

Version 3 - June 2007

**THE ABU DHABI
TRANSMISSION AND
DESPATCH COMPANY**

**THE WATER TRANSMISSION
CODE**

VERSION 3

June 2007

THE WATER TRANSMISSION CODE

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PREFACE

The Water Transmission Code

The **Water Transmission Code** is designed to allow operation of the Abu Dhabi **Water Trunk Mains System** and provide controlled connection arrangements at the entry and exit points between the **TRANSCO Trunk Main System, Water Producers** and **Distribution Companies (DISCOs)**. In this Code, **Users** are identified as **Water Producers, TRANSCO** and **DISCOs**.

TRANSCO also has a separate duty to manage and control Scheduling and Despatch of water to balance availability with potable water **Demand** at strategic locations in the **Total System**. These locations include **Desalination Unit** outlets, **Well-Field** collection reservoirs and all potable water pumping and storage assets. The Code also facilitates competition in **Water Production** and **Distribution** of potable water and has been developed to reflect the restructuring of the **Water and Electricity Sector (WES)** in the Emirate of Abu Dhabi into the following Entities:

- i) Desalinated Water Producers (**Water Producer**)
- ii) Wellfield Water Producers (**Water Producer**)
- iii) The Abu Dhabi Water and Electricity Company, the single buyer of water and electricity capacity and output
- iv) The Abu Dhabi Transmission and Despatch Company(**TRANSCO**)
- v) Distribution Companies, initially one at Abu Dhabi and one at Al Ain (**DISCOs**)
- vi) A separate Abu Dhabi Company for Servicing Remote Areas, including some small water treatment facilities
- vii) **Customers**

The **Water Transmission Code** makes provision for abstraction of groundwater from well-fields to be included within the definition of a **Water Producer**. Both seawater and groundwater abstraction and treatment processes undertaken by **Water Producers** connect with a transmission system and the transmission system in turn connects with distribution systems. All **Customers** are supplied and billed by the **DISCOs**.

The **Water Transmission Code** is divided into the following Chapters:

1. **Glossary and Definitions** for words and expressions;
2. **Water General Conditions** that describe the arrangements common to and between individual **Water Codes** and include requirements and arrangements not otherwise referred to in the **Water Codes** including the role and constitution of **The Water Transmission Code Review Panel**;

3. A **Water Planning Code** which provides generally for the supply of water demand data by **Users** in order for **TRANSCO** to undertake the planning and development of the **Water Trunk Mains System**;
4. A **Water Connection Conditions Code** which describes the connection conditions criteria which must be complied with by **TRANSCO** at **Connection Sites** and by **Users** already connected to or seeking new connections with the **Water Trunk Mains System**;
5. A **Water Operating Code**, which deals with: the forecasting of short and medium term water demand and production requirements for routine operation and outage planning, safety co-ordination, maintenance of water quality, operational liaison, contingency planning and procedures, start-up and shut-down of plant and numbering and nomenclature of plant and apparatus;
6. A **Water Scheduling and Despatch Code** that sets out the procedures for scheduling of potable water availability from storage via pump operation in order to meet **Demand** requirements and for despatching of potable water at the appropriate **Transmission** and **Distribution Entry Points**.
7. A **Data Registration Code**, which describes a list of all water data which is common to the submission of data from **Users** to **TRANSCO** and from **TRANSCO** to **Users**, under **The Water Transmission Code**.

CHAPTER 1 GLOSSARY AND DEFINITIONS

In the **Water Transmission Code** the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the following meanings:

<u>Authorised Water Operator</u>	Any person (other than TRANSCO in its capacity as operator of the TRANSCO Water Trunk Mains System) who is authorised under the Law to produce, transmit or supply potable water.
<u>Authority for Access</u>	An authority which grants the holder the right to unaccompanied access to sites containing plant or electrical conductors.
<u>Availability Notice</u>	A notice issued to the Water Control Centre by Pump/Storage Operators and Well-field Operators stating the availability of pumping and storage plant for the following Schedule Day .
<u>Bureau</u>	The Regulation and Supervision Bureau for the Water and Electricity Sector.
<u>Committed Water Planning Data</u>	Data relating to a User Development once the offer for a Connection Agreement is accepted.
<u>Completion Date</u>	Has the meaning set out in the Connection Agreement with each User .
<u>Complex</u>	Any Connection Site , pumping station and Water Production Plant with associated apparatus.
<u>Connected Water Planning Data</u>	Water demand data which for planning purposes is based on validated actual connected values and is used daily in the Scheduling and Despatch process.
<u>Connection Agreement</u>	The agreement envisaged in Condition 14 of the Transmission Licence .
<u>Connection Point</u>	A Water Trunk Mains System connection or junction with a User System .
<u>Connection Site</u>	A TRANSCO Site or User Site
<u>Contingency Planning</u>	Plans that are developed by Transco in consultation with Users and kept in a manual of emergency operating procedure using a standard Performa
<u>Control Telephony</u>	The method by which a Users Responsible

Engineer/Operator and **TRANSCO** control engineer(s) speak to one another for the purposes of secure point to point communication as prescribed by **TRANSCO** for both normal and emergency operating conditions.

Customer

A person to whom potable water is provided.

Data Reliability Level

Water planning data split into 3 categories which improves in accuracy as the data progresses from the preliminary stage, through the committed connection stage to the connected and operational stage.

Demand

The required potable water needed to meet **Customer** use, adjusted to take into account **Demand Control** including **Water Demand Management** policies which may include water conservation, efficiencies of use and water leakage.

Demand Control

The methods of achieving a **Demand** reduction

Demand Notice

A notice issued to the **TRANSCO Water Control Centre** by **DISCOs** stating estimated water **Demands** at **Distribution Entry Points** for the following **Schedule Day**.

Despatch

Issue by the **TRANSCO Water Control Centre** of instructions for pumping/storage plant to meet **Demand** within the **Despatch** parameters as referred to in Condition 21 of the **Transmission Licence**.

Despatch Instruction

Instructions issued by the **TRANSCO Water Control Centre** for the provision of specified water volumes to a **Transmission** or **Distribution Entry Point** for the **Schedule Day**.

Determinant

A **Water Quality** parameter which is the result of direct in-situ measurement or testing of a water sample in a laboratory. **Determinants** include test results for pH, electrical conductivity, chlorine residual, hardness, alkalinity, chloride and other substances and characteristics.

DISCO

A holder of a **Distribution Licence**.

Disconnection

The physical **Disconnection** of **Users** from the **TRANSCO Water Trunk Mains System**.

Distribution and Supply Licence

A licence issued pursuant to Article 82 of the **Law**

authorising the licence operator to distribute and supply water.

Distribution Entry Point

A **Connection Point** at which a **Water Producer** or **TRANSCO** is directly connected to a **DISCO** Distribution System

Distribution System

The system consisting (wholly or mainly) of water pipes and associated plant which are owned or operated by a **DISCO** and used for the distribution of potable water to the point of delivery to **Customers**, or other **Users**.

Electricity Transmission Code

The Code that defines the operating, planning and connection arrangements between **TRANSCO** and **Users** of electricity.

Five Year Planning Statement

A statement, prepared by **TRANSCO** in accordance with the terms of the **Transmission Licence**. This shows for each of the five succeeding **TRANSCO** financial years, the opportunities available for connecting to and using the **TRANSCO Water Trunk Mains System** and indicating those parts of the **TRANSCO Water Trunk Mains System** most suited to new connections and distribution of potable water.

Flow Meter

A device used for measurement of water flow which is either read manually or recorded remotely

Generation/Desalination Licence

The **Licence** granted to a **Water Producer** pursuant to Article 82 of the **Law**.

Good Industry Practice

The exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances.

Interface Agreement

An agreement between a **User** and **TRANSCO** containing provisions for dealing with the consequences of a **User** owning or operating plant or apparatus which is sited on another **User's** land and/or for the sharing of facilities and/or the provision of services at or near a **Connection Site**.

Intermediate Pumping Station

A pumping station that is part of the **TRANSCO Water Trunk Main System**, which boosts pressures

	within the TRANSCO Water Trunk Mains System
<u>Joint System Incident</u>	An event wherever occurring which, in the opinion of TRANSCO or a User , has or may have a serious and/or widespread effect, on the TRANSCO Water Trunk Mains System , or on a User System .
<u>Law</u>	Law No (2) of 1998 concerning the Regulation of the Water and Electricity Sector in the Emirate of Abu Dhabi;
<u>Licence</u>	Any Licence granted to TRANSCO or a User , under Article 82 of the Law .
<u>Licence Standards</u>	Those standards set out or referred to in condition 19 of the Transmission Licence .
<u>Load Despatch Centre</u>	The location used for Scheduling and Despatch of electricity generation and water desalination.
<u>Modification</u>	Any actual or proposed replacement, renovation, modification, alteration or construction by or on behalf of a User or TRANSCO to either that User plant or TRANSCO plant at a particular Connection Site .
<u>Network Data</u>	The data to be provided by TRANSCO to Users in accordance with the Water Planning Code .
<u>Network Security Standard</u>	is a License Standard for planning and development of the water network which employs best practice planning tools and procedures to ensure that pipelines, pumping stations, and reservoirs have sufficient capacity to meet all reasonable demand with view to the risk of interruption and contingencies.
<u>Operating Manuals</u>	A manual that describes operation, maintenance needs and maintenance scheduling for Potable Water Plant for the purposes of maintaining secure day to day operation.
<u>Operation</u>	A scheduled or planned action relating to the operation of plant.
<u>Operation Diagrams</u>	Diagrams which are a schematic representation of the Potable Water Plant and the connections at a Connection Site .
<u>Operational Planning</u>	Planning through various timescales the matching of

Water Production output with **Demand** together with a reserve of production capacity to provide a margin. This takes into account outages of certain **Water Production Units**, of parts of the **TRANSCO Water Trunk Mains System** and of parts of **Distribution Systems**.

Potable Water Plant

All water plant used in raw water abstraction, water production, water treatment, transmission and distribution that describes the fixed infrastructure above and below ground.

Potable Water Schedule

A notice issued by the **TRANSCO Water Control Centre** to **Pump/Storage Operators** and **Water Producers** confirming the volumes of potable water required at **Transmission and Distribution Entry Points** for the following **Schedule Day**.

Preliminary Water Planning Data

Water Demand data relating to a **User Development** at the time the **User** applies for a **Connection Agreement** but before an offer is made and accepted.

Pressure Transient

A rapid change (+ or -) in water pressure within a closed pipe network due to **Pump Start-Up** and **Shut-Down** and valve operation.

Procurer

Abu Dhabi Water & Electricity Company.

Production Reserve Storage

That part of the stored water controlled and managed by the **TRANSCO Water Control Centre** retained in the storage tanks at the **Water Production Plant** which is available for balancing output to avoid overflow or **Shut-Down** of production.

Pump

An item of water plant that mechanically raises water pressure within a closed pipe network for the purposes of generating water flow along the pipe.

Pumping Head

The variable pressure, generally referred to in metres of water, which is exerted on the pipework and pumping plant by operation of that pumping plant.

Pump/Storage Operator

The entity responsible for operation of pumps and the corresponding draw upon storage for supply into trunk or distribution mains.

Pumping Reserve Storage

That part of the stored water managed and controlled by the **TRANSCO Water Control Centre** at either the **Water Production Plant** or at an **Intermediate**

or **Terminal Pumping Station** that is available to balance supply against **Demand** and to supplement the water pumped into the **Water Trunk Mains** or **Distribution System**.

Record Drawings

Sections and plans of a **Users Potable Water Plant** that describe in detail the above and below ground installations after construction.

Responsible Engineer/Operator

A person nominated by a **User** to be responsible for system control.

Responsible Manager

A manager who has been duly authorised by a **User** or **TRANSCO** to sign **Site Responsibility Schedules** on behalf of that **User** or **TRANSCO**.

Safety Co-ordinator

A person or persons nominated by **TRANSCO** and each **User** to be responsible for the co-ordination of safety precautions at each **Connection Point** when work (which includes testing) is to be carried out on a system.

Safety Rules

The rules of **TRANSCO** or a **User** that seek to ensure that persons working on plant to which the rules apply are safeguarded from hazards arising from the system.

Security Standard

A coordinated set of criteria and methodologies which Licensees shall use in the planning and development of their water systems.

Schedule Day

The period from 0500 hours in the **Settlement Day** until 0500 hours in the next following **Settlement Day**.

Scheduling

The process of compiling and issuing a potable water production and pumping schedule to meet **Demand**.

Settlement Day

The period from 0000 to 2400 hours in each day.

Shut-Down

The condition of pumping plant when the motor is static and the system becomes depressurised once gravity equilibrium is achieved.

Site Common Drawings

Drawings prepared for each **Connection Site** which incorporate **Connection Site** pipe layout, pumping plant, local storage and associated apparatus.

Site Responsibility Schedule

A schedule containing the information and prepared on the basis of the provisions set out in the Water

Connection Conditions.

Start-Up

The action of bringing pumping plant from **Shut-down** into operation.

Statement of Readiness

Confirmation submitted by **TRANSCO** to the **User** advising that the connection is ready to become operational at a time and date agreed by both parties.

Supply Regulations

Supply Regulations as issued by the **Bureau** pursuant to defined in Article 62 of the **Law**.

System Tests

Tests which involve simulating conditions, or the controlled application of irregular, unusual or extreme conditions, on the **Total System**, or any part of the **Total System**, but which do not include commissioning or recommissioning tests.

Terminal Pumping Station

A pumping station that is part of the **TRANSCO Water Trunk Main System**, which is located upstream of the **Transmission Exit Point**.

Total System

The **TRANSCO Water Trunk Mains System** and all **User** systems in the Emirate of Abu Dhabi

TRANSCO

The Abu Dhabi Transmission and Despatch Company.

TRANSCO Demand

The amount of potable water to be supplied from **Water Producers** at the **Transmission Entry Points** including an allowance for system losses and **Water Demand Management** policies.

Transmission Entry Point

A **Connection Point** at which a **Water Producer** is directly connected to the **TRANSCO Water Trunk Mains System**.

Transmission Licence

A licence issued pursuant to Article 82 of the **Law** authorising the Abu Dhabi Transmission and Despatch Company to transmit water and electricity.

Transmission Exit Point

A **Connection Point** from the **TRANSCO Water Trunk Mains System** to a **DISCO**.

Trunk Mains

Water pipework used for the pressurised or gravity bulk transfer of potable water between a **Water Producer** and a **DISCO**.

User

A term utilised in various sections of the

Transmission Code to refer to entities using the **TRANSCO Water Trunk Mains System**, as more particularly identified in each section of the **Transmission Code** concerned.

User Development

Either **User Potable Water Plant** to be connected to the **TRANSCO Water Trunk Mains System** or a **Modification** relating to **User Plant** already connected to the **TRANSCO Water Trunk Mains System**.

User Site

A site owned (or occupied pursuant to a lease, licence or other agreement) by a **User** in which there is a **Connection Point**. For the avoidance of doubt, a site owned by **TRANSCO** but occupied by a **User**, is a **User Site**.

User System

Any system owned or operated by a **User** comprising **Water Production Units** and/or **Distribution Systems** and plant connecting **Water Production Units, Distribution Systems** to the **TRANSCO System**.

Valve

Plant associated with pipework within a pressurised system that control flows, expulsion of air and isolates sections of pipe.

Water Control Centre

The location used by **TRANSCO** for **Scheduling** and **Despatch** of potable water to meet **Demand**.

Water Demand Management

The strategic management of **Demand** for potable water that includes water conservation, use of potable water for irrigation, water losses and water rationing.

Water Distribution Code

The Distribution Code required to be drawn up by each **DISCO** and approved by the **Bureau**, as from time to time revised with the approval of the **Bureau**.

Water Producer

An entity producing potable water under a desalination **Licence** or well water from well-field abstractions.

Water Production

Unless otherwise provided in the **Water Transmission Code**, the abstraction of sea water or groundwater and the subsequent production of potable water.

Water Production Capacity

The maximum declared output of a **Water Production Plant**.

Water Production Plant or Unit

A generic term that describes the plant at the site of a **Water Producer**.

Water Quality

The quality of potable water defined by reference to minimum acceptable standards that relate to bacteriological quality, chemical composition, corrosive effects, taste and others as specified by the **Bureau**.

Water Transmission Code

The Code that defines the operating, planning and connection arrangements between **TRANSCO** and **Users** of water.

Water Transmission Code Review Panel

The panel with the functions set out in the Water General Conditions.

Water Trunk Mains System

The network of **Trunk Mains**, pumping stations and associated **Potable Water Plant** that constitutes the water transmission system operated by **TRANSCO**.

Well-field Operator

The entity responsible for operating the well-field abstractions and associated collecting reservoirs that supply **Trunk Mains**.

Construction and Interpretation

In the Water Transmission Code:

- a) the table of contents, **Preface** and headings are inserted for convenience only and shall be ignored in construing the **Water Transmission Code**;
- b) unless otherwise required, all references to a particular paragraph, subparagraph, Appendix or Schedule shall be a reference to that paragraph, subparagraph Appendix or Schedule in or to that part of the **Water Transmission Code** in which the reference is made;
- c) unless otherwise required, the singular shall include the plural and vice versa, references to any gender shall include all other genders and references to persons shall include any individual and any other entity, in each case whether or not having a separate legal personality;
- d) references to the words “include” or “including” are to be construed without limitation to the generality of the preceding words;
- e) unless there is something in the subject matter or the context which is inconsistent, any reference to the **Law** or any Article of or Schedule to, or other provision of the **Law** shall be construed as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made under or deriving validity from the relevant **Law**;
- f) references to “in writing” or “written” include word processing, printing, e-mail, telefax and other modes of reproducing and transmitting words and text;
- g) where the **Glossary and Definitions** refers to any word or term which is more particularly defined in a part of the **Water Transmission Code**, the definition in that part of the **Water Transmission Code**, will prevail over the definition in the **Glossary and Definitions** in the event of any inconsistency;
- h) a cross-reference to another document or part of **Water Transmission Code** shall not impose any additional, further or co-existent obligation or confer any additional, further or co-existent right in the part of the text where such cross-reference is contained;
- i) nothing in the **Water Transmission Code** is intended to or shall derogate from **TRANSCO’s** statutory or **Licence** obligations; and
- j) references to time are Abu Dhabi time.

CHAPTER 2 GENERAL CONDITIONS

1. INTRODUCTION

The **Water General Conditions** contain provisions which are of general application to all provisions of the **Water Transmission Code**. Their objective is to ensure, to the extent possible, that the various sections of the **Water Transmission Code** work together and work in practice for the benefit of all **Users**.

2. SCOPE

The **Water General Conditions** apply to all **Users** including **TRANSCO**.

3. UNFORESEEN CIRCUMSTANCES

If circumstances arise which the provisions of the **Water Transmission Code** have not foreseen, **TRANSCO** shall, to the extent reasonably practicable in the circumstances, consult promptly and in good faith with all affected **Users** in an effort to reach agreement as to what should be done. If agreement between **TRANSCO** and the relevant **Users** as to what shall be done cannot be reached within a period set by **TRANSCO**, **TRANSCO** shall determine what is to be done. Wherever **TRANSCO** makes a determination, it shall do so having regard, wherever possible, to the views expressed by **Users** and, in any event, to what is reasonable in all the circumstances. Each **User** shall comply with all instructions given to it by **TRANSCO** following such a determination provided that the instructions are consistent with the then current technical parameters of the particular **User System** registered under the **Water Transmission Code**. **TRANSCO** shall promptly refer all such unforeseen circumstances and any such determination to the **Panel** for consideration in accordance with Section 4 of the **Water General Conditions**.

4. THE WATER TRANSMISSION CODE REVIEW PANEL

TRANSCO shall establish and maintain the "**Panel**", which shall carry out the functions referred to below.

The **Panel** shall:

- i) keep the **Water Transmission Code** and its working under review;
- ii) review all suggestions for amendments to the **Water Transmission Code** which the **Bureau** or any **User** may wish to submit to **TRANSCO** for consideration by the **Panel** from time to time;
- iii) publish recommendations as to amendments to the **Water Transmission Code** that **TRANSCO** or the **Panel** feels are necessary or desirable and the reasons for the recommendations;
- iv) issue guidance in relation to the **Water Transmission Code** and its implementation, performance and interpretation when asked to do so by any **User**; and
- v) consider what changes are necessary to the **Water Transmission Code**

arising out of any unforeseen circumstances referred to it by **TRANSCO**.

The **Panel** shall consist of:

- a) up to five persons (one of whom shall be chairman) appointed by **TRANSCO**.
- ii) a person appointed by the **Bureau**;
- iii) a person appointed by The Abu Dhabi Water and Electricity Company; and
- d) the following members:
 - (i) A maximum of three persons representing the **Water Producer**; and
 - (ii) A maximum of two persons appointed by the **DISCOs**.

each of whom shall be appointed as set out below.

The **Panel** shall establish and comply at all times with its own rules and procedures relating to the conduct of its business, which shall be approved by the **Bureau**.

TRANSCO shall consult in writing with all **Authorised Water Operators** who are liable to be materially affected in relation to all proposed amendments to the **Water Transmission Code** and shall submit all proposed amendments to the **Panel** for discussion prior to such consultation.

5. DUTY OF GOOD FAITH AND STANDARD OF CONDUCT

Each party to this Code shall at all times in its dealings with the other parties to this Code

- (a) act in good faith;
- (b) act in accordance with good industry practice.

6. COMMUNICATION BETWEEN TRANSCO AND USERS

Unless otherwise specified in the **Water Transmission Code**, all instructions given by **TRANSCO** and communications (other than relating to the submission of data and notices) between **TRANSCO** and **Users** shall take place using identified post-holders and communication links as agreed between **TRANSCO** and relevant parties prior to connection.

Unless otherwise specified in the **Water Transmission Code**, all instructions given by **TRANSCO** and communications (other than relating to the submission of data and notices) between **TRANSCO** and **Users** shall be given by means of the **Control Telephony**.

If any communication links and contacts are changed by any party, they shall inform all other relevant parties prior to such changes and provide details of new communication links.

The recording (by whatever means) of instructions or communications given by means of **Control Telephony** shall be accepted by **TRANSCO** and **Users** as evidence of those instructions or communications.

7. MISCELLANEOUS

Data and notices to be submitted to **TRANSCO** under the **Water Transmission Code** (other than data which is the subject of a specific requirement of the **Water Transmission Code** as to the manner of its delivery) shall be delivered in writing either by hand, sent by registered pre-paid post, or communicated by telex, or facsimile transfer. Such data and notices shall be deemed to be received on recorded receipt.

Communications referred to above, shall be addressed to the **Responsible Manager** of either **TRANSCO** or a **User** at the addresses previously notified to the relevant parties

8. OWNERSHIP OF PLANT

References in the **Water Transmission Code** to plant of a **User** include plant used by a **User** under any agreement with a third party.

CHAPTER 3 PLANNING CODE

1. INTRODUCTION

The **Water Planning Code** specifies the criteria and procedures to be applied by **TRANSCO** in the longer term (5 year) planning and development of the **TRANSCO Water Trunk Main System** to be taken into account by **Users** in the planning and development of **User Systems**. It details information to be supplied by **Users** to **TRANSCO**, and certain information to be supplied by **TRANSCO** to **Users**.

Development of the **TRANSCO Water Trunk Main System**, involving network expansion (including new **Trunk Mains**) and its reinforcement or extension, shall arise for a number of reasons including:

- i) new development and therefore increased water **Demand** on a **User System** already connected to the **TRANSCO Water Trunk Main System**;
 - ii) introduction of a new **Connection Site** or the **Modification** of an existing **Connection Site** between a **User System** and the **TRANSCO Water Trunk Main System**; and
 - iii) construction of additional **Trunk Main(s)** and storage /pumping facilities connecting with the **Water Trunk Mains Systems**.
- iv) To enable Transco to meet its license obligations in economic dispatch.

Accordingly, the expansion, reinforcement or extension of the **TRANSCO Water Trunk Main System** may involve work at any **Connection Site** which is:

- i) at an **Intermediate or Terminal Pumping Station** where **User's Potable Water Plant** is connected to the **TRANSCO Water Trunk Main System**;
- ii) on **Trunk Mains** which join that **Connection Site** to the remainder of the **TRANSCO Water Trunk Main System**;
- iii) on **Trunk Mains** at points remote from a **Connection Site**;
- iv) at the interface between a **Water Producer** and **TRANSCO**; and
- v) at the interface between **TRANSCO** and a **DISCO**.

The time required for the planning and development of the **TRANSCO Water Trunk Main System** will depend on the type and extent of the necessary expansion, reinforcement and/or extension work. Other influences may include the degree of complexity in undertaking the new work while maintaining satisfactory security and quality of water supply on the existing **TRANSCO Water Trunk Main System**.

2. OBJECTIVE

The objectives of the **Water Planning Code** are:

- i) to promote **TRANSCO/User** interaction in respect of any proposed water services development on the **User System** which may impact on the discharge capacity of the **TRANSCO Water Trunk Main System**, **Water Production Plant** capacity or any direct connection with the

TRANSCO Water Trunk Main System;

- ii) to provide for the supply of longer term (5 years) water **Demand** forecasts and associated water planning data required by **TRANSCO** from **Users** in order for **TRANSCO** to undertake the planning and development of the **TRANSCO Water Trunk Main System** in accordance with the relevant **Licence Standards**, to facilitate existing and proposed connections and also to provide for the supply of certain information from **TRANSCO** to **Users**;
- iii) to provide the Abu Dhabi Water and Electricity Company with long term **Demand** forecasts including the relevant supporting data based on those developed by **TRANSCO** and **Users**. So that coordinated water Demand Forecasts are prepared by the Abu Dhabi Water and Electricity Company and the production capacity needs can be identified, planned and procured.
- iv) to provide the means for implementing the **Licence Standards** which shall be used by **TRANSCO** in the planning and development of the **TRANSCO Water Trunk Main System**.

3. SCOPE

The **Users** to whom the **Water Planning Code** applies are as follows:

- i) **Water Producers**;
- ii) **DISCOs**; and
- iii) **TRANSCO**.

The above categories of **User** shall become bound by the **Water Planning Code** prior to them producing or distributing potable water both in the prospective and connected **Users** role.

The **Water Planning Code** also applies to the Abu Dhabi Water and Electricity Company as a **User** for the purpose of co-ordinating capacity and system planning with **TRANSCO**.

4. PLANNING PROCEDURES

4.1 General

The means by which **Users** and proposed **Users** of the **TRANSCO Water Trunk Main System** are able to investigate connection to and use of the system comprises two distinct parts, namely:

- i) the **Five Year Planning Statement**; and
- ii) an offer, in accordance with the **Transmission Licence**, by **TRANSCO** to enter into a **Connection Agreement** for connection to the **TRANSCO Water Trunk Main System**.

4.2 Water Planning Data Categories

Three different water planning data categories for water **Demand** forecasting are referred to in the **Water Planning Code**. Their relationships to the application and offer for a **Connection Agreement** and to the **Data Reliability Level** are set down in Figure1 attached. The three water planning data categories are:

- i) **Preliminary Water Planning Data;**
- ii) **Committed Water Planning Data;** and
- iii) **Connected Water Planning Data.**

An existing **User** proposing a new **Connection Site** will need to supply water **Demand** requirements within the requirements of the **Water Planning Code**. Such requirements will be termed as either **Preliminary Water Planning Data** or **Committed Water Planning Data**, depending on the offer acceptance status at the time.

At the time the **User** applies for a **Connection Agreement** but before an offer is made and accepted by the applicant **User**, the requirements relating to the proposed **User Development** shall be considered as **Preliminary Water Planning Data**. This data shall be treated as confidential within the scope of the provisions relating to confidentiality in the **Connection Agreement**.

Once the offer for a **Connection Agreement** is accepted, the requirements relating to the **User Development** already submitted as **Preliminary Water Planning Data**, and subsequent data required by **TRANSCO**, will become **Committed Water Planning Data**. This data, together with other data held by **TRANSCO** relating to the **TRANSCO Water Trunk Main System** shall form the background against which new applications by any **User** shall be considered and against which planning of the **TRANSCO Water Trunk Main System** shall be undertaken. Accordingly, **Committed Water Planning Data** shall not be treated as confidential to the extent that **TRANSCO**:

- i) is obliged to use it in the preparation of the **Five Year Planning Statement** and in any further information given;
- ii) is obliged to use it when considering and/or advising on applications (or possible applications) of other **Users**; and
- iii) is obliged to use it for **TRANSCO** operational planning purposes;

At the time that a **Statement of Readiness** is submitted, any estimated values assumed for planning purposes are confirmed or, where practical, replaced by validated actual values and by updated estimates for the future water **Demand**. This data is then termed **Connected Water Planning Data**.

Connected Water Planning Data is at a validated reliability level due to availability of actual operational flows and volumes and forms the basis of the water flow rates and water volumes used daily in the **Scheduling** and **Despatch** activities.

Connected Water Planning Data, together with other data held by **TRANSCO** relating to the **TRANSCO Water Trunk Main System**, shall form the background

against which new applications by any **User** shall be considered and against which planning of the system shall be undertaken. Accordingly, **Connected Water Planning Data** will not be treated as confidential in the same manner as **Committed Water Planning Data** is not treated as confidential as referred to above.

TRANSCO shall also make available to **Users**, through the Abu Dhabi Water and Electricity Company, relevant details of the **TRANSCO Water Trunk Main System**.

4.3 Water Demand Data Provision

To enable **TRANSCO** and the Abu Dhabi Water and Electricity Company to prepare the **Five Year Planning Statement** and the Seven Year Statement respectively, each **User** is required to submit to **TRANSCO** and the Abu Dhabi Water and Electricity Company a summary of their five year water **Demand** requirements as listed in Appendix A of the Water Planning Code for each connection. This data shall be submitted in calendar week 24 of each year and should cover each of the five succeeding years. Where, from the date of one submission to another, there is no change in the data to be submitted, instead of resubmitting the data, a **User** may submit a written statement that there has been no change from the data submitted the previous time.

Transco shall submit **Demand** forecast data received from **Users** to the Abu Dhabi Water and Electricity Company by week 28 after adjusting it to take account of operational use, losses within the system, network operation and customers connected directly to the transmission system. Any Water Demand Management policies approved by the **Bureau** shall also be considered in the preparations of the demand forecasts.

The Abu Dhabi Water and Electricity Company shall by week 46, submit to **TRANSCO** and **Users** its coordinated long term demand forecast.

To enable **Users** to model flows and water network capacities in the **Water Trunk Mains System**, **TRANSCO** shall submit to the Abu Dhabi Water and Electricity Company for issue to **Users**, as determined by the Abu Dhabi Water and Electricity Company, the water network data as listed in Appendix B of the **Water Planning Code**. The data shall be submitted in week 42 of each year.

4.4 Offer of Terms for Connection

The completed **User** application form for a **Connection Agreement** shall include:

- i) a description of the new plant to be connected to the **TRANSCO Water Trunk Main System** or of the **Modification** relating to the **User Plant** already connected to the **TRANSCO Water Trunk Main System**;
- ii) the **Preliminary Water Planning Data** the basis of which is identified in Appendix A of the **Water Planning Code**; and
- iii) the desired **Completion Date** of the proposed **User Development**.

The completed application form shall be sent to **TRANSCO**.

Any offer of a **Connection Agreement** made by **TRANSCO**, must be accepted by the applicant **User** within the period stated in the offer, after which the offer automatically lapses. Acceptance of the offer renders the **TRANSCO** works relating to that **User Development**, reflected in the offer, committed and binds both parties to the terms of the offer. Within 28 days (or such longer period as **TRANSCO** may agree in any particular case) of acceptance of the offer the **User** shall confirm the **Committed Water Planning Data** pertaining to the **User Development**, the basis of which is identified in Appendix A of the **Water Planning Code**.

4.5 Complex Connections

The magnitude and complexity of any **TRANSCO Water Trunk Main System** expansion, extension or reinforcement will vary according to the nature, location and timing of the proposed **User Development**. It may be necessary for **TRANSCO** to carry out additional water network studies to evaluate more fully the impact of the proposed **User Development** on the **TRANSCO Water Trunk Main System**. Where **TRANSCO** determines that further water network analysis is necessary, the offer may indicate the conditions that are attached. The **User** shall indicate whether it wishes **TRANSCO** to undertake the work necessary to proceed to make a revised offer within the 3 month period normally allowed or within an alternative programme consented to by the **Bureau**.

In order that **TRANSCO** may carry out these water network studies, the **User** may, at the request of **TRANSCO**, be required to provide water planning data in advance of the normal time provided that **TRANSCO** can reasonably demonstrate that it is relevant and necessary.

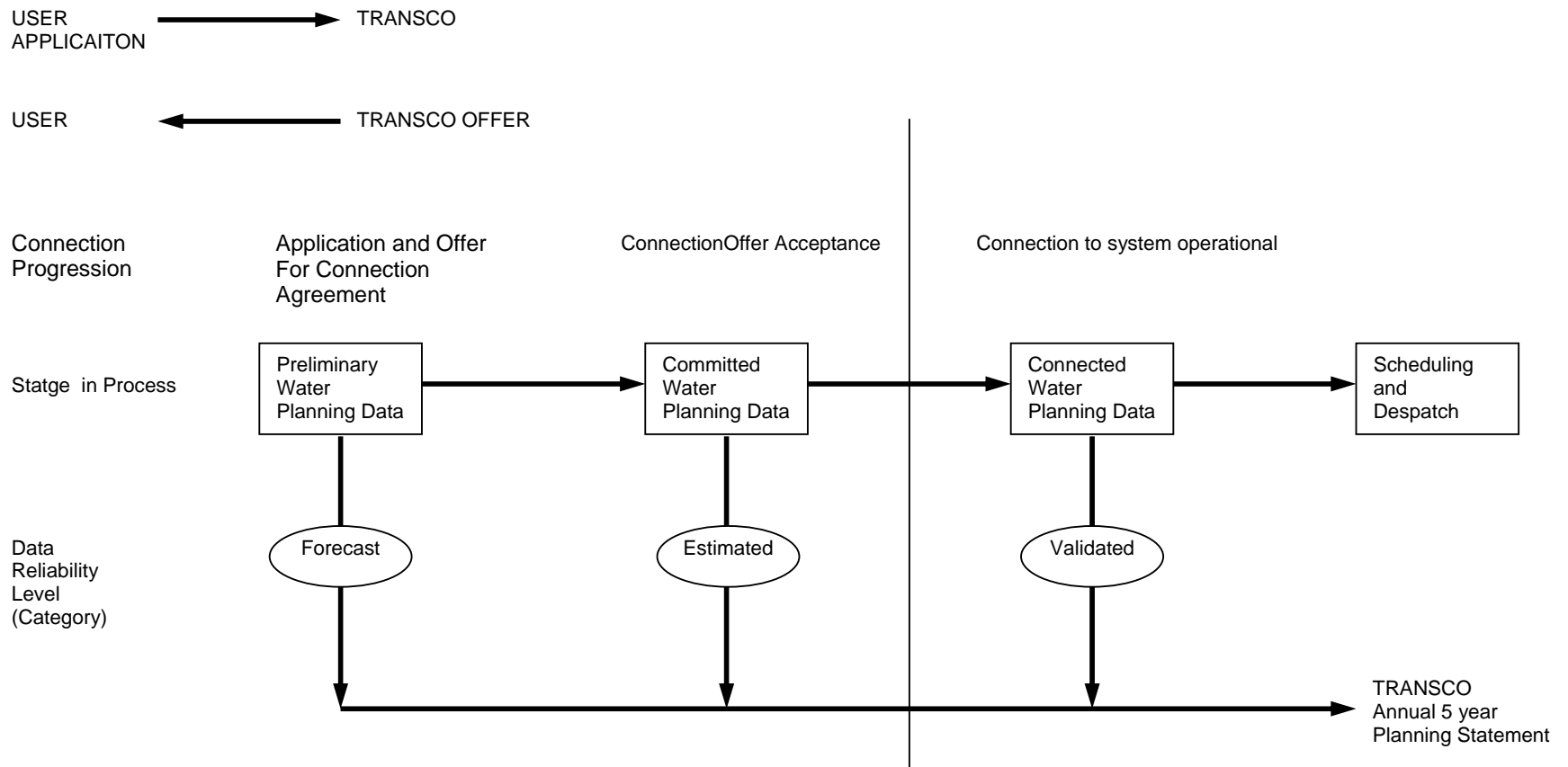
4.6 Planning Standards

TRANSCO shall apply the **Licence Standards** relevant to planning and development, in the planning and development of the **TRANSCO Water Trunk Main System**.

4.7 Water Demand Management

Longer term and strategic management of water **Demand** and the application of relevant policies and strategies is not detailed in this Code but shall be determined by the **Bureau**.

FIGURE 1: WATER PLANNING AND CONNECTION PROCESS



APPENDIX A WATER PLANNING DATA

Water planning data for the categories **Preliminary Water Planning**, **Committed Water Planning** and **Connected Water Data** shall include forecast, estimated or validated water **Demand**.

The data shall be presented, in terms of the average daily water **Demand** during the week of maximum consumption in the year and the average annual daily consumption, both in MIGD. The water planning data shall make due allowance for **Demand Control** including operational use of the system, system network efficiencies, losses within the system and where applicable, current **Water Demand Management** policies in place.

Management of storage requirements to balance throughput and meet daily fluctuations of **Demand** shall be controlled by the **Scheduling** and **Despatch** process and storage data is not required as part of the water planning data.

Conversions:

1 m³/hour (cubic metres per hour) = 5279.26 MIGD (million imperial gallons per day)

1 MIGD (million imperial gallons per day) = 4.55 MI/d

APPENDIX B WATER NETWORK DATA

Users will need to undertake hydraulic analyses and in more complex cases, numerical modelling of the **TRANSCO Water Trunk Mains System** in order to check the pipe network and pumping capacities that feed potable water to the **Distribution System**. **Users** may seek to confirm hydraulic feasibility in principle before an application is submitted to modify an existing connection or expand the **System** with a new connection. **Network Data** supplied by **TRANSCO** shall include the following:

- i) Network node data
- ii) Operating and design flow rates
- iii) Pipe materials, age (hence friction factor) and lengths
- iv) Variable head storage reservoir levels and storage volumes
- v) Pipe diameters
- vi) Pump type and characteristics (time switched, level control or pressure control)
- vii) Control valve settings/characteristics

CHAPTER 4 CONNECTION CONDITIONS CODE

1. GENERAL INTRODUCTION

The **Water Connection Conditions** specifies the minimum technical, design and operational criteria which must be complied with by any **User** connected to or seeking connection with the **TRANSCO Water Trunk Main System**. The **Water Connection Conditions** also specifies the minimum technical, design and operational criteria with which **TRANSCO** shall comply in relation to the part of the **TRANSCO Water Trunk Main System** at the **Connection Site** with **Users**.

2. OBJECTIVE

The objective of the **Water Connection Conditions** is to ensure that by specifying minimum technical, design and operational criteria the basic rules for connection to the **TRANSCO Water Trunk Main System** are similar for all **Users** of an equivalent category and shall enable **TRANSCO** to comply with its statutory and **Transmission Licence** obligations.

3. SCOPE

The **Water Connection Conditions** applies to **Users**, which in the **Water Connection Conditions** means:

- i) **Water Producers**;
- ii) **DISCOs**;
- iii) **TRANSCO**.

The above categories of **User** shall become bound by the **Water Connection Conditions** prior to them producing, supplying or receiving water.

4. PROCEDURE

The **Connection Agreements** contain provisions relating to the procedure for connection to the **TRANSCO Water Trunk Main System** and include requirements relating to certain conditions to be complied with by **Users** prior to **TRANSCO** notifying the **User** that it has the right to become operational.

5 CONNECTION

5.1 General Submission

The provisions relating to connection to the **TRANSCO Water Trunk Main System** are contained in each **Connection Agreement** with a **User** and include provisions relating to both the submission of information and reports relating to compliance with the **Water Connection Conditions** for that **User**, including the relevant **Safety Rules**, commissioning programmes, **Operation Diagrams** and approval to connect.

Prior to the **Completion Date** in the **Connection Agreement**, the following shall be submitted by the **User**:

- i) The most up to date water planning data available, prior to the **Completion Date** which shall include the latest forecast, estimated or validated actual water **Demand data**, as required by the **Water Planning Code Appendix A**;
- ii) copies of all **Safety Rules** and local safety instructions applicable at **User Sites** which shall be used at the **TRANSCO/User** interface;
- iii) information to enable **TRANSCO** to prepare **Site Responsibility Schedules** on the basis of the provisions set out in Appendix A;
- iv) an **Operation Diagram** for all **Potable Water Plant** on the **User** side of the **Connection Point**;
- v) the proposed name of the **User Site** (which shall not be the same as, or confusingly similar to, the name of any **TRANSCO Site** or of any other **User Site**);
- vi) a list of **Safety Co-ordinators**;
- vii) a list of the telephone numbers for **Joint System Incidents** at which the **Responsible Manager** nominated for the purpose can be contacted and confirmation that they are fully authorised to make binding decisions on behalf of the **User**;
- viii) a list of managers who have been duly authorised to sign **Site Responsibility Schedules** on behalf of the **User**;
- ix) information to enable **TRANSCO** to prepare **Site Common Drawings**;
and
- x) a list of the telephone numbers for the **User** facsimile machines.

6. TECHNICAL, DESIGN AND OPERATIONAL CRITERIA

6.1 TRANSCO Water Trunk Mains System Characteristics

TRANSCO shall ensure that, the **TRANSCO Water Trunk Main System** complies with the following technical, design and operational criteria in relation to the part of the system at the **Connection Site** with a **User**.

6.1.1 Trunk Main Pressure Variations

Trunk main working pressures will vary depending on location within the pipe network and the **Pumping Head** required to transmit the flow rate needed. **Pressure Transients** may locally increase and decrease normal operating pressures and these pressures need to be accommodated by the use of appropriately designed surge vessels and controlled valve operation. At each **Connection Site** **TRANSCO** shall provide any potential **User** with flow, pressure (normal and anticipated variable limits) and other relevant operating and system design details.

6.1.2 Trunk Main Pipework

All new pipework and connection arrangements shall be installed to meet the **Licence Standards**. All details of existing trunk main pipework in situ including its location and material are available from **TRANSCO**.

6.1.3 Water Quality

Water Quality throughout the **Water Trunk Main System** is the responsibility of **TRANSCO** and shall meet the minimum acceptable standards specified by the **Bureau** at all times. **Water Quality** at the boundary between **TRANSCO** and each **DISCO** is the responsibility of **TRANSCO** and shall meet the minimum acceptable standards specified by the **Bureau** at all times. **Water Quality** shall be audited by the **Bureau** and the laboratory where samples are tested must be accredited by the **Bureau**.

6.2 Plant Relating to User/TRANSCO Connections Site

The following requirements apply to plant relating to the **User/TRANSCO Connection Point**, which each **User** must ensure are complied with in relation to its plant. Where appropriate, **TRANSCO** must ensure the requirements are complied with in relation to its plant.

All connections to or from the **TRANSCO Water Trunk Main System** shall be designed to meet the current **Licence Standards**. The main components of plant at these connections must include the following:

- i) gate valve either side of **Flow Meter**;
- ii) **Flow Meter** to the accuracy specified in the **Metering Code**;
- iii) instrumentation for continuous real-time flow; and
- iv) **Water Quality** sampling point and chlorine residual monitoring.

Only one set of plant identified in i) to iv) above shall be associated with each **Connection Point**. Either **TRANSCO** or the **User**, depending on who is allocated ownership and operational responsibility for the components of plant, shall make the data available immediately to either the **User** or **TRANSCO** respectively.

6.3 Network Security

There are three aspects to network security:

1. Network capacity planning: Network capacity planning criteria are discussed hereunder in 6.3.1 which sets the technical and design criteria guidelines and performance requirements.
2. Network risk analysis: Performing the network risk analysis in accordance with the Security Standard requirements.

3. Operational contingency planning: This is part of the contingency planning and procedures of the “Operating Code” Chapter-5.

6.3.1 Network Capacity Planning Criteria

This section sets out the technical and design criteria, guidelines and performance requirements for the **TRANSCO Water Trunk Main System** capacity planning.

6.3.1.1 Criteria for Standby Pumps

All **Pumps** (variable or fixed speed) must be capable of supplying the output required by the **Despatch** process at a continuous rate against the head specified in the **Connection Agreement**. Pump operation at the Production, **Intermediate** and **Terminal Pumping Stations** shall be instructed by **TRANSCO**

To maintain supplies incase of pump fails or routine maintenance requires to be undertaken, 30% to 40% standby capacity, (depending on the sequence of failure), to be provided at Pumping stations. The number of standby pumps required to meet these criteria is given in the following table:

Number of Duty Pumps	Number of Standby Pumps (33%)-normal	Number of Standby Pumps (40%)-critical
1	1	2
2	1	2
3	1	2
4	1	2
5	2	2
6	2	3
7	3	3
8	3	4

The criteria in the Table above are for guidance only. **TRANSCO** shall undertake risk analyses, in accordance with the guidelines given in the **Security Standard**, to justify the level of standby pump facilities in specific circumstances.

6.3.1.2 Reservoirs Sizing criteria

- i) Reservoirs at water Production Plants

Each **Water Production Plant** and associated town water pumping station shall have a water storage facility that has a function, which is managed and dispatched by **TRANSCO Water Control Centre**. The dual function allows **TRANSCO** to balance availability of water production with **Production Reserve Storage**. The total storage of the production reserve shall provide 24 hours of water supply at the rated design output of the **Water Production Plant**. A minimum of two storage tanks or one tank with minimum of two sections or more that can be isolated shall be provided, and the volume of storage so calculated shall be usable and exclusive of any unusable top and bottom storage.

ii) Reservoirs at Intermediate and Terminal Pumping Stations

The following criteria to be considered as guidelines for all water storage at the **Intermediate and Terminal Pumping Stations**:

- (a) Intermediate pumping stations shall be provided with water storage equivalent to 10% of the average daily transfer and 100% of the daily demand of the distribution system;
- (b) Terminal pumping stations shall be provided with water storage equivalent to 24 hours' supply at the average daily demand of the distribution system;
- (c) All water storage facilities should have a minimum of two tanks, or one storage tank with minimum of two section or more that can be isolated, at each location; and the volume of storage so calculated shall be usable and exclusive of any unusable top or bottom water storage

Items (a) and (b) are guideline figures only and TRANSCO shall undertake risk analyses in accordance with the guidelines given in the **Security Standard** to determine whether the departure from those given guidelines is required.

6.3.1.3 Maximum and Minimum Pipe Velocities

Transmission pipelines shall be designed not to exceed maximum velocities of 3.0 m/s . Transco shall undertake technical evaluation to determine the appropriate design velocity. Slightly higher velocities can be tolerated in emergencies, but only for short periods depending on the pipe material.

TRANSCO shall have regard to minimum velocities in its systems. If possible, these should not fall below 0.3 m/s during reduced transmission periods to ensure that the age of the water does not become excessive and that loose deposits in the main are not allowed to settle, only to be lifted into suspension again at high transmission periods. Water should not be allowed to stagnate under normal operating conditions. Should this be unavoidable, secondary chlorination facilities should be provided at the terminal stations

6.3.1.4 Stand-by Generators

Standby generators (either fixed or mobile) shall be provided at sites where no alternative power supply is available (for example, through dual feeds) and where a risk assessment, as per the **Security Standard**, has shown that service to customers is compromised.

6.3.2 Criteria for Network Modelling

The calibrated network models to be used for water transmission planning shall include all pipes, pumps and reservoirs in operation. The models shall be constructed, calibrated and updated in accordance with international best practice. The procedures used for model construction and field-testing and the criteria applied for determining the adequacy of model calibration shall be in accordance with the Water Research

Centre, (WRc), Code of Practice for Network Modelling, or similar Bureau approved standard.

6.3.3 Asset Failure Data

TRANSCO shall set up systems for recording asset failures and repair times to improve the quantity and quality of the data to support risk assessment. The minimum data recording requirements are set out in the following Table.

Table for Asset Failure Data to Support Risk Analyses

Asset Type	Failure data	Attributes
Pipelines	Bursts	Date, diameter, material, location, failure type, response time, repair time
Power supplies	Power outages	Date, location, outage duration
Pumping stations	Pump outages	Date, location, asset reference (e.g. pump no. 1), asset type (e.g. pump motor), failure type (e.g. failed motor windings), failure mode (e.g. pump over-running and motor operating outside design parameters), response time, repair time

To facilitate cluster analysis (geographical analysis of failure hotspots) all asset failure data should have a geographical reference so that it can be displayed in GIS.

6.3.4 Whole-life Costs

In considering alternative investment options for network and storage planning, Transco to demonstrate that its preferred options are the most economic through undertaking Whole Life Cycle Cost, (WLCC), analyses. In particular, whole-life costs shall be used to:

- i. Determine planning horizons and the appropriate phasing of development, taking account of growth in demand and changing operating conditions;
- ii. Size new transmission mains in conjunction with their associated pumping stations to determine the most economical sizes.
- iii. Transco shall use the discount interest rate stipulated by the Bureau for whole-life costing.

6.4 Communications Plant and Water Quality Data

In order to ensure control of the **TRANSCO Water Trunk Main System**, telecommunications between **Users** and **TRANSCO** must, if required by **TRANSCO**, be established in accordance with the requirements set down below.

6.4.1 Control Telephony

Control Telephony is the method by which a **User Responsible Engineer/Operator** and **TRANSCO** control engineers speak to one another for the purposes of control of the **Total System** in both normal and emergency operating conditions.

Where **TRANSCO** requires **Control Telephony**, **Users** are required to use the **Control Telephony** with **TRANSCO** in respect of all **Connection Points** with the **TRANSCO Water Trunk Main System**. **TRANSCO** shall pay for and install **Control Telephony** at the **User** location where the **User** telephony equipment is not capable of providing the required facilities or is otherwise incompatible with the **TRANSCO Control Telephony**.

Detailed information on **Control Telephony** facilities and suitable equipment required for individual **User** applications shall be provided by **TRANSCO** upon request.

6.4.2 Operational Data Telemetry Links

TRANSCO shall supply and pay for supervisory control and data acquisition (SCADA) outstation interface equipment for installation at the **User** premises. The **User** shall provide such flow, storage, chlorine residual and other measurement outputs, plant status indications and alarms to the **TRANSCO** SCADA outstation interface equipment as required by **TRANSCO**.

6.4.3 Facsimile Machines

Each **User** and **TRANSCO** shall provide a facsimile machine:

- i) in the case of the **Water Producers**, at each **Water Production Plant**;
and
- ii) in the case of **TRANSCO** and the **DISCOs**, at their respective control centre(s).

Each **User** shall, prior to connection to the **System** of the **User** plant notify **TRANSCO** of its or their telephone number or numbers, and shall notify **TRANSCO** of any changes. Prior to connection to the **System** of the **User's** plant, **TRANSCO** shall notify each **User** of the telephone number or numbers of its facsimile machines and shall notify any changes.

7. SITE RELATED CONDITIONS

In the absence of agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.

7.1 Responsibilities for Safety

Any **User** entering and working on its plant on a **TRANSCO Site** shall work to the **TRANSCO Safety Rules**.

TRANSCO entering and working on its plant on a **User Site** shall work to the **User Safety Rules**.

A **User** may apply to **TRANSCO** for permission to work according to the **User Safety Rules** when working on its plant on **TRANSCO Sites**. If **TRANSCO** is of

the opinion that the **User Safety Rules** provide for a level of safety commensurate with that of the **TRANSCO Safety Rules**, it shall notify the **User**, in writing, that, with effect from the date requested by the **User**, the **User** may use its own **Safety Rules**. Until receipt of such notice the **TRANSCO Safety Rules** shall apply.

TRANSCO may apply to a **User** for permission to work according to **TRANSCO Safety Rules** when working on its plant on **User Sites**, rather than the **User Safety Rules**. If the **User** is of the opinion that **TRANSCO Safety Rules** provide for a level of safety commensurate with that of the **User Safety Rules**, it shall notify **TRANSCO** that it may use its own **Safety Rules**. Until receipt of the notice, the **User Safety Rules** shall apply.

7.2 Site Responsibility Schedules

In order to inform site operational staff of agreed responsibilities for **Potable Water Plant** at the operational interface, a **Site Responsibility Schedule** shall be produced for **TRANSCO** and **Users** with whom they interface.

The format, principles and basic procedure to be used in the preparation of **Site Responsibility Schedules** are set down in Appendix A.

Each **Site Responsibility Schedule** must include a reference to the **Safety Rules** which apply to each item of plant.

7.3 Operation Diagrams

An **Operation Diagram** shall be prepared for each **Connection Site** at which a **Connection Point** or points exists using graphical symbols agreed between **TRANSCO** and **Users**.

The **Operation Diagram** shall include all **Potable Water Plant** above and below ground and the connections to all potable water pipework.

The **Operation Diagram** is intended to provide a record of pipes, **Valves** and **Pump** interconnections, **Pump** ratings and referencing (numbering and nomenclature) of **Potable Water Plant**.

A non-exhaustive guide to the types of **Potable Water Plant** to be shown in the **Operation Diagram** is shown in Appendix B, together with certain basic principles to be followed.

7.3.1 Preparation of Operation Diagrams for User Sites

In the case of a **User Site**, the **User** shall prepare and submit to **TRANSCO** an **Operation Diagram** for all **Potable Water Plant** on the **User** side of the **Connection Point** and **TRANSCO** shall provide the **User** with an **Operation Diagram** for all **Potable Water Plant** on the **TRANSCO** side of the **Connection Point**, in accordance with the **Connection Agreement**.

Referencing (numbering and nomenclature) for **Potable Water Plant** shall be in accordance with the procedures set down in the **Water Operating Code**.

The **User** shall then prepare, produce and distribute, using the information submitted on the **User Operation Diagram** and the **TRANSCO Operation Diagram**, a composite **Operation Diagram** for the complete **Connection Site**.

7.3.2 Preparation of Operation Diagrams for TRANSCO Sites

In the case of a **TRANSCO Site**, the **User** shall prepare and submit to **TRANSCO** an **Operation Diagram** for all **Potable Water Plant** on the **User** side of the **Connection Point** in accordance with the **Connection Agreement**.

TRANSCO shall then prepare, produce and distribute, using the information submitted on the **User Operation Diagram**, a composite **Operation Diagram** for the complete **Connection Site** in accordance with the **Connection Agreement**.

7.3.3 Changes to Operation Diagrams

When **TRANSCO** has decided that it wishes to install new **Potable Water Plant** or it wishes to change the existing referencing (numbering and nomenclature) of its **Potable Water Plant** at a **TRANSCO Site**, **TRANSCO** shall one month prior to the installation or change, send to each such **User** a revised **Operation Diagram** of that **TRANSCO Site**.

When a **User** has decided that it wishes to install new **Potable Water Plant** at one of its sites, the **User** shall one month prior to the installation or change, send to **TRANSCO** a revised **Operation Diagram** of that **User Site**.

7.3.4 Validity

The composite **Operation Diagram** prepared by **TRANSCO** or the **User**, shall be the definitive **Operation Diagram** for all operational and planning activities associated with the **Connection Site**. If a dispute arises as to the accuracy of the composite **Operation Diagram**, a meeting shall be held at the **Connection Site**, as soon as reasonably practicable, between **TRANSCO** and the **User**, to endeavour to resolve the matters in dispute.

7.4 Site Common Drawings

Site Common Drawings, based where possible on **Record Drawings**, sufficient to show the layout interrelationships to scale shall be prepared for each **Connection Site**.

7.4.1 Preparation of Site Common Drawings for a User Site

In the case of a **User Site**, **TRANSCO** shall prepare and submit to the **User**, **Site Common Drawings** for the **TRANSCO** side of the **Connection Point** in accordance with the **Connection Agreement**.

The **User** shall then prepare, produce and distribute, using the information submitted on the **TRANSCO Site Common Drawings**, **Site Common Drawings** for the complete **Connection Site** in accordance with the **Connection Agreement**.

7.4.2 Preparation of Site Common Drawings for a TRANSCO Site

In the case of a **TRANSCO Site**, the **User** shall prepare and submit to **TRANSCO Site Common Drawings** for the **User** side of the **Connection Point** in accordance with the **Connection Agreement**.

TRANSCO shall then prepare, produce and distribute, using the information submitted in the **User Site Common Drawings, Site Common Drawings** for the complete **Connection Site** in accordance with the **Connection Agreement**.

7.4.3 User Changes to Site Common Drawings

When a **User** becomes aware that it is necessary to change any aspect of the **Site Common Drawings** at a **Connection Site** it shall:

- i) if it is a **User Site**, prepare, produce and distribute revised **Site Common Drawings** for the complete **Connection Site**; and
- ii) if it is a **TRANSCO Site**, prepare and submit to **TRANSCO** revised **Site Common Drawings** for the **User** side of the **Connection Point** and **TRANSCO** shall then, prepare, produce and distribute, using the information submitted in the **User Site Common Drawings**, revised **Site Common Drawings** for the complete **Connection Site**.

If the **User** change can be dealt with by it notifying **TRANSCO** in writing of the change and for each party to amend its copy of the **Site Common Drawings**, then it shall so notify and each party shall so amend.

When **TRANSCO** becomes aware that it is necessary to change any aspect of the **Site Common Drawings** at a **Connection Site** the same procedures as for the **User** above shall apply with substitution of **TRANSCO** for the **User**.

7.4.3 Validity

The **Site Common Drawings** for the complete **Connection Site** prepared by the **User** or **TRANSCO**, shall be the definitive **Site Common Drawings** for all operational and planning activities associated with the **Connection Site**. If a dispute arises as to the accuracy of the **Site Common Drawings**, a meeting shall be held between **TRANSCO** and the **User**, to endeavour to resolve the matters in dispute.

7.5 Access

The provisions relating to access to **TRANSCO Sites** by **Users**, and to **User Sites** by **TRANSCO**, shall be as set out in each **Interface Agreement** between **TRANSCO** and each **User**.

7.6 Maintenance Standards

It is a requirement that all **User Potable Water Plant** on **TRANSCO Sites** shall be maintained adequately for the purpose for which it is intended and to ensure that it

does not pose a threat to the safety of any of **TRANSCO** plant or personnel on the **TRANSCO Site**. **TRANSCO** shall have the right to inspect the test results and maintenance records relating to such plant at any time.

It is a requirement that all **TRANSCO Potable Water Plant** on **User Sites** shall be maintained adequately for the purposes for which it is intended and to ensure that it does not pose a threat to the safety of any of the **User** plant or personnel on the **User Site**. **Users** shall have the right to inspect the test results and maintenance records relating to such plant, at any time.

7.7 Site Operational Procedures

TRANSCO and **Users** with an interface with **TRANSCO**, must make available staff to take necessary safety precautions and carry out operational duties as may be required to enable work/testing to be carried out and for the operation of plant connected to the **Total System**.

APPENDIX A: FORMAT, PRINCIPLES AND BASIC PROCEDURE TO BE USED IN THE PREPARATION OF SITE RESPONSIBILITY SCHEDULES

A.1 PRINCIPLES

At all **Connection Sites** (which may form part of a **Complex**) the following **Site Responsibility Schedules** shall be drawn up using the proforma attached or with such variations as may be agreed between **TRANSCO** and **Users**, and in the absence of agreement the proforma attached shall be used:

- i) Schedule of **Potable Water Plant**;
- ii) Schedule of services and supplies; and
- iii) Schedule of telecommunications and measurement equipment.

Other than at **Water Producer** plant locations, the schedules referred to in (ii) and (iii) may be combined.

Each **Site Responsibility Schedule** for a **Connection Site** shall be prepared by **TRANSCO** in consultation with other **Users** at least 2 weeks prior to the **Completion Date** under the **Connection Agreement** for that **Connection Site** (which may form part of a **Complex**). Each **User** shall provide information to **TRANSCO** to enable it to prepare the **Site Responsibility Schedule**.

Each **Site Responsibility Schedule** shall be subdivided to take account of any separate **Connection Sites** on that **Complex**.

Each **Site Responsibility Schedule** shall detail for each item of plant:

- i) plant ownership;
- ii) site manager (controller);
- iii) applicable **Safety Rules** and **Safety Co-ordinator**, or such other person who is responsible for safety;
- iv) **Operations** (applicable operational procedures and control engineer);
and
- v) responsibility to undertake maintenance and contact details.

The **Site Responsibility Schedule** for each **Connection Site** must include pipework emanating from the **Connection Site**.

Every page of each **Site Responsibility Schedule** shall bear the date of issue and the issue number.

When a **Site Responsibility Schedule** is prepared it shall be sent by **TRANSCO** to the **Users** involved for confirmation of its accuracy.

The **Site Responsibility Schedule** shall then be signed on behalf of **TRANSCO** by the **Responsible Manager** for the area in which the **Connection Site** is situated and on behalf of each **User** involved by its **Responsible Manager**.

A.2 ALTERATION TO EXISTING SITE RESPONSIBILITY SCHEDULES

When a **User** identified on a **Site Responsibility Schedule** becomes aware that an alteration is necessary, it must inform **TRANSCO** prior to any change taking effect.

Where **TRANSCO** has been informed of a change by a **User**, or itself proposes a change, it shall prepare a revised **Site Responsibility Schedule** prior to the change taking effect.

When **TRANSCO** or a **User** identified on a **Site Responsibility Schedule**, becomes aware that an alteration to the **Site Responsibility Schedule** is necessary urgently to reflect, for example, an emergency situation, the **User** shall notify **TRANSCO**, or **TRANSCO** shall notify the **User**, immediately and shall discuss:

- i) change(s) necessary to the **Site Responsibility Schedule**;
- ii) whether the **Site Responsibility Schedule** is to be modified temporarily or permanently; and
- iii) the distribution of the revised **Site Responsibility Schedule**.

TRANSCO shall prepare a revised **Site Responsibility Schedule** as soon as possible, and in any event within seven days of it being informed of or knowing the necessary alteration. The **Site Responsibility Schedule** shall be confirmed by **Users** and signed on behalf of **TRANSCO** and **Users** as soon as possible after it has been prepared and sent to **Users** for confirmation.

A.3 RESPONSIBLE MANAGERS

Each **User** shall, prior to the **Completion Date** under each **Connection Agreement**, supply to **TRANSCO** a list of **Responsible Managers** who have been duly authorised to sign **Site Responsibility Schedules** on behalf of the **User**. **TRANSCO** shall, prior to the **Completion Date** under each **Connection Agreement**, supply to that **User** the name of the **Responsible Manager** for the area in which the **Complex** is situated.

**ATTACHMENT TO APPENDIX A PROFORMA
FOR SITE RESPONSIBILITY SCHEDULE**

Connection and Interface Agreement Schedules

Region:

Site:

**OWNERSHIP, ACCESS, OPERATION AND MAINTENANCE SCHEDULES
(OAOM)**

Schedules identifying responsibility for the following are attached to this Appendix:

Ownership

Identifies which party owns the asset. Ownership is identified as one of the following:

- i) Company (T)
- ii) User (D/P)

Access Rights

Identifies which parties have right of access to the asset. Access is identified as either (T) or (D/P); or (T) & (D/P).

Operation

Identifies which of the parties that have the right of Access to the plant also have the right to operate the plant under the instruction of the Control authority.

Operation by one Party on the other Party's equipment is limited to disconnection / reconnection for maintenance purposes only.

Control

Identifies which authority issues instructions to operate plant and equipment. Control shall be in accordance with the attached schedules. The control authority shall be referred to as WCC.

Maintenance

Identifies which party is responsible for the maintenance of the plant and equipment.

Safety Rules

Identifies which of the party's safety rules are applicable to the plant and/or equipment.

Responsible Persons

Contact details for Persons responsible for Operations and Safety at the connection site are beneath. Each Party shall notify the other Party of any changes immediately the change arises.

Transco: Safety:

Operation Control:

User: Safety:

Operation Control:

APPENDIX B NON-EXHAUSTIVE LIST OF POTABLE WATER PLANT TO BE INCLUDED ON OPERATION DIAGRAMS

B.1 BASIC PRINCIPLES

Where practicable, all the **Potable Water Plant** on any **Connection Site** shall be shown on one **Operation Diagram**. Provided the clarity of the diagram is not impaired, the layout shall represent as closely as possible the geographical arrangement on the **Connection Site**.

Where more than one **Operation Diagram** is unavoidable, duplication of identical information on more than one **Operation Diagram** must be avoided.

The **Operation Diagram** must show accurately the current status of the plant eg, commissioned or decommissioned.

Provision shall be made on the **Operation Diagram** for signifying approvals, together with provision for details of revisions and dates.

Operation Diagrams will be prepared in A4 format or such other format as may be agreed with **TRANSCO**.

The **Operation Diagram** should normally show a pipe as a single line. Symbols for **Pumps**, meters, chemical dosing points, chemical dosing equipment, surge vessels, storage facilities, **Valves**, electrical supplies, telecommunication lines and SCADA equipment shall be based on the abbreviations agreed by **TRANSCO** and **Users**.

B.2 APPARATUS TO BE SHOWN ON OPERATION DIAGRAM:

- i) Potable water mains and interconnections
- ii) Wash out pipework
- iii) Storage tanks
- iv) All **Valves** (showing method of operation ie. manual or powered)
- v) Other pipework fittings
- vi) **Pumps** including motors
- vii) Standby Generation facilities
- viii) **Flow Meters**
- ix) Chemical dosing points
- x) Chemical dosing equipment
- xi) Sampling/analyser points
- xii) Surge vessels
- xiii) Electrical supplies and switchgear

xiv) Telecommunications lines

xv) Remote data transmitting units and SCADA Interfaces.

Locations of site boundaries, pipe sizes and other relevant information to be stated on the diagram.

CHAPTER 5 OPERATING CODE

1. GENERAL INTRODUCTION

The **Water Operating Code** is concerned with forecasting short and medium-term water **Demand** and co-ordinating the required water production availability for daily operation including outage planning. It also includes maintenance of **Water Quality**, operational liaison, contingency planning and procedures, **Start-Up** and **Shut-Down** of plant and numbering and nomenclature of plant.

2. GENERAL SCOPE

The **Water Operating Code** applies to **TRANSCO**, **DISCOs** and **Water Producers**, each of which is a **User** under the Code.

3. DEMAND AND PRODUCTION FORECASTS INCLUDING OUTAGE PLANNING

3.1 Introduction

This section specifies procedures to be followed in forecasting **Demand** over periods between one year and one day in advance to accommodate operational requirements and the procedures to be followed when programming outages of all operational plant for maintenance or repair.

3.2 Objective

- i) To set out the requirements for **Users** to provide **Demand** data to **TRANSCO** to enable **TRANSCO** to fulfil its obligations under the **Transmission Licence**.
- ii) To enable **TRANSCO** and **Users** to accommodate outages of all **Potable Water Plant** owned by **Users**, for maintenance or repair whilst continuing, so far as possible, to meet **Demands** from **Customers**.

3.3 Procedures

3.3.1 Forecasts

DISCOs shall provide to **TRANSCO**, by week 43 each year, estimates of their average and peak daily water **Demand** for each week for a period of 52 weeks starting from the first week of the following year.

DISCOs shall provide to **TRANSCO**, by weeks 4, 17, 30 and 43 during each year, estimates of their total and peak water **Demand** for each day for a period of 13 weeks starting from weeks 13, 26, 39 and 52 of each year.

TRANSCO shall, within 4 weeks of receipt of the above **Demand** forecasts, prepare corresponding **Demand** forecasts for total water **Demand** taking account of, operational use, losses within the system network operation and any **Water Demand**

Management policies approved by the **Bureau**. The **TRANSCO** forecasts shall determine **Demands** at all **Transmission** and **Distribution Entry Points**.

In preparing the above forecasts, both **TRANSCO** and **DISCOs** shall take account of the following additional factors:

- i) Historic trends and **Demand** patterns over yearly and weekly periods (including the effects of holidays).
- ii) Projected growth in **Demands** from existing **Customers**.
- iii) Forecast **Demands** from new **Customers**.
- iv) Initiatives by **TRANSCO** and **DISCOs** to promote the efficient use of water.

Water Producers shall provide to **TRANSCO** forecasts of **Water Production Capacity** by the same dates and for the same periods and time increments as the **Demand** forecasts required from **DISCOs**.

In addition, **Water Producers** shall provide to **TRANSCO**, by week 39 of each year, a forecast of **Water Production** capacity for each month for a period of 5 years starting the following year.

Should **DISCOs** or **Water Producers** become aware of factors which would result in material changes to their forecasts, they shall provide updated forecasts to **TRANSCO** without delay.

3.3.2 Outage Planning

Water Producers shall provide to **TRANSCO**, by week 39 each year, a programme showing outages for planned annual maintenance of all **Potable Water Plant** for a period of 5 years from week 1 of the following year.

Users shall also provide to **TRANSCO**, by weeks 13, 26, 39 and 52 each year, a detailed programme showing all planned outages of all **Potable Water Plant** over the following 12 months.

Users shall give notice to **TRANSCO**, at the earliest opportunity, of unplanned and forced outages of operational plant.

Should **DISCOs** or **Water Producers** become aware of factors which would result in material changes to their outage programmes, they shall provide updated programmes to **TRANSCO** without delay.

TRANSCO shall determine, in consultation with **Water Producers** and **DISCOs**, the planned availability of **Potable Water Plant** to maximise the meeting of **Demand** from **Customers**. Planned outages within the **Water Trunk Mains System** shall be co-ordinated to take account of this objective. **TRANSCO** may ask **Water Producers** to advance or defer planned outages where this is necessary to meet obligations under the **Transmission Licence** and/or **Distribution and Supply Licence**.

Users shall not be required by **TRANSCO** to defer an outage if this would result in risk of injury to persons, serious damage or deterioration to **Users** plant. **TRANSCO** are obliged to take a reasonable view on the priority that may be attached to the need for outage maintenance and repair and must take due notice of a substantiated need identified by a **User**.

TRANSCO shall provide to **Users**, at the end of each month, a provisional outage programme including their own plant covering the 12 month period starting at the end of the following month. **TRANSCO** shall also include an estimate of any reductions in flow and pressure which may result during the period of outage.

TRANSCO shall provide to **Users**, not less than 7 days before the end of each month, a final outage programme covering the following month. This shall set out the inclusive start and finish dates of planned outages. **TRANSCO** shall also include an estimate of any reductions in flow and pressure which may result during the period of outage.

In all situations identified in this section, verification of the reduction in **Water Production Capacity**, pumping capacity or water main capacity shall be provided to **TRANSCO** by **Users**.

4. SAFETY CO-ORDINATION

4.1 Introduction

This Section specifies the standard procedures to be used by **Users** for the co-ordination of safety precautions to allow work to be carried out on a water mains system.

This Section does not impose a particular set of **Safety Rules** on **TRANSCO** and **Users**, although it would be prudent for common operational health and safety procedures to be developed by **Users**, unless otherwise required by law.

4.2 Objective

The objective is to achieve safe working conditions when work on a system necessitates safety precautions on another connected system.

4.3 Procedure

TRANSCO and each **User** sharing common **Connection Points** shall exchange copies of their health and safety procedures relating to their respective sides of the **Connection Point**.

TRANSCO and each **User** shall, at all times, have a nominated **Safety Co-ordinator** responsible for health and safety precautions on their system. **TRANSCO** and each **User** shall notify each other of the identities of their respective **Safety Co-ordinators**.

If work is to be carried out on a water mains system which necessitates health and safety precautions on a connected system, the requesting **Safety Co-ordinator** shall contact the **Safety Co-ordinator** responsible for that system.

Records of requests for, and implementation of health and safety precautions shall be maintained by **TRANSCO** and **Users**. The health and safety precautions to be taken shall be agreed between the **Safety Co-ordinators** concerned.

Implementation of the agreed health and safety precautions shall be confirmed by both the requesting and implementing **Safety Co-ordinators** before work on the system is begun. Should any health and safety precaution require reappraisal or renewal, the requesting **Safety Co-ordinator** shall advise the implementing **Safety Co-ordinator** immediately.

TRANSCO and **Users** shall maintain health and safety logs which shall contain a chronological record of all communications relating to safety sent or received in accordance with this section. The health and safety logs must be retained for a period of not less than one year.

5. WATER QUALITY

5.1 Introduction

This section covers matters relating to **Water Quality** monitoring, sampling, testing and control.

The general rule established by this Code is that the upstream party at a boundary interface shall undertake monitoring and where required, sampling and testing. Provision of results for both in-situ monitoring and laboratory tests shall be made immediately available to the downstream party.

5.2 Objective

To provide procedures for **Water Quality** monitoring, reporting and remedial action in the event that **Water Quality** falls below defined standards.

5.3 Water Quality Standards

The **Bureau** shall be responsible for specifying and reviewing potable water quality standards and for administering independent sampling and testing audits.

5.4 Procedures for Monitoring and Reporting

Water shall be monitored and have samples taken and tested immediately upstream of the **Transmission** and **Distribution Entry Points** by **Water Producers** and **TRANSCO** respectively to check that the **Water Quality** standards as required at the **Entry Points** are adhered to at all times. In the case of well water production, additional sampling and testing carried out by the **Well-field Operator** shall check for concentrations of other substances in the water including metals, physical characteristics and inorganic substances. Continuous monitoring to confirm and

adjust chlorine residuals at **Transmission Exit Points** shall be undertaken by **TRANSCO**.

Samples shall be taken regularly and frequently (at least one per location per shift) from a sampling point. Analysis and testing of water samples shall be carried out at a laboratory accredited for the purpose by the **Bureau**.

The results of analyses shall be provided to **TRANSCO** and as necessary, **DISCOs** within two working days of the day on which the samples were obtained.

In the event that the value of a **Determinant**, from a sample or a test taken, lies outside the prescribed limits, **TRANSCO** or the **Water Producer** shall immediately rectify the defect. The result shall be immediately reported formally by **Water Producers** and **TRANSCO** to **TRANSCO** and the relevant **DISCO** respectively together with a statement of the action taken to bring **Water Quality** within the standard and mitigate the risk of public health. **TRANSCO** or the **DISCO** shall acknowledge, in writing, receipt of such a report indicating either its approval of the **User** remedial action or stating what further measures the **User** shall take to bring **Water Quality** within the prescribed limits. Procedures to cover more serious and widespread water contamination are included in Section 7 of this chapter dealing with Contingency Planning and Procedures.

6. OPERATIONAL LIAISON

6.1 Introduction

This section sets out the requirements for the exchange of information relating to routine operation and/or unplanned events which might occur, or which have occurred and which could affect:

- i) the **TRANSCO Water Trunk Mains System** in the case of an operation and/or event on a **User System**, or
- ii) a **User System** in the case of an operation and/or event on the **TRANSCO Water Trunk Main System**.

This section does not cover actions related to **Water Quality** failures which are dealt with in Section 5.

6.2 Objective

To specify:

- i) the information to be exchanged between **Users** and **TRANSCO** to identify the potential impact of an operation and/or event and to assess the potential risk arising from it so that appropriate action can be taken.
- ii) the information to be exchanged between **Users** and **TRANSCO** when an unplanned operation or event has occurred which may have resulted in risk or damage to **Potable Water Plant**.

6.3 Procedures for Notification

In the case of an operation or event on the **TRANSCO System** which may affect **User Systems**, **TRANSCO** shall notify forthwith the **Users** whose **Systems** may be affected.

In the case of an operation or event on a **User System** which may affect the **TRANSCO Systems**, the **User** shall notify forthwith **TRANSCO** who shall, in turn, notify forthwith other **Users** whose **Systems** may be affected.

The notification must contain sufficient detail to enable the recipient to assess the implications and risks. It shall also contain the following specific information:

- i) Name and contact details for the individual making the notification.
- ii) The nature of the operation/event.
- iii) The extent of any effects of the operation/event.
- iv) The timing of the operation/event.

The notification shall be given as far in advance as practicable and in writing if there is sufficient time to do so. If notification is given by telephone, it shall be recorded by the recipient and confirmed by the sender in writing at the earliest opportunity.

The following are examples of effects where notification shall be required:

- i) Where **Potable Water Plant** is being operated under conditions which presents a hazard to personnel;
- ii) Where an alarm or other indication of abnormal operating conditions has been activated;
- iii) Breakdowns, faults or temporary changes in performance of **Potable Water Plant**;
- iv) Breakdowns of or faults to control or communication equipment or instrumentation; and
- v) Damage or bursts to pipelines.

In the case of an unforeseen operation or event on the **TRANSCO System** which may affect or has affected **User Systems**, **TRANSCO** shall notify at the earliest opportunity, the **Users** whose **Systems** may have been affected.

In the case of an unforeseen operation or event on a **User System** which may have affected the **TRANSCO System**, the **User** shall notify, at the earliest opportunity, **TRANSCO** who shall, in turn, notify other **Users** whose **Systems** may have been affected.

The notification shall contain the same information as that required for an operation or event which is expected to take place in the future.

The procedures described in this section do not deal with actions arising from the exchange of information, but merely with that exchange.

7. CONTINGENCY PLANNING AND PROCEDURES

7.1 Introduction

This section covers:

- i) the implementation of procedures following failures which result in, or may result in serious, widespread loss or disruption of water supplies to **Customers**;
- ii) the establishment of communications between **Responsible Managers** of **TRANSCO** and **Users** to facilitate urgent managerial action at all times; and
- iii) procedures to be followed when normal routine **Scheduling** and **Despatch** activities are inoperative.

Such failures might include:

- i) a total or partial **Shut-Down** of the electricity supply system which would render pumping plant inoperative at sites where **Standby Generation** facilities are not provided;
- ii) a major pollution or water contamination event that causes failure of **Water Quality** to meet the standards throughout extensive parts of the **Total System**;
- iii) a burst main in **TRANSCO** or a **User System**; and
- iv) forced outages resulting in loss of production or pumping capacity.

7.2 Objectives

- i) To restore water supplies to meet **Demands** in the shortest possible time;
- ii) To ensure that communications arrangements for use in circumstances of serious disruption of water supplies are available between appropriately authorised representatives of **TRANSCO Users**; and
- iii) To ensure that the **Water Trunk Mains System** can continue to operate in circumstances where routine **Scheduling** and **Despatch** arrangements are inoperative.

7.3 Procedures

TRANSCO is responsible for co-ordinating action in the event of a failure which results in, or may result in serious, widespread loss or disruption of potable water supplies.

Following a failure which results in serious, widespread loss or disruption of potable water supplies, standards of continuity, pressure or **Water Quality** may not be met. **Scheduling** and **Despatch** in accordance with the **Water Scheduling and Despatch Code** may be suspended until **TRANSCO** decides that normal procedures can be re-implemented.

The complexities of recovery in the event of a major failure of the system will require a flexible approach to operation and hence preclude setting out detailed procedures or operational sequences in the Code.

When it is found necessary to isolate parts of the system while emergency work are carried out, **TRANSCO** shall ensure that those parts of the system isolated under these circumstances are minimised and that maximum integration is achieved with the minimum possible delay.

Users shall abide by instructions issued by **TRANSCO** in the event of a failure which results in, or may result in serious, widespread loss or disruption of potable water supplies to **Customers**.

If a **User** is unable to comply with instructions issued by **TRANSCO**, the **User** shall advise **TRANSCO** accordingly so that **TRANSCO** can consider whether to issue revised instructions or provide conditions within the system which enable the **User** to comply.

TRANSCO shall advise all **Users** when normal operation has been resumed.

TRANSCO shall initiate and co-ordinate **Water Trunk Mains System** studies and investigations to enable emergency plans to be prepared and updated as development of the system takes place. This plan shall be made available to all **Users**.

A manual of emergency operating procedures shall be developed by **TRANSCO** in consultation with all **Users**. If an event occurs which is not catered for in the manual of operating procedures, the procedure to be used shall be determined by **TRANSCO** at the time.

As part of the manual of emergency operating procedures, **TRANSCO** shall maintain a complete set of **Record Drawings** and **Operating Manuals** for all plant under its control.

Subject to procedures agreed between **TRANSCO** and **Users** to ensure adequate security, copies of the emergency plans and manual of emergency operating procedures shall be maintained by **TRANSCO** at a location to be notified to **Users**. The plans and procedures shall be available for reference by **Users**.

A Performa identified in the **Contingency Planning** document in *Appendix-A* of the Operating Code, has been designed to aid in the development of these plans. These guidelines should read in conjunction with the Performa developed around the following identified elements.

Contingency plans should include as a minimum, the following elements:

1. Summary Sheet – General information on the contingency plan.
2. Decision Flow Chart – This should identify the process by which a contingency plan is selected for use depending on the failure scenario
3. Action Plan – Step by step summary of actions to be taken to resolve issues and reinstate supply

4. Procedures – Specific details of activities identified in the action plan
5. Plan Specific Information – Essential information for those managing the event, for example consumers affected, volumes not supplied, location and availability of materials
6. Pumping Station and Valves Arrangements – Details and timings of operations to be performed
7. Contact Details – details for all personnel who should be contacted whilst implementing the contingency plan
8. Time Line – A program of work to be undertaken and the expected duration until reinstatement
9. Network Schematic – Location plan of area with relevant valves, pumping stations and pipelines identified.

In addition to the above, the date at which the plan was originally produced, the date it was revised, the version number and the scenario description and location (where appropriate) should be included.

In circumstances where **Demand** cannot be met, **TRANSCO** shall supply water intermittently to **DISCOs** in accordance with a schedule, drawn up for the purpose of securing **Demand Control**, in consultation with the **DISCOs** and approved by the **Bureau**. **Demand Control** reduction can be achieved by the following means:

- i) Pre-planned time supply water rationing by the **Water Control Centre**;
- ii) Disconnection by **DISCOs**;
- iii) Emergency and pre-planned disconnection or **Valve** operation by **DISCOs**;
- iv) Reduced **Customer** consumption initiated by water conservation and pricing incentives;
- v) Other **Water Demand Management** policies.

8. START-UP AND SHUT-DOWN PROCEDURES

8.1 Introduction

This section makes provision for procedures relating to:

- i) the **Start-Up** and **Shut-Down** of **Potable Water Plant** or valve **Operations** which may cause **Pressure Transients** within the **TRANSCO System** or **Users Systems**; and
- ii) recharging pipework or other installations following internal access by personnel.

8.2 Objective

- i) To avoid damage to **Potable Water Plant**, or unstable operating conditions resulting from **Pump Start-Up** or **Shut-Down** or valve **Operations**; and

- ii) To avoid bacterial contamination of the water supply following internal access by personnel.

8.3 Procedures

TRANSCO and **Users** shall ensure that routine **Start-Up** and **Shut-Down** of all **Potable Water Plant** is carried out in accordance with **Good Industry Practices** including where:

- i) Action by a **User**, may influence hydraulic conditions within the **Water Trunk Mains System**; and
- ii) Action by **TRANSCO**, may influence hydraulic conditions within **User Systems**.

These practices shall, so far as possible, ensure that **Pressure Transients** generated as a result of **Pump Start-Up** or **Shut-Down** or valve **Operations** are maintained within the rated working pressures of connected pipelines, surge vessels and other plant..

Should a situation arise in which it becomes necessary to operate a **Pump** or **Valve** in a manner other than set down in the operating procedure relating to that **Pump** or **Valve**, the **User** responsible shall advise other affected entities in advance of the operation.

Following internal access by personnel to pipework or other **Potable Water Plant** for supply, flushing and disinfecting, shall be carried out in accordance with the **Supply Regulations**.

9. NUMBERING AND NOMENCLATURE OF PLANT

9.1 Introduction

This section sets out requirements regarding numbering and nomenclature of all **User Potable Water Plant**.

9.2 Objective

The overall objective of this section is to ensure, so far as possible, the safe and effective operation of **Potable Water Plant** and to reduce the risk of human error by requiring, in certain circumstances, that the numbering and nomenclature of **User Potable Water Plant** shall be in accordance with the **System** used by **TRANSCO**.

9.3 Procedures

TRANSCO Potable Water Plant on **User** sites shall have numbering and nomenclature in accordance with the system used by **TRANSCO**.

TRANSCO shall advise the **User** of the numbering and nomenclature to be used at least one month prior to the proposed date of installation of such plant. **DISCOs** shall adopt numbering and nomenclature arrangements consistent with that of **TRANSCO** to facilitate co-ordination at **Connection Points**.

Notification shall be made in writing and shall consist of an **Operation Diagram** (in accordance with the **Water Connection Conditions**) showing the plant to be installed, the proposed numbering and nomenclature and the proposed date of installation.

The **Responsible Manager** shall, on receipt of the notification, confirm that no other plant at the site has numbering and nomenclature which could be confused with that proposed by **TRANSCO**.

User plant on a **TRANSCO** site shall have numbering and nomenclature in accordance with the procedure used by **TRANSCO**.

When either **TRANSCO** or a **User** installs **Potable Water Plant**, either **TRANSCO** or the **User**, as the case may be, shall be responsible for the provision of clear and unambiguous labelling showing the numbering and nomenclature.

Where **TRANSCO** changes the numbering and nomenclature of its plant, the provisions of this section shall apply.

The numbering and nomenclature of existing **User** plant shall be provided to **TRANSCO** within one month of such a request by **TRANSCO**.

APPENDIX A

Performa contingency planning:

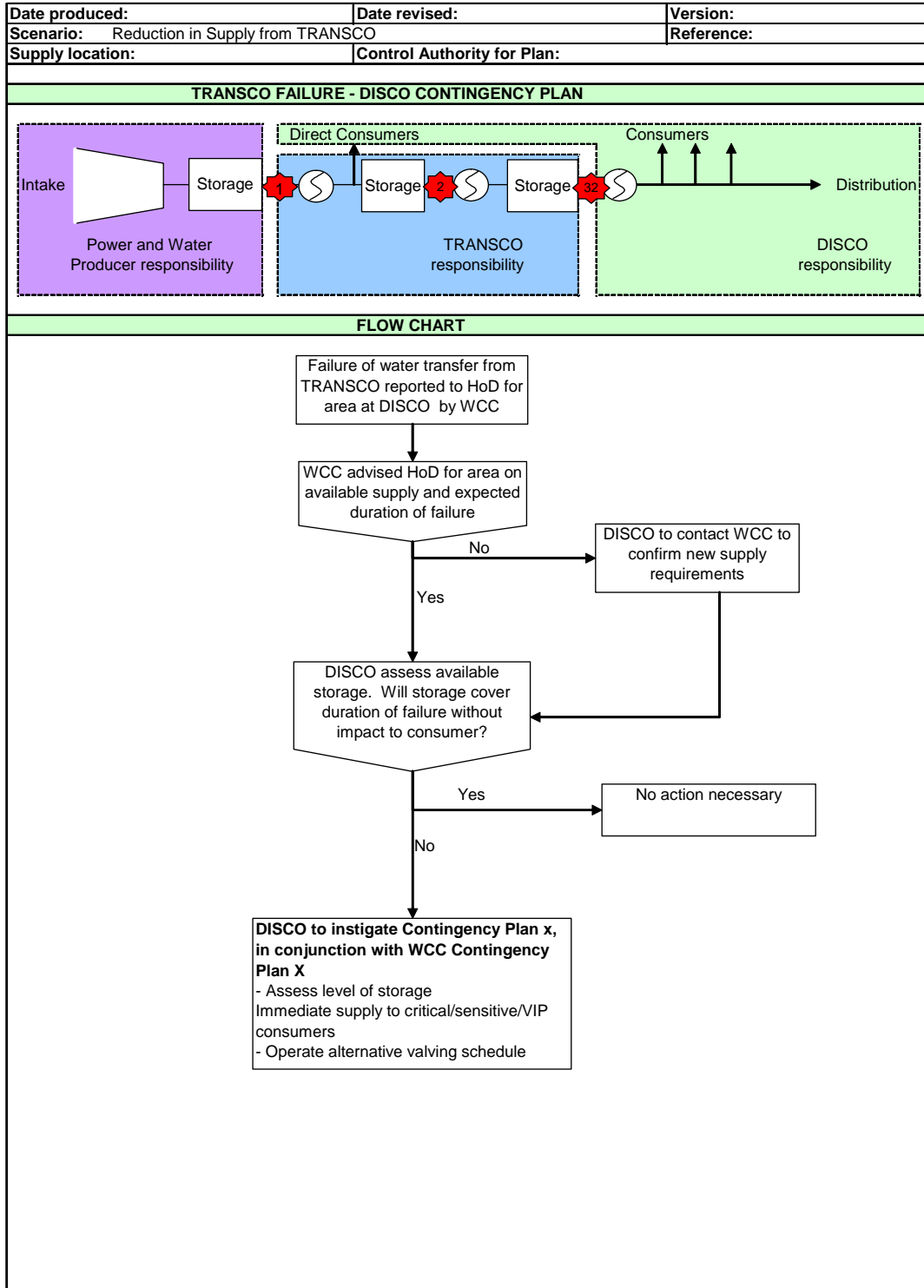
Blank Transco-DISCO Contingency plan Performa is included for presentation purposes in the following sheets. Other Contingency plans Performa are available at **WCC** and should be completed by the relevant Users for the following contingency events:

TRANSCO

- Contamination event affecting TRANSCO
- Reduction in desalination supply to TRANSCO
- Failure of TRANSCO pumping station
- Failure of TRANSCO pipeline

DISCO

- Contamination event affecting DISCO
- Reduction in supply from Transco
- Failure of DISCO pumping station
- Failure of DISCO pipeline



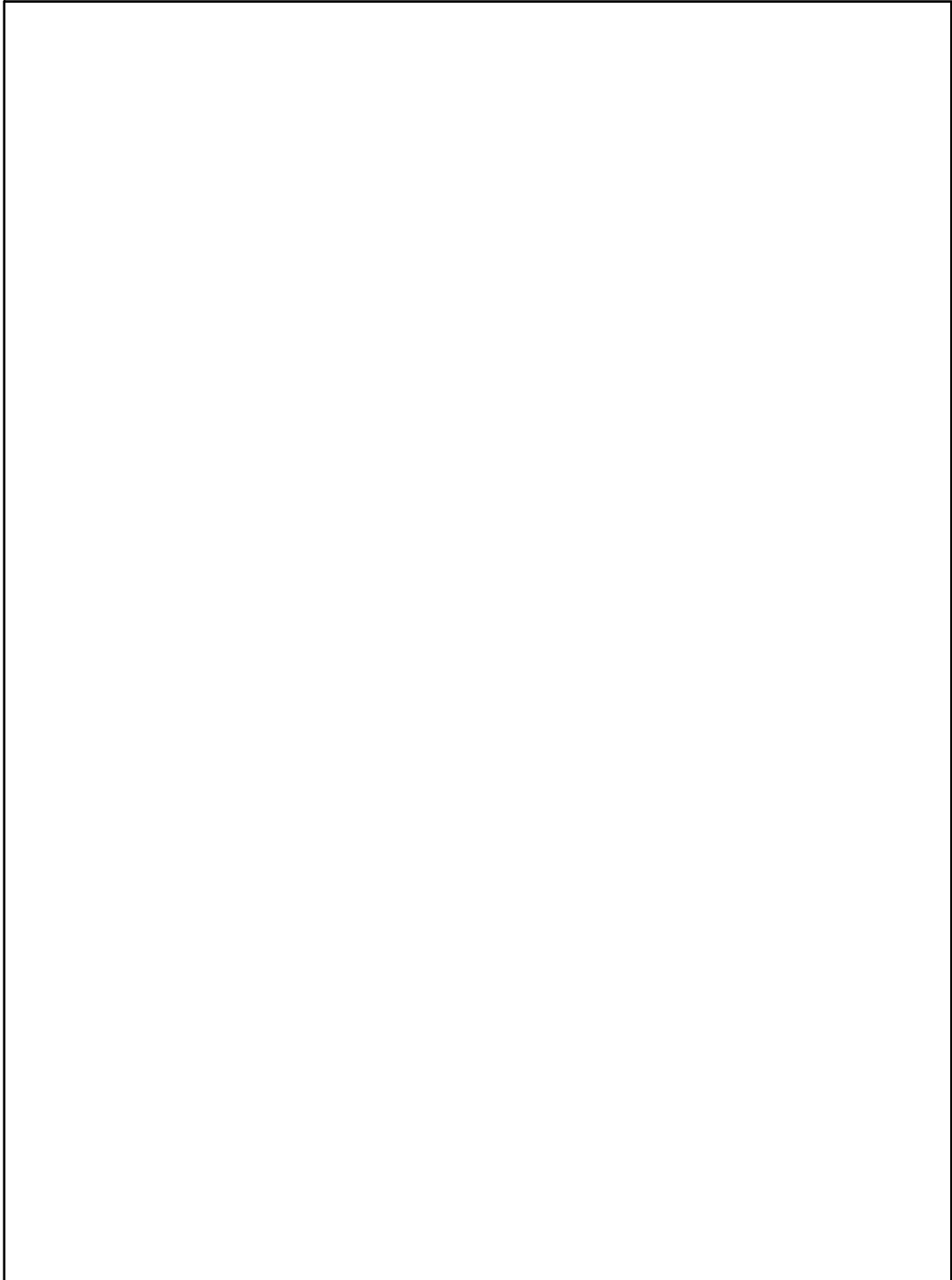
Date produced:		Date Revised:		Version:	
Scenario:		Reduction in Supply from TRANSCO		Reference:	
Supply location:		Control Authority for Plan:			
ACTION PLAN					
Repair Time	Expected time to reinstate supply (see time line chart attached)				
Item	Action Required				
Action Plan (Carry out actions in conjunction with planning chart, network schematic and additional information contained in this plan)					
PROCEDURES					
Available Storage Assessment					
VIP consumers supply Arrangements					
Other consumer supply arrangements					
Water Quality					
HSE Procedure					
Contamination					
Repair Procedure					
Valving Arrangements					
Customer Notification Procedure					

Date produced:		Date Revised:			Version:					
Scenario:		Reduction in Supply from TRANSCO			Reference:					
Supply location:		Control Authority for Plan:								
PUMPING STATION AND VALVING ARRANGEMENT										
Pumping Station										
Supply Area										
Day of Supply										
Hours from notification	Actual time	Ref	Flow rate	Operation	Ref	Flow rate	Operation	Ref	Flow rate	Operation
0:00										
0:30										
1:00										
1:30										
2:00										
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23:30										
0:00										
Total										

Date produced:		Date Revised:		Version:		
Scenario:		Reduction in Supply from TRANSCO		Reference:		
Supply location:		Control Authority for Plan:				
PLAN SPECIFIC INFORMATION						
Affected Customers	Customers in the following locations could be affected:					
	Reference	Location	Supply	Hours su	Other information	
	Type	Customer	Location	Demand	Supply	Hours
	Large Customers					
	Vulnerable Customers					
Sensitive Customers						
Comment:.....						
Constant Supply Requirements	During a contingency event the following domestic and essential use demand may need to be met through tankered supplies.	Location	Supply required	Nr 3000 gallon tanker		
Valving operations	Shut off plan checked:	Yes / No	<input type="text"/>			
	Valves checked:	Date:	<input type="text"/>			
		By Whom:	<input type="text"/>			
		Status:	<input type="text"/>			
Contacts	Name	Position	Number			
Additional Information	Comment:.....					

Date produced:		Date Revised:				Version:			
Scenario:		Reduction in Supply from TRANSCO				Reference:			
Supply location:		Control Authority for Plan:							
TIME LINE									
Hours	Valving operations and rezoning	Actual Time	Repair activities	Actual Time	Other activities	Actual Time	Secondary supplies	Actual Time	Milestones
Time in hours after notification of failure									
1									
2									
3									
4									
5									
6									
7									
8									
9									
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24									

Date produced:	Date Revised:	Version:
Scenario:	Reduction in Supply from TRANSCO	Reference:
Supply location:	Control Authority for Plan:	
NETWORK SCHEMATIC		



CHAPTER 6 SCHEDULING AND DESPATCH CODE

1. GENERAL INTRODUCTION

The **Water Scheduling and Despatch Code** sets out procedures for:

- i) the **Scheduling** of potable water at storage/pumping stations located at water desalination sites, well-fields and **Intermediate and Terminal Pumping Stations**; and
- ii) **Despatch** of potable water at the **Transmission and Distribution Entry Points**.

The **TRANSCO Water Control Centre (WCC)** will manage the **Scheduling** and **Despatch** of potable water through controlled operation of **Pumps**, taking into account optimisation of storage and optimisation of water transfer costs. Storage operation and **Demand Control** policies shall also be taken into account in the **Scheduling** and **Despatch** process.

Each day the **WCC** shall notify the **TRANSCO Load Despatch Centre** of the **Demand** to be met from the desalination process and shall receive in return later the same day the desalination plant scheduled for the following **Schedule Day**. **Scheduling** of well-fields and balancing availability of desalination production together with well-field production shall be undertaken by the **WCC**.

The **Transmission Code (Electricity)** deals with **Scheduling** and **Despatch** of desalination plant as part of the optimisation of the electricity and water cogeneration production process.

2. GENERAL SCOPE

The **Scheduling** and **Despatch** Code applies to **TRANSCO, DISCOs** and **Water Producers** (where they operate desalination town water pumps), each of which is a **User** under the Code.

3. POTABLE WATER SCHEDULING

3.1 Introduction

This section specifies procedures for:

- i) Daily notification of the availability of storage/pumping plant to **WCC** at a predetermined time by **Pump/Storage Operators**;
- ii) Immediate notification by **Pump/Storage Operators** of any changes to pump/storage plant availability from that notified previously;
- iii) Daily notification of **Demands** at **Distribution Entry Points** by **DISCOs**, and
- iv) The issue by **WCC** of a **Potable Water Schedule** by 1800 hours on the day before the **Schedule Day**.

Any constraints in the system or outage planning which needs to be taken into consideration by **WCC** shall be identified by reference to the procedures set out in the **Water Operating Codes** of the **Transmission and Distribution Codes (Water)**.

3.2 Objective

- i) To enable, so far as possible, average and peak day water **Demand** to be met during the **Schedule Day**;
- ii) To enable **WCC** to prepare **Potable Water Schedules** and instructions issued as **Despatch Instructions**;
- iii) To enable **WCC** to implement **Demand Control** in circumstances where total water **Demand** exceeds potable water availability.

3.3 Procedures

3.3.1 Availability Declaration

Pump/Storage Operators and **Well-field Operators** shall, by not later than 0800 hours each day, notify **WCC**, by means of an **Availability Notice** in the format set out in Appendix A to this Code, of the pumping and storage plant availability at each of the **Transmission and Distribution Entry Points** on the following **Schedule Day**.

The availability of desalination plant shall be notified to the **WCC** by the **TRANSCO Load Despatch Centre** as determined from procedures dealt with in the **Transmission Code (Electricity)**.

Where plant availability differs from the original notification, **Pump/Storage Operators** and **Well-field Operators** shall immediately advise **WCC** by means of a revised **Availability Notice**. An explanation of the reasons for the change in availability shall be included in the notice. **WCC** shall also assess the extent of mains constraints or outages on the system and take these into account in assessing system availability.

3.3.2 Demand Notification

Each **DISCO** shall, by not later than 0800 hours each day, notify **WCC**, by means of a **Demand Notice**, in the format set out in Appendix B to this Code, the estimated average daily and peak daily water **Demand** at each **Distribution Entry Point** for the following **Schedule Day** and the **Demand** during each hour over the same period.

3.3.3 Demand Evaluation

WCC shall, by not later than 1000 hours each day prior to the **Schedule Day**, prepare **Demand** estimates including:

- i) **Demands** met directly from **Water Trunk Mains System** and **Distribution Systems** taking due account of **Demand Control** on both systems;
- ii) Storage associated with a **User System**; and
- iii) flow capacity constraints within the **Water Trunk Mains** and

Distribution Systems including outages and emergency closures.

Should there be any reason why **Demand** subsequently differs from that previously notified, each **DISCO** shall immediately notify **WCC**, by means of a revised **Demand Notice**.

3.3.4 Scheduling

By 1600 hours on each day, the **Load Despatch Centre** shall issue confirmation of desalination plant **Scheduling** to the **WCC**. **WCC** shall in turn, by 1800 hours each day issue to **Pump/Storage Operators** and **Well-field Operators** a **Potable Water Schedule** (in the form set out in Appendix C) for the following **Schedule Day**. This schedule provides the average and peak daily flows needed to meet **Demand** at each **Transmission** and **Distribution Entry Point** during the **Schedule Day** and any estimated change in storage associated with that requirement. Where the volume scheduled is required over a specific period, this shall also be notified.

4. POTABLE WATER DESPATCHING

4.1 Introduction

The **WCC** shall instruct the **Despatch** of potable water from storage by the controlled operation of **Pumps** located at water production sites and **Intermediate** and **Terminal Pumping Stations** and from well-field collecting reservoirs by issuing **Despatch Instructions**. For the declared storage/pump availability, the process of **Despatch** shall optimise network operation to minimise water transfer costs in order to meet **Demand** at **Distribution Entry Points**.

WCC shall issue **Despatch Instructions** commencing at 00:00 hours and any subsequent further time on the **Schedule Day** to **Pump/Storage Operators** and **Well-field Operators** using **Control Telephony**.

4.2 Objective

To set out procedures for the issue of daily volumetric water **Despatch** by **WCC** to meet average and peak daily **Demand** at each **Transmission** or **Distribution Entry Points**, during the **Schedule Day**.

4.3 Procedures

The information which **WCC** shall use in assessing which **Transmission** and **Distribution Entry Points** to apply **Despatch Instructions** to shall be:

- i) **Availability Notices**;
- ii) **Demand Notices**;
- iii) transmission and distribution main constraints, outages and emergency closures; and
- iv) pump/storage availability.

Despatch Instructions that relate to the **Schedule Day** and as given to **Pump/Storage Operators** and **Well-field Operators** by **WCC** shall be in the format set out in Appendix D to this Code.

A **Despatch Instruction** shall indicate the total volume of water required at each **Transmission** or **Distribution Entry Point** during a **Schedule Day** and the **Demand** during each hour over the same period. Where this volume is required over a specific period, this shall also be notified. **Demand Control** policies may be applied, in which case the implications for **Pump** operation shall be identified in the **Despatch Instruction**. Pumping is controlled by **TRANSCO** and **Water Producer** local operation such that storage tank use and pressures /flows in the water mains are optimised. Storage tank levels shall be monitored by the **Pump/Storage Operators** to avoid over-pumping or storage tank water levels falling below the minimum allowed.

To meet emergency and other unforeseen circumstances, **WCC** may issue revised **Despatch Instructions** during a **Schedule Day**. **WCC** shall state why such an instruction is necessary.

APPENDIX A

Format for Availability Notice

Availability Notice

To WCC

From _____ Date _____
(Name of Pump/Storage Operator*)

Schedule Day _____ Total pump capacity (MI/d) _____ (a)

Potable Water Statement Supply Point and (b))	Availability (b) (MI/d)	Verification (reason for difference, (a)
--	--------------------------------	---

1
2
etc

_____ estimated storage available at start of Schedule Day
m³ _____

Signed _____
On behalf of Pump/Storage Operator

1 MIGD = 4.55 MI/D

* includes Well-field Operator

APPENDIX B

Format for Demand Notice

Demand Notice

To WCC

From _____ Date _____
(Name of DISCO)

Schedule Day _____ Distribution Entry/Transmission Exit Point

Average. daily demand Peak daily demand
at Entry/Exit Point (MI/d) _____ at Entry/Exit
Point(MI/d) _____

Period	Demand (MI)
0000 - 0100	
0100 - 0200	
etc	

Signed _____
On behalf of DISCO

1 MIGD=4.55 MI/D

APPENDIX C

Format for Potable Water Schedule

Potable Water Schedule

To _____
(Name of Pump/Storage Operator*)

From WCC Date _____

Schedule Day _____

Potable Water
Supply Point
(Transmission/Distribution)

Scheduled Requirement
(MI/d)
Average/day Peak day

1
2
etc

_____ estimated storage change in the Schedule Day
m³ _____

Signed _____
On behalf of WCC

1 MIGD=4.55 MI/D

* includes Well-field Operator

APPENDIX D

Format for Despatch Notice

Despatch Instruction

To _____
(Name of Pump/Storage Operator*)

From WCC Date _____

Schedule Day _____ Despatch Point

Confirmed total daily demand
at Despatch Point (MI)_____

Period	Demand (MI)
0000 - 0100	
0100 - 0200	
etc	

Signed _____
On behalf of TRANSCO

1 MIGD=4.55MI/D

* Includes Well-field Operator

Note Demand Control policies in force are:

1. eg Bureau requirements to instruct restricted pumping between 24.00 and 06.00

CHAPTER 7 DATA REGISTRATION CODE

The **Water Data Registration Code** contains a unified listing of all data required by **TRANSCO** from **Users** and from **Users** from **TRANSCO** as set out the two tables attached.

(Name) WATER PRODUCTION PLANT				
Item	Parameter	Unit	Value	Code No
Distiller No 1	Capacity	MI/d		WP/n/d/1.0
Distiller No 2	Capacity	MI/d		WP/n/d/2.0
Well-field output Etc	Capacity	MI/d		WP/n/w/3.0
Production Site Storage Tank No 1	Total capacity	MI		WP/n/t/1.1
	Top water level	m		WP/n/t/1.2
	Lowest outlet level	m		WP/n/t/1.3
	Usable capacity.	MI		WP/n/t/1.4
Production Site Storage Tank No 2	Total capacity	MI		WP/n/t/2.1
	Top water level	m		WP/n/t/2.2
	Lowest outlet level	m		WP/n/t/2.3
	Usable capacity	MI		WP/n/t/2.4
Etc				
Pumping Station No 1 Pump No 1	Q/h curve	l/s, m		
	Pump curve pt 1			WP/n/p/1.01
	Pump curve pt 2			WP/n/p/1.02
	Pump curve pt 3			WP/n/p/1.03
	Etc			
Etc	Duty point			WP/n/p/1.10

Code No-suggested reference numbering

P-Production
n-name
d-distiller
w-well-field
t-storage tank
p- pump

(Name) WATER TRANSMISSION PUMPING STATION				
Item	Parameter	Unit	Value	Code No
Storage Tank No 1	Total capacity	MI		TT/n/t/1.1
	Top water level	m		TT/n/t/1.2
	Lowest outlet level.	m		TT/n/t/1.3
Storage Tank No 2	Total capacity	MI		TT/n/t/2.1
	Top water level	m		TT/n/t/2.2
	Lowest outlet level.	m		TT/n/t/2.3
Etc				
Pump No 1	Q/h curve	l/s, m		
	Pump curve pt 1			WT/n/p/1.01
	Pump curve pt 2			WT/n/p/1.02
	Pump curve pt 3			WT/n/p/1.03
	Etc			
Pump No 2	Duty point			WT/n/p/1.10
	Q/h curve			
	Pump curve pt 1			WT/n/p/1.01
	Pump curve pt 2			WT/n/p/1.02
	Pump curve pt 3			WT/n/p/1.03
	Etc			
Etc	Duty point			WT/n/p/1.10
Etc				

Code No- suggested reference numbering

T-Transmission
n-name
t-storage tank
p-pump