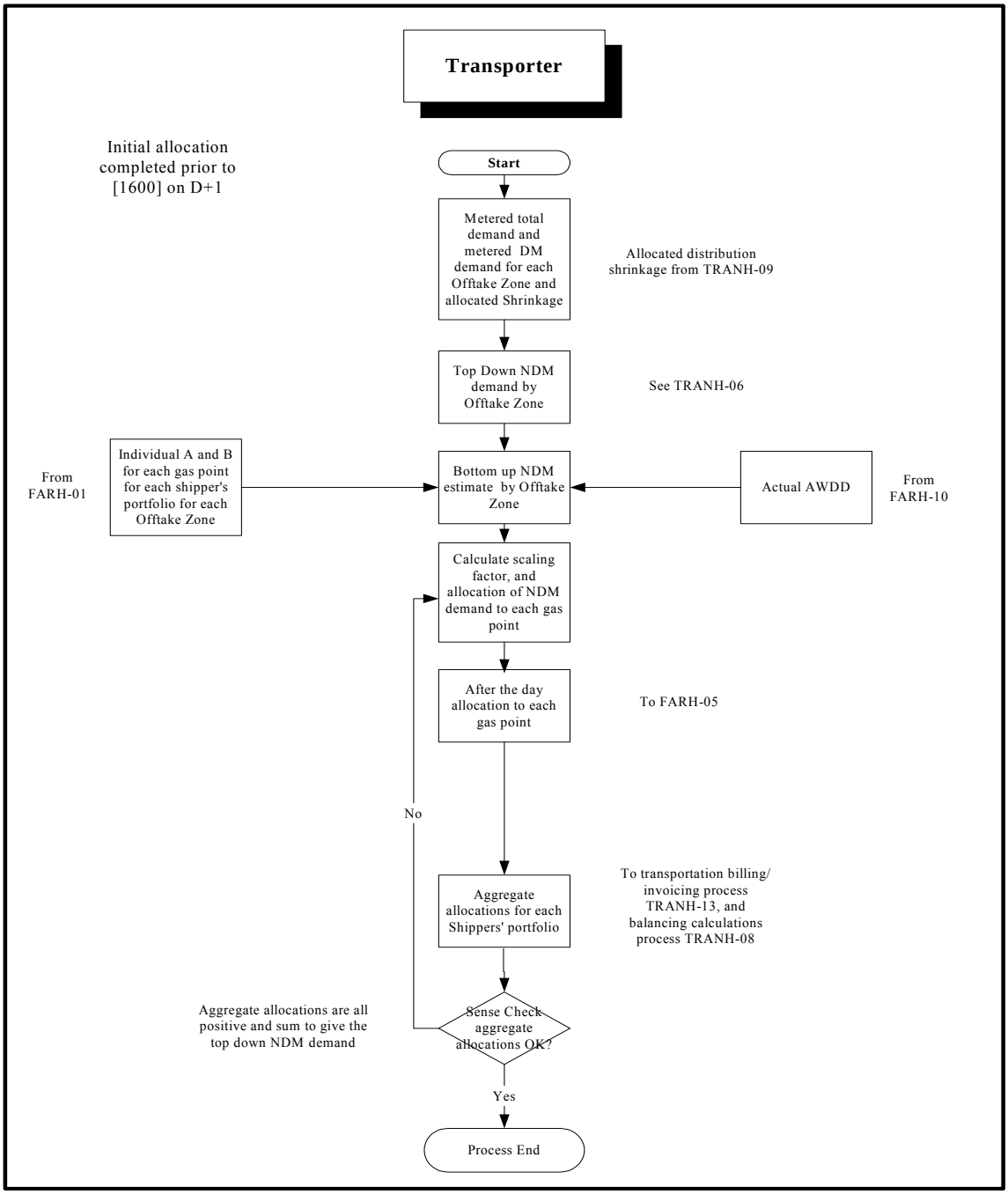
**F4**
We endorse the top-down model and believe that it most efficient that the system operator creates the NDM forecast. It must be accepted, however, that NDM shippers are not balancing to a measured volume of gas but to a forecast of an estimate at D+7. As NDM shippers are balancing on the day to a figure that is not known until after the day, an actual NDM zero imbalance will never be achieved. How will the cost of these imbalances be recovered and will there be redistributive effects between NDM and other classes of end-user

BGE Transportation response: There will be new balancing rules under entry/exit. However, it should be noted that the imbalance on the DM gas points is not necessarily zero either. The new balancing arrangements will be discussed further under the GMAG process.

## 2.4.5 Step through of process:

The diagram below shows the FARH-03 process.

**Process Title:** NDM Allocation **Process ID:** FARH-03




| | | | | | |
|---|---|---|---|---|---|
| **Process Title:** | NDM Allocation | **Team:** | FAR | **Prepared By:** | BGT |
| **Revision:** | GMOWG Proposal Version 1.0 | **Release Date:** | 19 December 2003 | **Approved By:** | |

The process is run for gas day D on day D+1 once the actual metered total demand and metered DM demand are known. The top down NDM demand is derived by subtracting the DM demand and the allocated shrinkage from the total demand for each Offtake Zone (see TRANH-06 for details). The shrinkage allocation will be calculated by applying the shrinkage factor (see FARH-04) to the relevant volumes (see TRANH-09).

The process takes the actual AWDD (FARH-10) and the total A and total B for each Shipper's NDM portfolio on Day D as recorded on the gas register at day D. These are used to produce a bottom up estimate of the NDM demand to each gas point (D = A + B*AWDD).

The bottom up estimates of demand are scaled so that in total they match the top down NDM demand. The scaling process produces the NDM allocations for each gas point.

The allocations to the gas point are used in the transportation charging process, and the aggregate of the allocations to all the gas points in a Shipper's portfolio is used for imbalance calculations.

A sense check is performed that the aggregate allocations for each Shipper are positive and sum to give the top down NDM demand. If the check fails the cause is determined and the process is repeated from the start.

The allocations will be subject to revision up to D+7 when final close out of allocations takes place. It is intended to first run the process by [1600] on D+1 and to rerun the process if there has been a change to the NDM total demand, and/or AWDD, and/or Shipper aggregate A and B.

## 2.5 FARH-04 Distribution shrinkage factor annual update

### 2.5.1 Related High Level Principles:

This process adheres to the following high level principles:

- A shrinkage estimate is required to allow for unaccounted-for gas losses in the ~~distribution zone~~***distribution system***. It is proposed that shrinkage should be represented as a fixed percentage of ~~distribution zone~~ ***distribution system*** daily throughputs. The percentage figure will be calculated using established Bord Gáis methodology. The figure will be subject to annual review.

- The percentage figure will be applied to the D-1 ~~DZ~~***estimate of distribution throughput calculated on D-1 for gas day D*** to calculate the forecast energy quantity for shrinkage. On D+1 the actual shrinkage energy quantity ***for gas day D*** will be recalculated based on the measured ~~distribution zone~~ ***distribution system*** offtake.

### 2.5.2 Process Scope:

This process is carried out once a year. The output is a distribution percentage shrinkage figure which will be used in transportation shrinkage process (TRANH-09) as the basis for calculating daily shrinkage values. The updated shrinkage factor will be implemented from 1 October each year.

### 2.5.3 Process Background / Preconditions:

Distribution shrinkage is required by the Transporter in the day-to-day operation of the Distribution system. Disntribution Shrinkage is made up of unaccounted for gas due to measurement variations, leaks and theft etc.

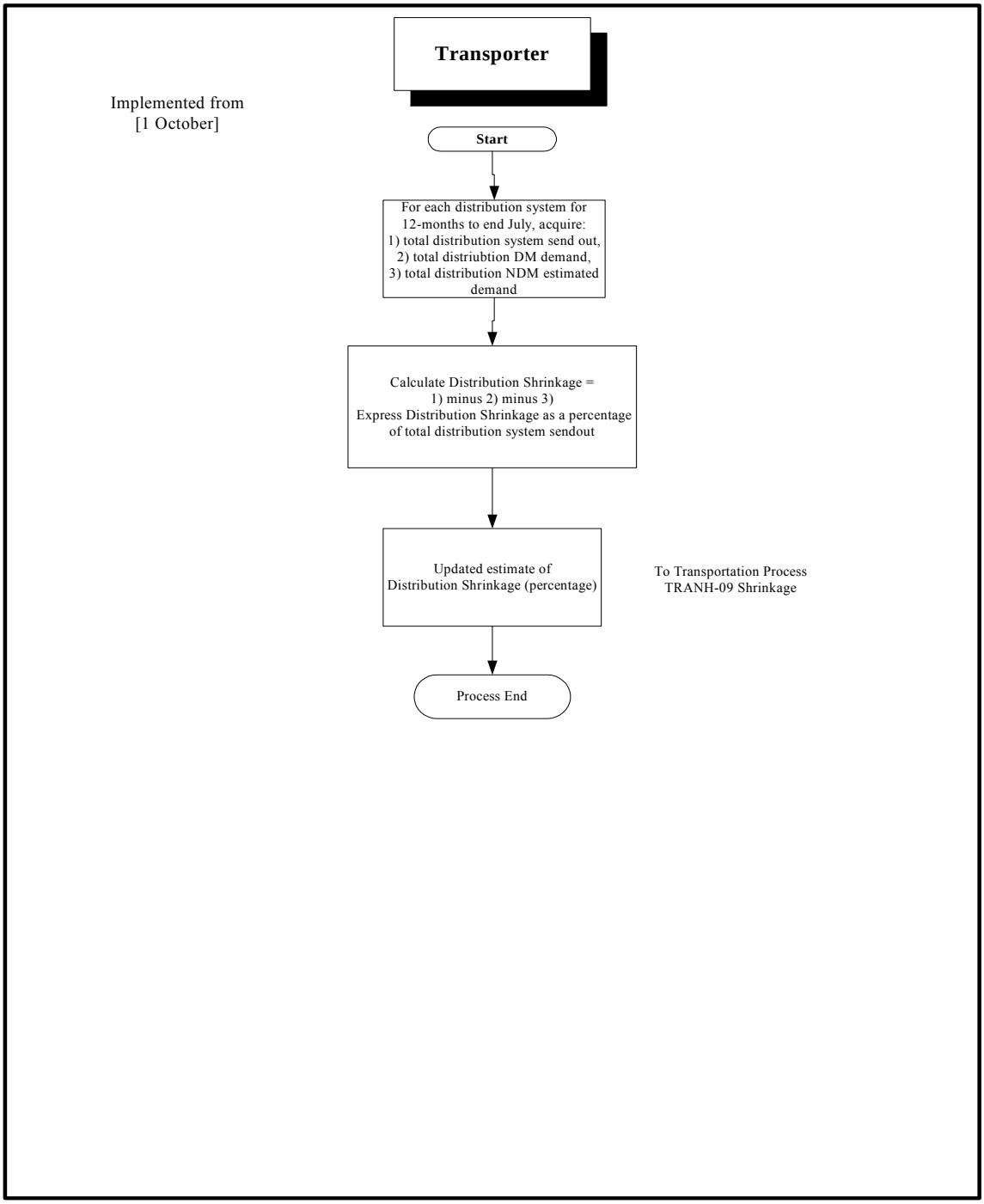
### 2.5.4 Issues from Phase 1 addressed

No issues arose with regard to distribution shrinkage factor.

### 2.5.5 Step through of process:

The diagram below shows the FARH-04 process.

**Process Title:** Distribution Shrinkage: Annual Update **Process ID:** FARH-04




| Process Title: | Distribution Shrinkage: Annual Update | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The calculation of shrinkage is based on a 12-month period to the end of July and uses metered demands wherever possible. However, since NDM meter readings will not necessarily coincide with the start and end of the period it will be necessary to estimate the NDM demands at a gas point from the start of the year up to the date of the first meter read, and from the last meter read in the period up to the end of the year being analysed.

The output is a distribution percentage shrinkage figure which will be used in transportation shrinkage process (TRANH-09) as the basis for calculating daily shrinkage values. The updated figure will be implemented on 1 October each year.

## 2.6 FARH-05 Reconciliation (monthly process)

### 2.6.1 Related High Level Principles:

This process adheres to the following principles:

- No reopening of Transportation or Balancing invoices will take place. Reconciliation elements will be invoiced separately
- Reconciliation will be carried out in respect of the Distribution commodity charges, the Transmission Exit commodity charge and gas quantities
- The process must be simple to understand and administer for the Transporter and Shippers
- The Reconciliation quantity for each Shipper will be the aggregate difference, for the Reconciliation period, between allocated and metered gas flows for NDM Gas Points
- Only valid meter readings will generate a reconciliation quantity.
- Reconciliation charges/credits will be derived from the aggregate Shipper Reconciliation quantity multiplied by the Transmission Exit commodity rate, the Distribution commodity rate, and the relevant gas price. ***In the case of reconciliation volumes relating to Distribution commodity rates (which are not fixed) the appropriate unit rate will be applied to the applicable volume and time period.***
- A monthly gas price will be used to reconcile gas commodity and will be a neutral price based on a straight average of the Balancing Buy and Balancing Sell prices
- While reconciliation will be performed as each meter read is received, invoices will relate to the aggregate Reconciliation quantity per Shipper per Reconciliation Period
- Reconciliation statements will be sent out at predetermined times during the year – a Reconciliation invoice is not initiated with a meter read)
- Annual close out of Reconciliation volumes will be at the end of September
- Any meter reads/ Reconciliation volumes received after the close out deadline will be dealt with in the subsequent Reconciliation round
- The Transporter will be cash neutral in respect of the gas value in the Reconciliation process
- In the event that, at the end of a Reconciliation Period, the aggregate of all gas value reconciliations is non-zero, the surplus or deficit will be smeared across all ***NDM*** Shippers in proportion to their ***NDM transportation throughput.***
- Validation checks will be developed by the Transporter to 'catch' any unusually large Reconciliation quantities

### 2.6.2 Process Scope:

NDM Allocations are made according to apportionment principles, which, although reasonably accurate, will not be exact. The Reconciliation process is designed to adjust for differences between NDM Allocations and actual consumption, which will be calculated upon receipt of a meter read.

### 2.6.3 Process Background / Preconditions:

This process covers the calculation of reconciliation variances (in kWh). Reconciliation variances are passed to Transportation for booking against Shippers and for subsequent invoicing. Annually, each Shipper will be cashed out on the total of all Reconciliations.

### 2.6.4 Issues from Phase 1 addressed:

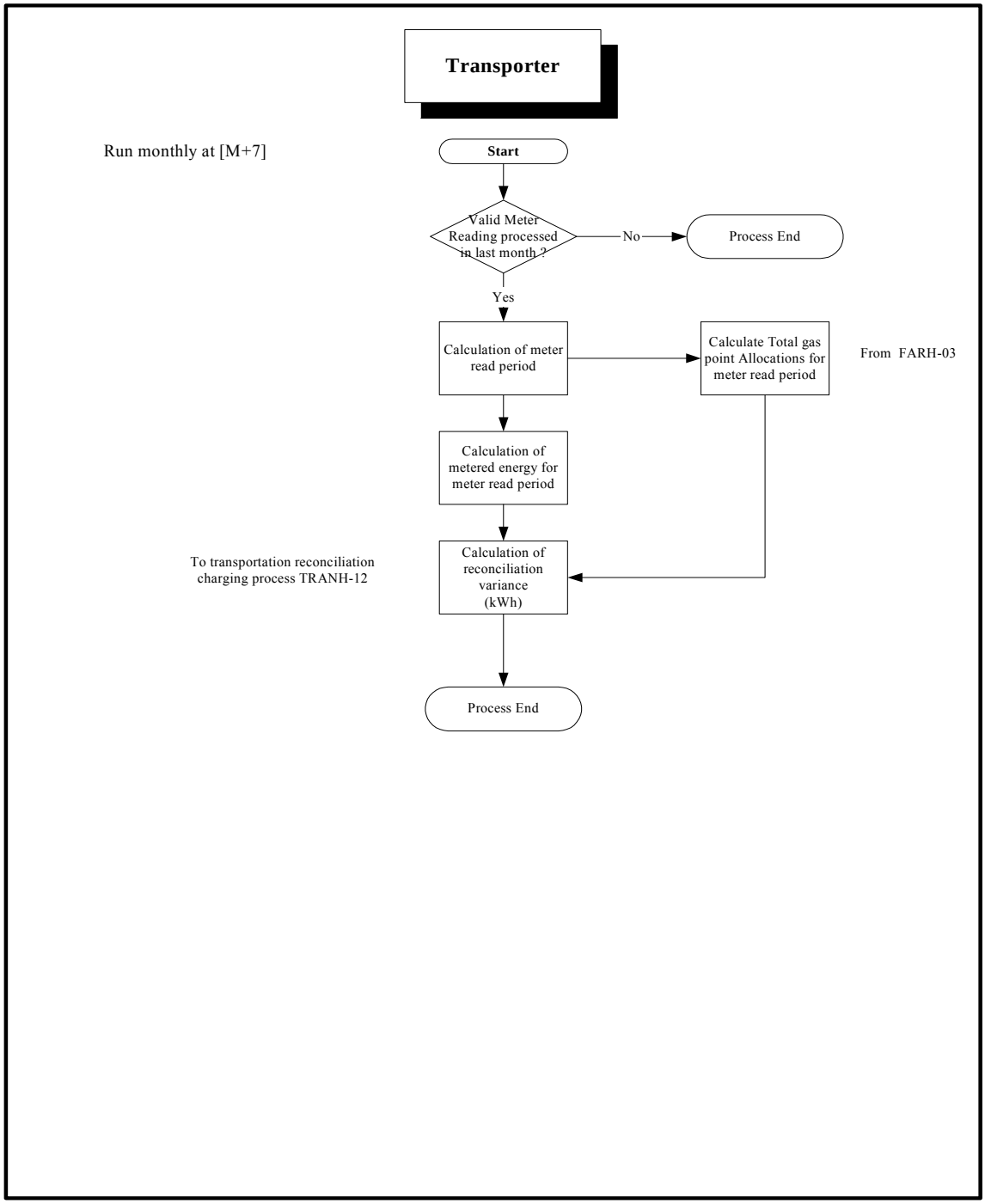
**F5**
A worked example showing the potential materiality of reconciliation volumes and financial values would help to set the reconciliation process in context

BGE Transportation response: the actual reconciliation volumes and financial values will depend on the Shipper's portfolio of supply points and on the quality of the estimates. BGE intends to provide Shippers with the coefficient of variation as an indication of the goodness of fit of the A and B parameters at each individual supply point. Shippers can use this information to estimate the potential size of individual reconciliation variances. In a mixed portfolio, the diversity of supply points is likely to produce both over- and under-estimates which will offset one another in the total reconciliation variance.

## 2.6.5 Step through of process:

The diagram below shows the FARH-05 process.

**Process Title:** NDM Reconciliation (monthly process) **Process ID:** FARH-05

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|---|---|---|---|---|---|
| **Process Title:** | Reconciliation (monthly process) | **Team:** | FAR | **Prepared By:** | BGT |
| **Revision:** | GMOWG Proposal Version 1.0 | **Release Date:** | 19 December 2003 | **Approved By:** | |

The process is run once a month at M+7 for all NDM gas points which have had meter readings processed in the last calendar month.

The first check is whether a meter reading has been processed for the gas point during the last calendar month. If not, the process ends. If a reading has been processed during the month, the meter read period (the period between the last two meter reads to which the reconciliation will apply) is calculated. For the meter read period two values are calculated:

- the total of the daily gas point allocations (FARH-03);
- the metered energy produced at the time the meter reading was processed by MDS;

The difference between the metered energy and the total allocated energy forms the reconciliation variance (in kWh).

The reconciliation variance for the gas point is passed to transportation for booking against the relevant Shipper and for subsequent invoicing in the annual reconciliation charging process (TRANH-12).

There will be a delay of [1 to 4] days between the meter reading being taken and the meter reading being processed. In the case of a routine meter read the effect of the delay has no impact on the reconciliation since the supply point remains with the same Shipper. In the case of a meter reading on a change of Shipper then there will be a reconciliation for the period between when the meter read was taken and the date on which the Incoming Shipper commences to supply their own gas to the Supply Point (see also the GPR Business Model, Section 2.2.4 for a "Step through of process" description of the Change of Shipper and Commodity Reconciliation processes.

In the case of a change of shipper correction (GPR process GPRH-2) there will be a reconciliation for the intervening period. The incoming Shipper is the Shipper that had been responsible for shipping gas prior to the erroneous transfer and the outgoing Shipper is the Shipper that previously submitted an erroneous change of Shipper request. The reconciliation will cover the period between the date of the erroneous change of shipper request and the date on which the change of shipper correction is made. The correction of an erroneous change of Shipper transfer must be within a 3 month period of the original change of Shipper transfer having taken place.

## 2.7 FARH-06 NDM peak load and AQ calculation

### 2.7.1 Related High Level Principles:

This process adheres to the following principles:

- NDM peak loads should correspond to ~~a 1 in 20~~ ***the*** peak day condition.
- A degree day value corresponding to the ~~1 in 20~~ ***peak day*** condition will be determined.
- A gas point peak load will be generated by reference to the gas point A and B parameters described above in the following way:
  NDM gas point peak load = A + (B****DD*****peak***), where ~~$DD_{20}$~~ ***DD*****peak*** is the ~~1 in 20~~ degree day value ***on the peak day***.
- A supply point peak load will be generated as the sum of the peak loads of the gas points which comprise the supply point.
- Component gas points of the supply point will be determined by reference to the gas point register.
- A gas point annual quantity (AQ) will also be generated from the A and B parameters by reference to the total of the degree day values for an average year. A supply point AQ will be calculated as the sum of component gas point AQs.
- A peak load factor will be calculated for each supply point as LF=(AQ/365)/supply point peak load
- An average load factor will be calculated for each of a number of supply point categories, defined in terms of AQ ranges. One such range will be for domestic supply points, to be defined as those with AQ less than [73,000] kWh.

### 2.7.2 Process Scope:

The process covers the calculation of supply point peak loads. The supply point peak load is calculated as the sum of the peak loads of its component gas points. The supply point peak load figures are used for NDM supply point capacity setting (FARH-07).

### 2.7.3 Process Background / Preconditions:

The demand model used to estimate demand at a gas point on a day is used to calculate the demand at the gas point over a year, and the peak day load at the gas point calculated at the degree day value corresponding to the design peak condition.

### 2.7.4 Issues from Phase 1 addressed:

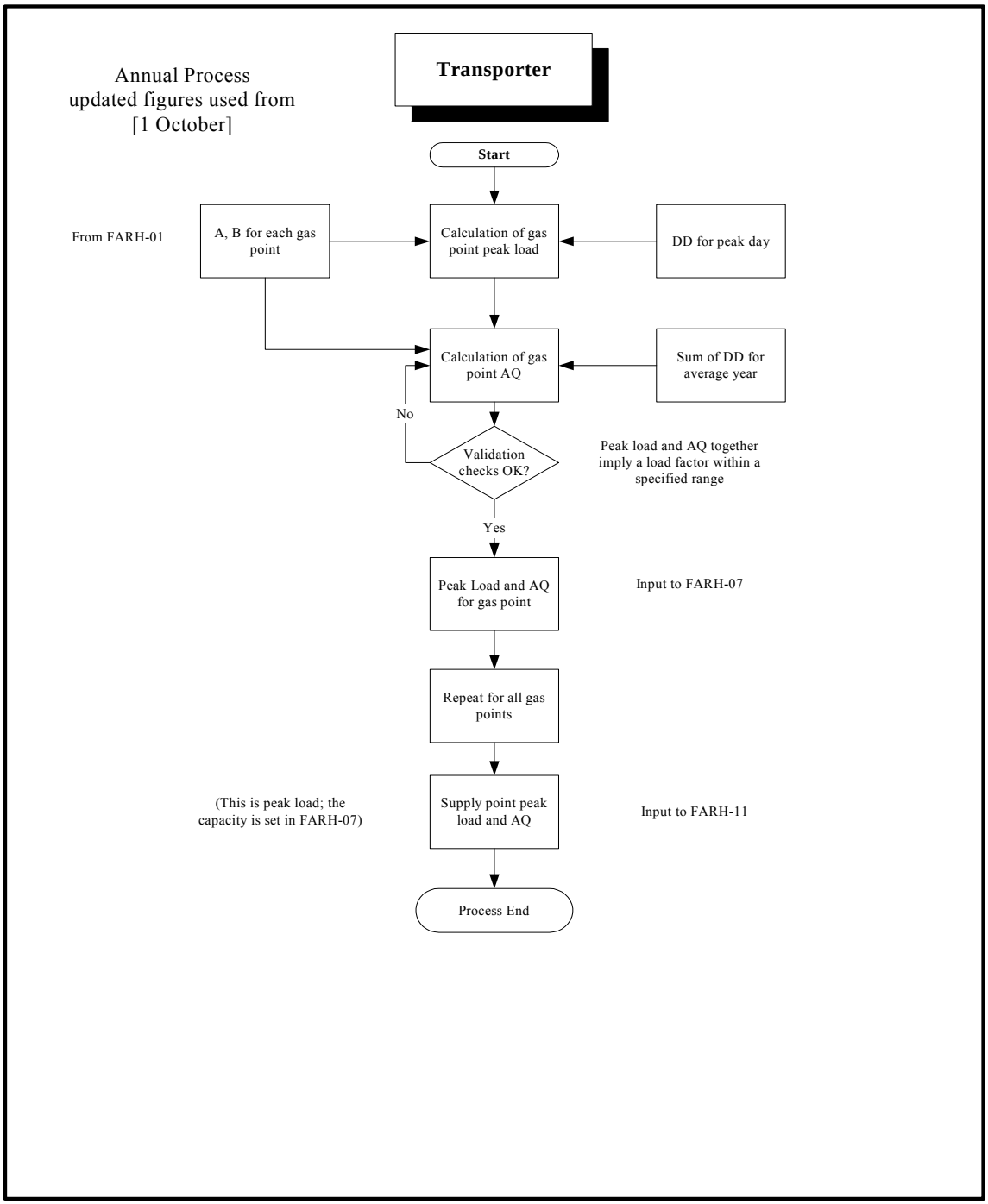
**F12**
" It is envisaged that NDM supply point capacities will be based on the peak loads calculated as described above for the Industrial & Commercial market (defined for these purposes as supply points with AQ>73,000 kWh). However in the domestic market it is proposed that the average domestic load factor should apply, in order to simplify transportation capacity charging in this sector" - It is too crude to use a single average load factor for all customers with annual consumption below 73,000kWh, particularly as a consumer with 73,001 kWh annual consumption will have his capacity individually set. One possibility is to group customers according to the sensitivity of their gas consumption to the weather as measured by the consumer specific parameter Bj, which relates consumption to degree-days. Without some disaggregation, low load factor customers will not be paying the full costs of their peaky loads and high load factor customers will be paying for capacity that they do not use.

BGE Transportation response: There is a need for consistency with tariff application bands, in order to avoid market distortion. The principle of banding was agreed subject to the discussions on threshold and tariff. Details of the NDM peak load calculation and the NDM supply point capacity setting are described in FARH-06 and FARH-07.

## 2.7.5 Step through of process:

The diagram below shows the process FARH-06.

**Process Title:** NDM Peak Load and AQ Calculation **Process ID:** FARH-06




| Process Title: | NDM Peak Load and AQ Calculation | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The process to calculate peak load and AQ for each gas point is run once a year. Updated values are implemented and used for Transportation charging from 1 October.

Firstly the A and B parameters (FARH-01) are used to calculate the peak load. Two cases exist:

- For gas points which have a positive B (temperature sensitive) the peak load is calculated as $A + B*DD_{peak}$, where $DD_{peak}$ is the degree day value corresponding to the design peak condition which is set so as to achieve a match between the aggregate of the bottom up peak load estimates and the top down NDM capacity estimate used in tariff setting.
- For gas points which have a negative B, the peak load is calculated from the AQ below and is the average daily consumption, that is AQ/365.

The annual quantity is calculated as A*365 + B*total degree day figure for an average year

A validation check will be applied that the peak load and AQ together imply a load factor within a specified range.

The supply point peak load and supply point AQ are the sum of the individual peak loads and AQs for the gas points which together make up the supply point.

The output is a peak load and AQ for each supply point used for NDM supply point capacity setting (FARH-07).

## 2.8 FARH-07 NDM supply point capacity setting

### 2.8.1 Related High Level Principles:

It is envisaged that NDM supply point capacities will be based on the peak loads calculated as described in process FARH-06 above for the Industrial & Commercial market (defined for these purposes as supply points with AQ≥[73,000] kWh). However in the domestic market it is proposed that the average domestic load factor should apply, in order to simplify transportation capacity charging in this sector.

This process thus adheres to the following principles:

- Supply points with AQ≥[73,000] kWh will have their capacity set at the supply point peak load, as calculated from their A and B parameters and described in FARH-06.
- Supply points with AQ<[73,000] kWh will have their capacity determined by applying the domestic group average load factor to the supply point annual quantity, as follows:
  Capacity = (AQ/365)/average domestic load factor
- In the Industrial / Commercial category, in the absence of A and B parameters (e.g. new customer) supply point capacity will be determined by reference to the peak load provided by the Shipper
- For the purpose of NDM capacity setting, gas point AQs and peak load factors will be calculated annually prior to the gas year for which they will become effective.

### 2.8.2 Process Scope:

Supply point capacities will be updated once a year. The output of the process is a figure for the supply point capacity, which is used for calculating the transportation charges. For new supply points, capacities will be determined by reference to the AQ and peak load entered as part of the supply point registration process described in FARH-01.
In order to achieve the targeted cost recovery for transportation capacity charges, it is necessary that the total of all NDM supply point capacities should be consistent with the top down NDM peak load assumed in setting transportation unit charges. Capacities are therefore scaled to ensure that this is the case and $DD_{peak}$ will be set to achieve this.

### 2.8.3 Process Background / Preconditions:

The Supply Point capacity is the capacity at a Supply Point which is deemed to be reserved for the peak day. For domestic Supply Points the Supply Point Capacity is calculated from the supply point AQ using the average domestic load factor. For Industrial and Commercial Supply Points it is calculated directly from the Peak Load.

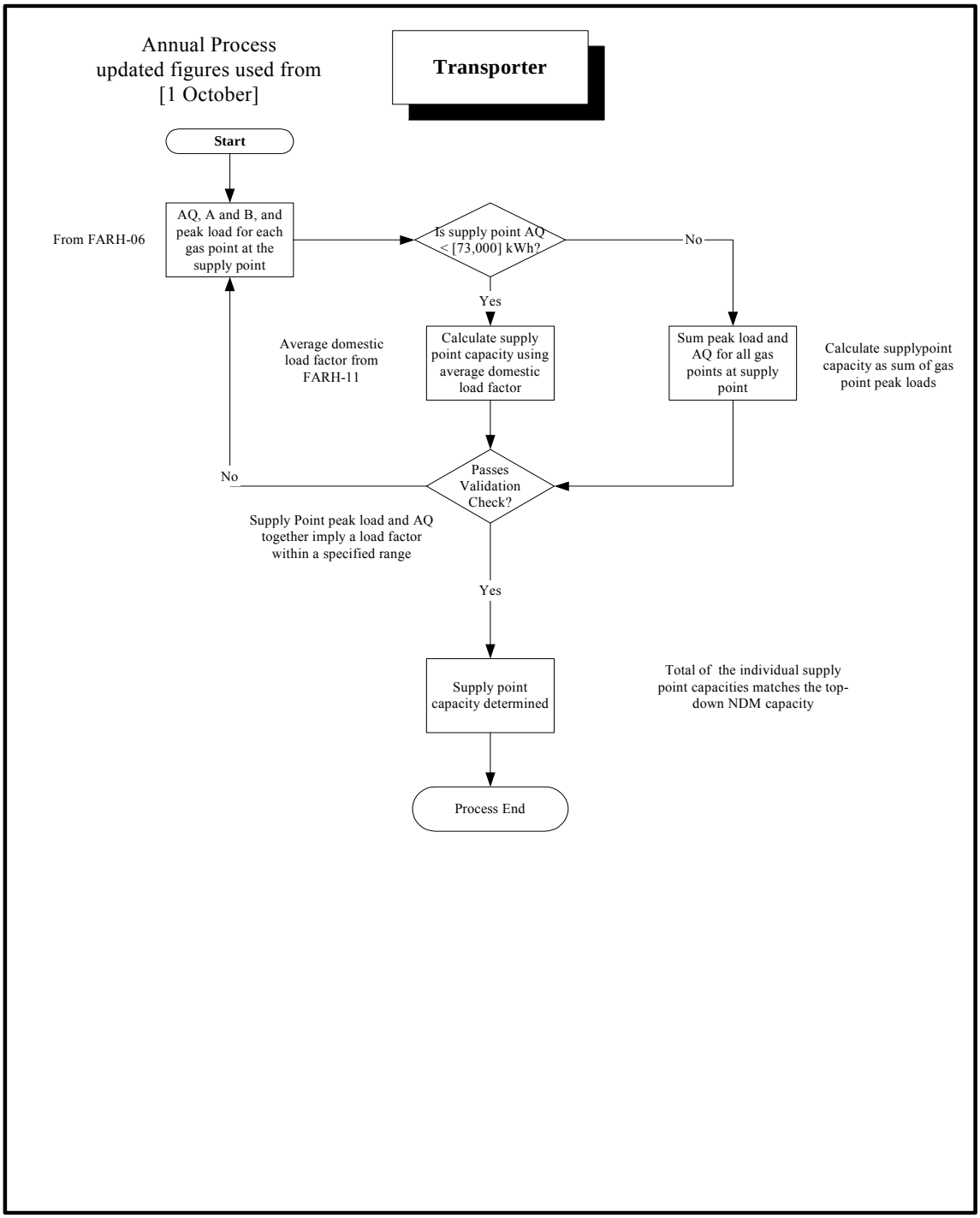
### 2.8.4 Issues arising from phase 1 addressed

No issues arose with regard to NDM supply point capacity setting.

## 2.8.5 Step through of process:

The diagram below shows the FARH-07 process.

**Process Title:** NDM Supply Point Capacity Setting **Process ID:** FARH-07

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|---|---|---|---|---|---|
| **Process Title:** | Supply Point Capacity Setting | **Team:** | FAR | **Prepared By:** | BGT |
| **Revision:** | GMOWG Proposal Version 1.0 | **Release Date:** | 19 December 2003 | **Approved By:** | |

The process is run once a year for each supply point.

Firstly it takes the AQ for the supply point (from FARH-06):

- If the supply point AQ is less than [73,000]kWh then the average domestic load factor (from FARH-11) is used to calculate the supply point capacity as follows: (AQ/365)/average domestic load factor.
- If the AQ is greater than or equal to [73,000]kWh then the supply point capacity is the sum of the peak loads of its gas points calculated in FARH-06.

A validation check is applied to confirm the initial supply point capacity and AQ give a load factor within a range.

The output is a figure for the supply point capacity used for transportation charging.

## 2.9 FARH-08 Top down forecasting of demand

### 2.9.1 Related High Level Principles:

This process adheres to the following high level principles:

- NDM forecasting is carried out for each ~~distribution zone~~ ***offtake zone*** independently
- A total NDM forecast for an ~~distribution zone~~ ***offtake zone*** will be calculated as

- ~~NDM demand forecast = Total forecast demand – DM forecast – shrinkage~~
- ***NDM demand will be forecast based on historical NDM demand and forecast weather data***

- Shippers will make aggregate DM nominations in respect of their DM offtakes within the ~~distribution zone~~ ***offtake zone***;

- A forecast will be generated for ~~each of two Distribution Zone~~s ***an offtake zone***, ~~East and South,~~ the zone being defined in terms of the transmission exit points which supply gas into the ***offtake zone***. Thus the forecasts will relate to the total metered throughput ***net of DM*** demand at transmission exit points into ~~each distribution zone~~ ***the offtake zone*** (~~DZ~~***OZ***).
- Actual and forecast values of temperature and other weather variables will be provided by the Met Office and will be limited to one weather station for each ~~distribution zone~~***city gate area (see below)***.
- Precise timings for the calculation of the forecasts ***are outlined in the Transportation paper.*** ~~have yet to be determined, but they will be generated periodically to support transportation arrangements~~.
- The forecasting method will involve some development of the current method being employed for the non-TPA market.
- ~~The DM forecast methodology will be developed in detail during phase2~~ ***No DM forecast is to be provided to Shippers***;

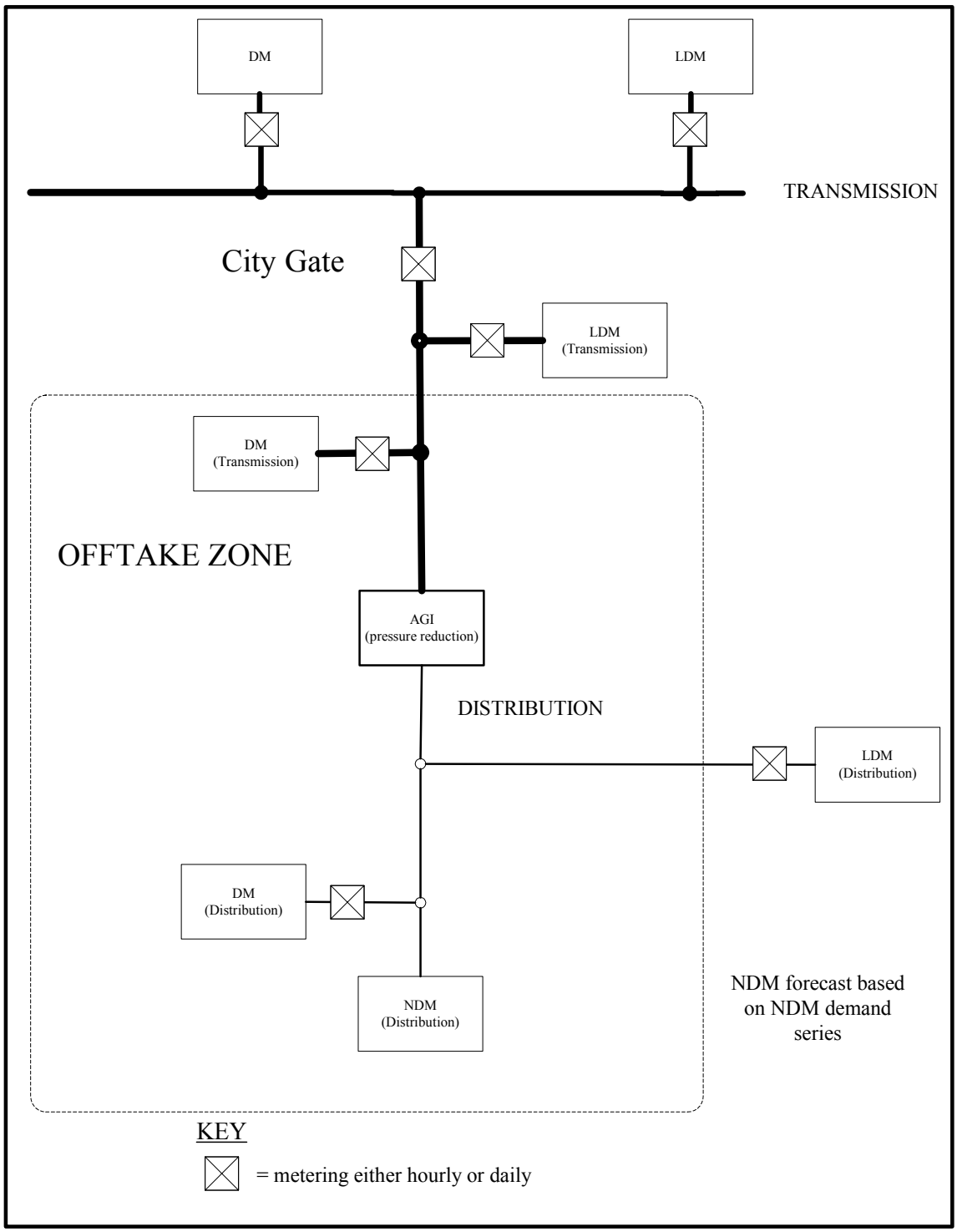
### 2.9.2 Process Scope:

This process relates to the forecasting of total NDM demand within each offtake zone. The process is first run for day D on the morning of D-1 in order to input to the NDM forecast apportionment process (FARH-02). Within day the process is run again in order to produce the renomination.

A number of city gate areas will be specified in the top down forecasting of NDM demand. The city gate areas are defined by the transmission system exit points which supply gas to them. A top-down NDM forecast will be made for each city gate area and these will be combined into a single offtake zone forecast.

The diagram overleaf shows the connected loads and associated metering within a city gate area and within an offtake zone.

**Process Title:** Schematic of Offtake Zone

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|---|---|---|---|---|---|
| **Process Title:** | FAR Business Area | **Team:** | FAR | **Prepared By:** | BGT |
| **Revision:** | GMOWG Proposal Version 1.0 | **Release Date:** | 19 December 2003 | **Approved By:** | |

### 2.9.3 Process Background / Preconditions:

The Transporter's forecast of NDM demand is required as input to the NDM forecast apportionment process (FARH-02).

### 2.9.4 Issues from Phase 1 addressed:

**F2**
The timing, frequency and any tolerance trigger for the NDM forecasts need to be established. If possible, the final NDM nomination should be based on and therefore coincide with the final DM forecast

BGE Transportation response: more detail of forecasting process is given in a separate paper 'Top Down NDM Forecasting'. The renomination process is set out in TRANH-05.

**F8**
"A forecast AWDD value for day D will be derived from the NDM forecast" - our view is that the AWDD value should be based on the weather forecast for Day D and should, in turn, form the basis of the NDM forecast

BGE Transportation response: NDM top-down forecast uses the weather forecast (detail of process described in FARH-08). AWDD is then calculated from this NDM forecast (further detail described in FARH-09, and FARH-10).

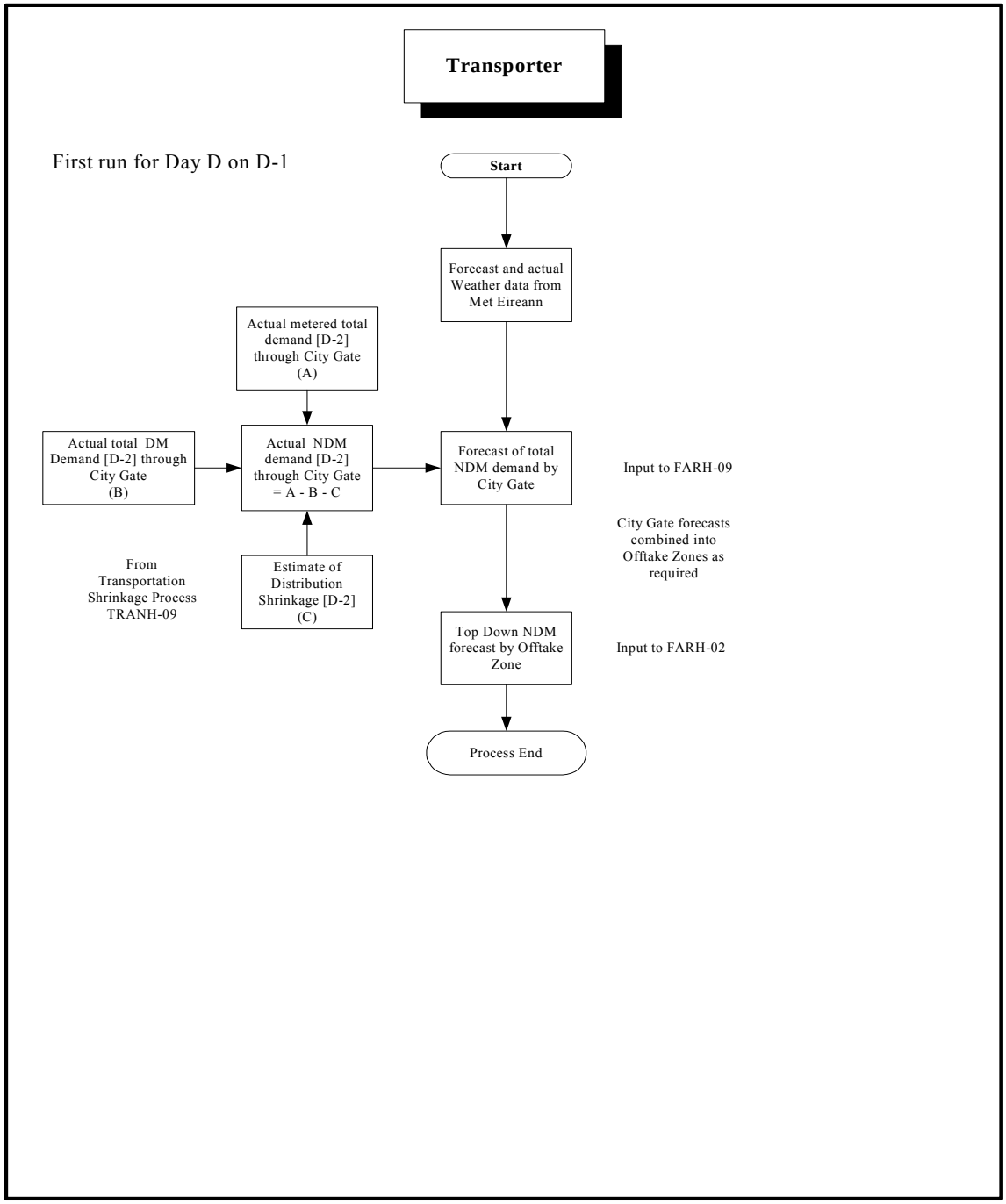
**F9**
"The actual AWDD value for gas day D will be derived from the total NDM send-out for gas day D to the OZs" - the AWDD is measured from weather data and not derived from demand. Whatever number is being derived here it is not an 'actual AWDD', but looks more like an 'arbitrary AWDD' used to make the allocated NDM demand more closely match the measured amount

BGE Transportation response: Calculating the AWDD from the NDM demand series allows the actual AWDD to capture weather/temperature and other unexplained variations in the NDM demand. The methodology is set out in FARH-10.

## 2.9.5 Step through of process:

The diagram below shows the FARH-08 process.

**Process Title:** Top Down Forecast of Demands **Process ID:** FARH-08




| Process Title: | Top Down Forecast of Demands | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The diagram relates to the process as it takes place before the day i.e. on day D-1.

Met Éireann provides the forecast and actual weather data.

For each city gate the actual NDM demand for the previous day [i.e. D-2] is derived by subtracting the actual daily-metered demand from the total city gate metered demand.

Based on recent actual demand and actual weather data up to [D-2], a forecast for D is generated. A statistical demand model will support this process but the forecast will be subject to manual override to allow for unusual events.

The D-1 forecast is updated on Day D itself based on actual demands and weather data for Day D-1, and further updated through Day D on the basis of the actual within-day demands on the day.

Further details of the top down NDM forecasting process is given in a separate paper 'Top Down NDM Forecasting'.

## 2.10 FARH-09 Calculation of forecast AWDD

### 2.10.1 Related High Level Principles:

This process adheres to the following high level principle:

- The adjusted weighted degree day (AWDD) series will capture ***the variation in NDM demand including*** relevant weather/temperature variations and provide a good linear relationship with gas point demand.

### 2.10.2 Process Scope:

This process describes the calculation of AWDD for forecasting purposes, before (D-1) and during (D) the day, where it is an essential input to the NDM forecasting apportionment process (FARH-02).

### 2.10.3 Process Background / Preconditions:

The forecast AWDD enables the forecast total NDM demand to be apportioned to each Shipper's portfolio of gas points.

### 2.10.4 Issues from Phase 1 addressed:

**F6**
It is not clear whether it is possible to produce a daily forecast for each day of the forthcoming contract year using the proposed forecasting methodology. This uncertainty relates to both the methodology and the data that will be made available, particularly relating to degree days. In other words, it is not clear that shippers could replicate the calculation ex ante. A worked example may help

BGE Transportation response: A 30-year average degree-day series for the year will be available. The shipper will also have access to the A and B parameters for the end users for which it is the Registered Shipper.

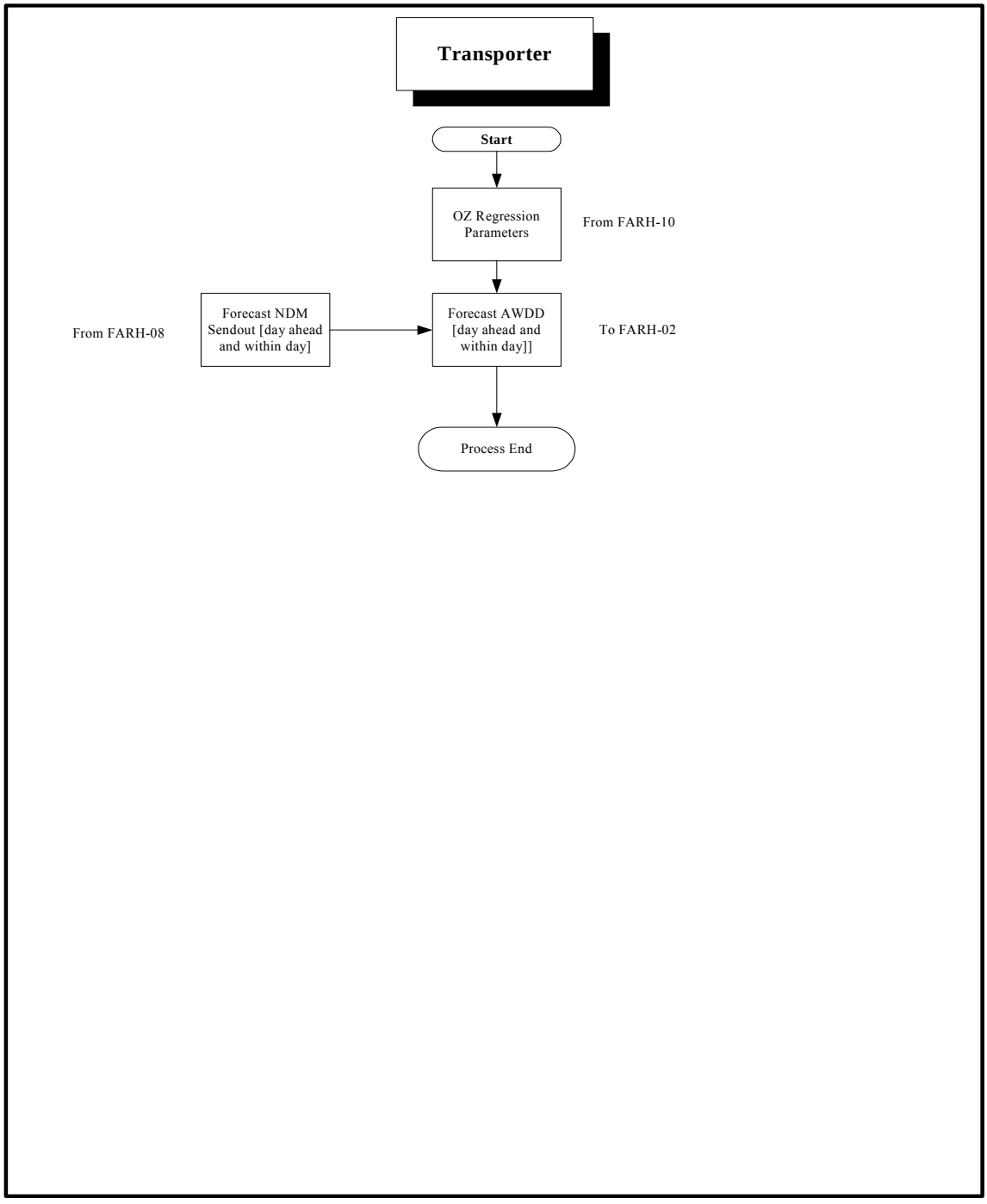
**F32**
How will degree-day value be determined?

BGE Transportation response: more detail described in calculation of forecast AWDD and calculation of actual AWDD (FARH-09 and FARH-10).

### 2.10.5 Step through of process:

The diagram below shows the FARH-09 process.

**Process Title:** Calculation of Forecast AWDD **Process ID:** FARH-09




| Process Title: | Calculation of Forecast AWDD | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The process is run daily after FARH-10 (which produces the updated OZ regression parameters).

The process uses the latest offtake zone regression parameters, $A_{oz}$ and $B_{oz}$ calculated from the most recent 365 days data (from FARH-10) and the forecast NDM demand (FARH-08). The forecast NDM demand is adjusted to exclude the impact of gas points added and gas points removed during the 365 day period. This is the forecast 'static' NDM demand. The forecast value of AWDD is derived as follows:

Forecast AWDD = (forecast 'static' NDM sendout - $A_{oz}$)/ $B_{oz}$

Thus ensuring that:

Forecast 'static' NDM sendout = $A_{oz}$ + $B_{oz}$*forecast AWDD

The forecast AWDD is used for the NDM forecast apportionment (FARH-02).

## 2.11 FARH-10 Calculation of actual AWDD

### 2.11.1 Related High Level Principles:

This process adheres to the following high level principle:

- The adjusted weighted degree day (AWDD) series will capture ***the variation in NDM demand including*** relevant weather/temperature variations and provide a good linear relationship with gas point demand.

### 2.11.2 Process Scope:

This process describes the calculation on day D+1 of the actual AWDD for day D, for input to the NDM allocation process, FARH-03

### 2.11.3 Process Background / Preconditions:

The actual AWDD enables the total NDM demand (inferred from daily meter readings) to be apportioned at the gas point level.

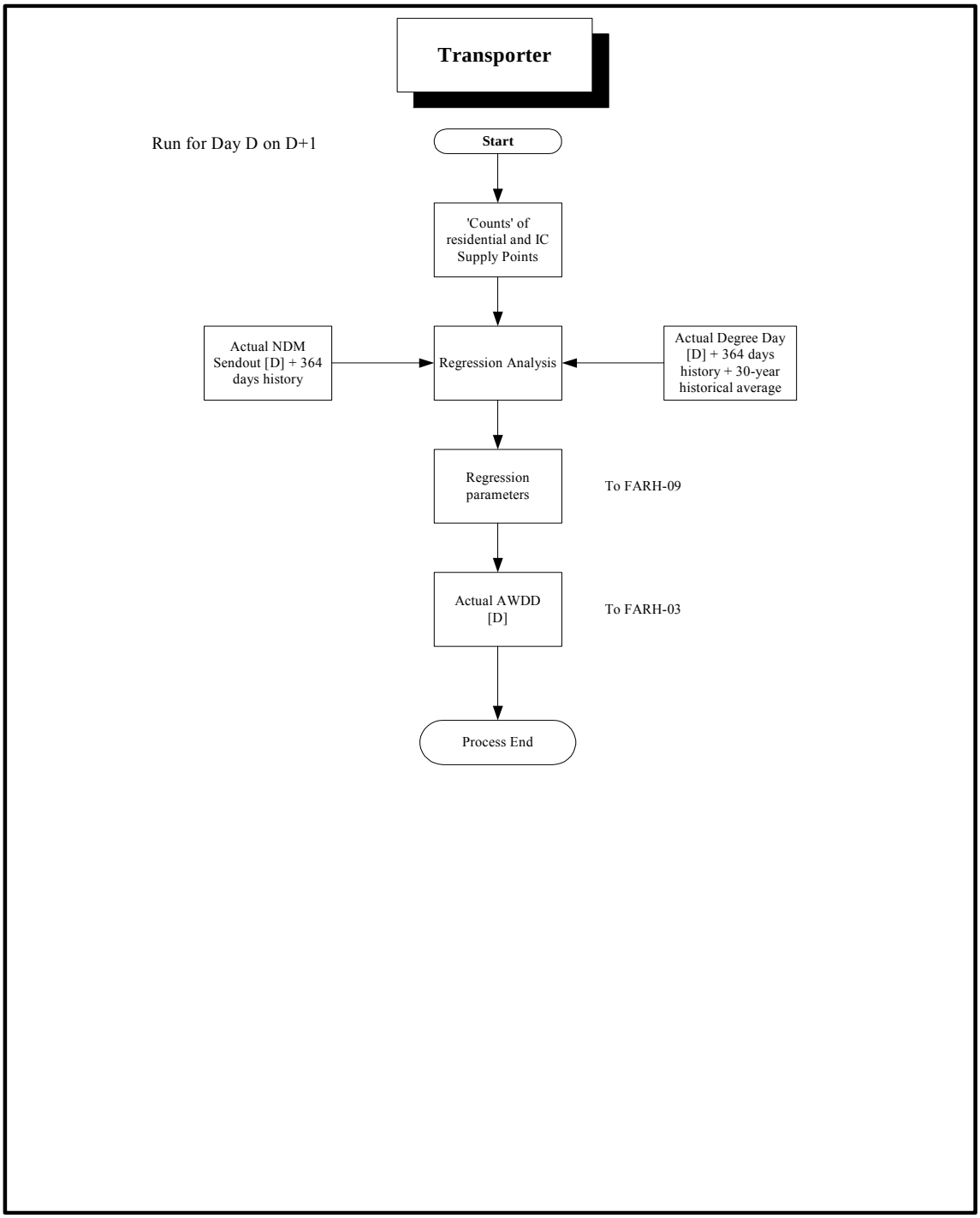
### 2.11.4 Issues arising from phase 1 addressed

No issues arose with regard to calculation of actual AWDD.

## 2.11.5 Step through of process:

The diagram below shows the FARH-10 process.

**Process Title:** Calculation of Actual AWDD **Process ID:** FARH-10




| Process Title: | Calculation of Actual AWDD | Team: | FAR | Prepared By: | BGT |
|---|---|---|---|---|---|
| Revision: | GMOWG Proposal Version 1.0 | Release Date: | 19 December 2003 | Approved By: | |

The process is run for day D on D+1.

The process uses the following data:

- the 'counts' of the residential and I/C gas points;
- the most recent 365 days actual NDM demand and actual degree day data; and
- the 30-year history of degree day data.

The following analysis is performed:

1. The daily NDM series is analysed for a rolling 365-day period and is adjusted to exclude the impact of gas points added and gas points removed during the 365 days. The objective is to generate an NDM series that comprises the consumptions at the same gas points throughout the 365-day period.

2. This 'static' NDM series is regressed against the actual degree-days and the 30-year average degree-days to generate an estimate of the weighting of these series. The weights are applied to generate a single Weighted Degree Day (WDD) series.

3. The 'static' NDM series is then regressed against the WDD series, and aggregate offtake zone parameters $A_{oz}$ and $B_{oz}$ parameters are generated as follows:

   'Static' NDM demand for gas day D = $A_{oz} + B_{oz}$*WDD + error,

   The AWDD for gas day D is derived as: AWDD = ('Static' NDM for gas day D - $A_{oz}$)/ $B_{oz}$

The output is updated regression parameters, $A_{oz}$ and $B_{oz}$, (used in FARH-09 to calculate a forecast AWDD for the next gas day) and an actual AWDD used in NDM allocation (FARH-03). FARH-10 process is run on a daily basis before process FARH-09 can be run.

## 2.12 FARH-11 Banding of end users by AQ

### 2.12.1 Related High Level Principles:

This process adheres to the following high level principles:

- It is proposed that domestic supply points should be defined as those with annual quantity less than [73,000] kWh.
- Two NDM supply point categories are thus proposed – the domestic category, with AQ<[73,000] kWh, and the Industrial and Commercial category, with AQ≥[73,000]kWh.
- An average load factor will be calculated for each of a number of supply point categories, defined in terms of AQ ranges. One such range will be for domestic supply points, to be defined as those with AQ less than [73,000] kWh.

### 2.12.2 Process Scope:

This process describes how supply points will be allocated to a band defined in terms of AQ range. Two such bands are envisaged, domestic and I&C, defined as above.

The process produces information on the peak load and AQ of the NDM market as a whole. The supply point peak load and AQ are summarised to produce group averages. Average values are used to set the average domestic load factor (this feeds into FARH-07).

The categorisation by AQ is used to determine the meter read frequency in Metering and Data Services process MDSH-1.

### 2.12.3 Process Background / Preconditions:

Banding of supply points by AQ gives information about the gas point population at an aggregate level. This information is used for setting the average domestic load factor.

### 2.12.4 Issues from Phase 1 addressed:

**F37**
What do BGE propose to use as "average domestic load factor"?

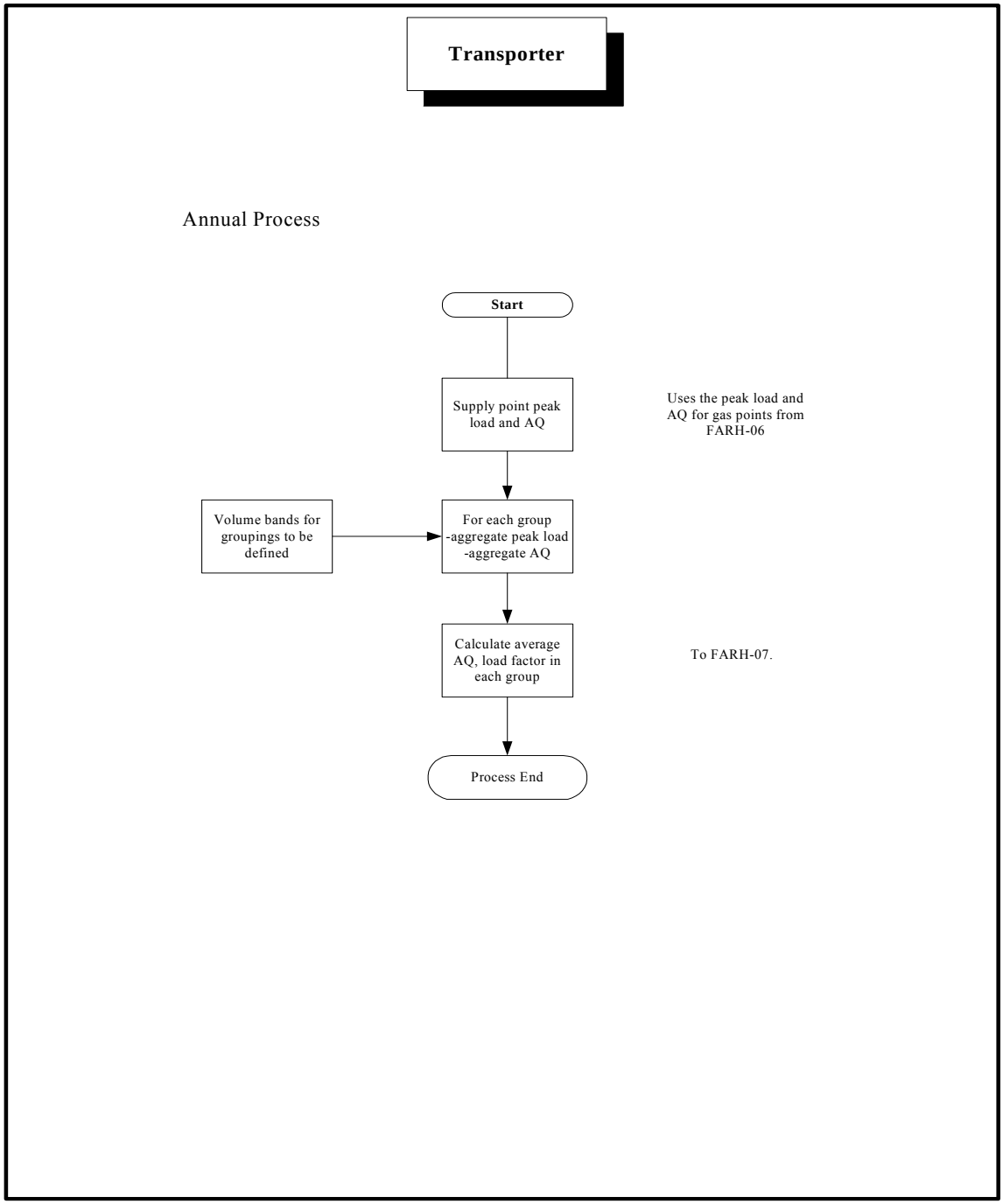
BGE Transportation response: At present a figure of [32.5]% has been assumed. The average domestic load factor will be calculated in the banding of end-users by AQ (FARH-11) and will be the calculated from the totals for all gas points in the domestic market as:

(Total domestic AQ/365) / Total domestic peak load**.**

## 2.12.5 Step through of process:

The diagram below shows the FARH-11 process.

**Process Title:** Banding of end-users by AQ **Process ID:** FARH-11

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|---|---|---|---|---|---|
| **Process Title:** | Banding of end-users by AQ | **Team:** | FAR | **Prepared By:** | BGT |
| **Revision:** | GMOWG Proposal Version 1.0 | **Release Date:** | 19 December 2003 | **Approved By:** | |

The process takes the peak load and AQ values for Supply Points as calculated in FARH-06. It produces aggregate figures for the two volume bands and produces the aggregate peak load and AQ in each band. For the domestic band with AQ<[73,000]kWh the average domestic load factor will be calculated from the aggregate figures for this band as:

(Total domestic AQ/365) / Total domestic peak load.