

REPORT



IMO Administered Markets Readiness Report

Issue 1.4

*This document provides an assessment of the readiness of
the IMO Administered Market as of December 17, 2001*

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1. Purpose this document

This report represents a statement of IMO administered market readiness as at December 17, 2001 and an assessment of the date by which the IMO would be in a position to open the market. Certain of the market opening activities will be ongoing right up to market in-service, and conditions relating to those activities remain to be met. Therefore, two further releases of this report are planned; one prior to the start of Coupled Operational Dry Run (Version 2) and one towards the end of CODR (Version Final). Reference should be made to Section 14 for items that will be covered in the second and final releases of this report.

The information contained within the document is provided to MoEST for use in their decision regarding the opening of both the retail and IMO-Administered electricity markets. The report is based upon the objective results obtained from the IMO's own testing and the testing that participants have undertaken with the IMO. It should be noted that the IMO's testing approach and strategy were defined to provide the IMO and the IMO Board with appropriate assurance that its systems and processes would operate according to requirements. Testing and verification of the systems and procedures will continue beyond the first release of this report up to and including the coupled operational dry run.

With regard to participant testing, it is important to note that the testing undertaken by the IMO has tested only the ability of participants to interface with the IMO in the manner prescribed in the market rules and manuals. It is up to individual participants themselves to assure their own readiness when they complete the Participation Agreement.

– End of Section –

2. Structure of this document

The remainder of this document is structured into the following sections:

- **Summary:** A summary of the entire document;
- **Market opening timelines constraints and assumptions:** A description of the necessary steps and timelines that precede an opening of the IMO-Administered markets.
- **IMO-Administered market opening conditions:** A description of the seven opening conditions that have been used to make the readiness assessment. Six of these are as reviewed with MoEST in July/August 1999;
- **IMO testing:** Much of the IMO's assessment is based upon the results of the IMO's testing. This section provides an overview of the types of testing that the IMO has undertaken.

The remaining sections deal with the market opening conditions. The first seven sections examine compliance with the conditions. Where an exception is noted it is referenced thus – ***C/Condition No.]/[Exception No.]*** e.g. ***C4.1***. All exceptions are then discussed further in section 14 titled "Exceptions".

- **Condition 1 - IMO readiness:** The assessment of IMO Readiness. The basis of this assessment is the IMO Readiness Checklist.
- **Condition 2 - Participant readiness:** The assessment of participant readiness. This includes evidence relating to participant authorisation, meter registration, facilities registration, participant ability tests and the views of the Market Commissioning Task Force (MCTF).
- **Condition 3 – Contingency arrangements:** Confirmation that contingency arrangements exist that will allow the IMO to operate the IMO-administered markets even if some participants are not fully compliant with the market rules.
- **Condition 4 – Reliable operations:** The assessment by the IMO of its ability to continue to provide reliable operation of the IMO-controlled grid during the transition to the new market and beyond. Some evidence was gained from internal testing and shadow operations but the majority of confirmatory evidence to support this condition will come through Coupled Operational Dry-Run.
- **Condition 5 – Market design** – The assessment by the IMO of the operability of the market design. This includes evidence gained from the Uncoupled Operational Dry-Run test, Market Readiness Shadow Operations, Retail feeds and Coupled Operational Dry Run.
- **Condition 6 – Legal framework** – Confirmation that the required legal instruments to enforce the market (rules, agreements) are in place or will be put in place in sufficient time to commence market operations.

- **Condition 7 – System adequacy:** The assessment by the IMO of system adequacy during the period of transition to the new market and beyond. This is based upon soon to be released forecasts and assessments by the IMO.
- **Exceptions** – The IMO’s timetable for completing outstanding items.

– **End of Section** –

3. Summary

The IMO, based on the assessment set out in this report, is confident that its systems and capabilities would support a market opening as of March 1, 2002. That said, market participants would benefit from access to a full production data set to fully complete their testing and allowing for this additional testing would add confidence in the market generally. This additional testing period could be provided in mid-January, with CODR then commencing in late February. Accordingly, the IMO's advice is that April 1, 2002 would be an appropriate date for market opening.

This advice is based upon the following:

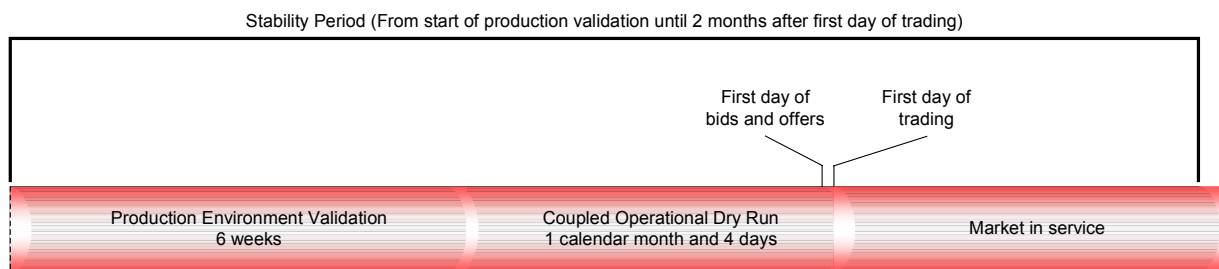
- IMO business process managers have indicated formally that they are (or will be) able to support the processes in production. A series of surveys of IMO staff have indicated increasing comfort with their ability to operate the market, the latest conducted at the end of November indicated over 90% of staff who replied have confidence that the IMO will be able to operate the new market successfully.
- Viable contingency arrangements have been identified to embrace all non-ready participant types and these are being finalised.
- The number of participants who have completed ability testing, together with a review of possible contingency arrangements, indicate a high level of participation will be possible in the timescales under consideration.
- Although some issues have been identified, which is to be expected, during Market Readiness Shadow Operation and that exercise is still in process, no items have been discovered that would suggest that system reliability cannot be maintained.
- Testing of systems has taken place over an extended period and has exercised the systems in many different ways (see section 6 for a high level description of the testing undertaken). The rate of discovery and the low severity of new defects provides confidence that computer systems are sufficiently stable to support production operation.
- The legal documentation is either already in place or is scheduled to be so in advance of any date under consideration for market opening.
- The latest eighteen month IMO assessment of system adequacy is considered to be acceptable.

– End of Section –

4. Market opening timelines, constraints and assumptions

Timeline

The diagram below shows the key timings relative to the declared Market Opening Date (MOD):



The components of the above diagram are described below:

- **Production Environment Validation:** During this period participants would be added progressively over the first three weeks (LDCs within the first two weeks), they would be asked to validate their registration information and would have the opportunity to exercise their systems in an end-to-end mode against the IMO's production environment running normal business cycles.
- **Coupled Operational Dry Run:** During this period the IMO-administered markets will operate in full with the exception that interchange schedules will be limited and that final settlement and funds transfer will continue to be effected under the current arrangements.
- **First day of bids and offers:** This will be the first day on which live bids and offers will be submitted to the IMO. Bids and offers received on this day will relate to intervals in the first day of trading (the next day).
- **First day of trading:** This will be the first day on which energy is bought and sold on the IMO-Administered markets.
- **Stability Period:** During this period new participants and changes to the configuration and status of existing participants will not normally be allowed. However, it may be necessary to accommodate changes essential to successful market operation.

Constraints and assumptions

The following constraints apply to the above timeline:

- There is a requirement for the first day of trading to be on the 1st day of a calendar month.
- The commencement of CODR assumes that the market will start unless there is a major failure of systems and processes during the CODR period.

The following assumptions underpin the above timeline:

- An urgent rules amendment mechanism is in place.
- No major impediment is encountered prior to market opening which would prejudice the effective operation of the market or the IMO controlled grid.

– End of Section –

5. IMO-Administered Market opening conditions

Seven conditions have been identified as necessary to be satisfied to allow the IMO-Administered Markets to open. These conditions largely follow the six reviewed with MoEST in July/August 1999, but include an additional item to cover system adequacy.

Each of the conditions is sub-divided into several “Areas of Demonstration” and each area is further sub-divided into a set of criteria.

The table below sets out the conditions and the areas of demonstration for each one.

Conditions	Areas of Demonstration
Condition 1 - IMO readiness: The IMO is able to meet its obligations as set out in the market rules for the IMO-Administered Markets.	• IMO Readiness Checklist – enterprise wide sign-off by department & business process covering: a. Finance b. Market Services c. Market Operations & Forecasts d. Market Assessment & Compliance e. Information Technology and Infrastructure • Financial – prudentials, banking and insurance
Condition 2 - Participant readiness: All participants authorized by the IMO meet the prudential, technical, interface and training requirements of the IMO and have confirmed their readiness to commence participation in the IMO-Administered Markets. Note: Participants are not required to lodge prudentials until two weeks before market opening. The final status of fully qualified participants will be updated at that time.	• Conditional authorisation • Ability tests • Digital certificates • Emergency preparedness plan • Participation agreement • OEB licence • Prudential support • Facility information • Delivery point relationships • Meter registration • Emergency restoration plan • Connection agreement

Conditions	Areas of Demonstration
Condition 3 – Contingency arrangements: The IMO is able to operate and reliably settle the market even if some participants are not fully compliant with the market rules.	• Transitional IMO Market Rules • Process published • Complete data sets permit required settlements tool functionality
Condition 4 – Reliable operations: Continued reliable operation of the IMO-controlled grid is assured.	• Energy Management System (EMS) availability • Control Performance • Operating Reserve • Outage Scheduling • Communications • Ancillary Services • Operating security limits • Emergency preparedness • Load forecasts
Condition 5 – Market design: The IMO-Administered Markets are able to function in accordance with the market rules.	• Performance of IMO-Administered Markets “bid to bill”
Condition 6 – Legal framework – All IMO developed legal documents that govern the operation of the IMO-Administered Markets are complete.	• IMO Market Rules • IMO Market Manuals • IMO agreements
Condition 7 – System adequacy: The assessment by the IMO of system adequacy during the period of transition to the new market and initial operations.	• 18 month outlook

– End of Section –

6. IMO Testing

Much of the IMO's assessment is based, directly and indirectly, upon the results of the IMO's testing. In order to provide context for the remainder of the report this section provides an overview of the key testing that the IMO has undertaken.

System Integration Testing	
Objective	Test that all systems inter-operate and that individual functions within each system perform as expected.
Nature of testing	A combination of scripted testing and ad-hoc tests
When undertaken	Performed each time a new release is received from software vendors
Participant involvement	None formally, though for certain interface tests participants were involved on an ad-hoc basis.
User Acceptance Testing	
Objective	Test that all systems and user procedures are robust and meet the user requirements.
Nature of testing	Scripted testing with known results based upon the IMO's business processes
When undertaken	Performed after selected releases from software vendors
Participant involvement	None.
Structured Market Testing	
Objective	Provide assurance to both the IMO and Market Participants that they are able to inter-operate and meet their obligations as defined in the Market Rules and Market Procedures.
Nature of testing	Scripted testing with known results based upon the market rules and procedures.
When undertaken	December, 2000 until May, 2001
Participant involvement	Selected group of key market participants.

Uncoupled Operational Dry-Run

Objective	To provide sufficient evidence that the market functions as envisaged and that the IMO and a sub-set of market participants are able to meet their obligations in the market on a sustained basis.
Nature of testing	Production simulation without dispatch and funds transfer. Certain pre-defined scenarios triggered to force specific events and circumstances
When undertaken	May and June, 2001.
Participant involvement	Selected group of key market participants
Performance testing	
Objective	To provide specific testing on system performance where other tests have either indicated some concerns or have not adequately exercised a system component at production loads.
Nature of testing	Stress test communication front end to participant interface to bids/offers/settlement data Stress test of Participant interface to metering data (simulation of 100 concurrent participants)
When undertaken	Staged, final tests in January 2002
Participant involvement	None
Fail Over, Fall Back and Fall Forward (FO/FB/FF)	
Objective	Build confidence that the IMO has the business processes, procedures, technical solutions and trained staff in place that address most likely system failure scenarios
Nature of testing	Scripted testing of FO/FB/FF scenarios
When undertaken	October till December, 2001
Participant involvement	None.
Retail Feeds and Market Settlement support	
Objective	To provide production data feeds to LDCs and other participants over a sustained period of time in order to test the IMO's metering and settlement systems and processes in production and allow LDCs to fully test their settlement systems
Nature of testing	Non-scripted, simulation of production settlement operations
When undertaken	August until December, 2001
Participant involvement	42 LDCs and 3 non-LDC have participated in the tests

Sandbox

Objective	Enable participants to test their interfaces with the IMO
Nature of testing	Non-scripted.
When undertaken	October 2001 until market in service
Participant involvement	Four dispatchable participants
Funds Transfer Dry Run	
Objective	To confirm bank account information for each participant and that the electronic funds transfer between the participants banks and the IMO bank operate correctly including second layer PKI testing.
Nature of testing	Scripted tests
When undertaken	November 2001
Participant involvement	All participants were invited, 176 participated, over 90% completely successful
Market Readiness Shadow Operations (MRSO)	
Objective	To operate the EMS/MIS systems in production mode with OPGI over a sustained period of time in order to test the IMO's scheduling and dispatch systems and processes and allow OPGI to test their automatic dispatch systems.
Nature of testing	Non- scripted, simulation of production operations
When undertaken	Phased with increasing functions brought on-line between October 2001 and January 2002.
Participant involvement	OPGI
Coupled Operational Dry-Run (CODR)	
Objective	Provide final evidence that the market functions as envisaged and that the IMO and all the day one participants are able to meet their obligations in the market on a sustained basis.
Nature of testing	Full production, without funds transfer.
When undertaken	Commences 1 month and four days in advance of the first day of trading.
Participant involvement	All participants who will be active in the market on the first day of trading.

– End of Section –

7. Condition 1 - IMO readiness

IMO readiness checklist

IMO readiness for Market Opening has been assessed and documented using the IMO Readiness Checklist. The Checklist is structured as a hierarchical sign-off from manager/supervisor level to CEO. The list is divided into departmental and market business process categories. This approach provides verification from all levels within the IMO of the readiness of people, tools and procedures to operate the market

The Checklist includes several hundred items at the detailed level, a summary level concentrates this information into about 40 areas. Each item on the checklist is colour coded; Green means sustainable in production now, Yellow indicates an item is not yet ready but there is confidence that readiness will be achieved on schedule and Red indicates that additional action is required to achieve a ready state. There are no Red items.

The current status of the high level summary is:

	Green	Yellow	Red
To operate market	25	14	0

A full list of this summary is provided in Appendix A.

Each Yellow item scheduled for future completion has a projected completion date associated with it (C1.1 through C1.15).

Financial

There are two underlying criteria relating to this area of demonstration:

- Establishment of prudential requirements for market participants; and
- Establishment of IMO financial conditions.

Posting of prudentials will be required before market opening. Also required is the calculation of each market participant's *Prudential Support Obligation*, which requires that procedures and tools be put in place with the CIBC Mellon (custodian), and that IMO prudential monitoring tools are made available in the production environment.

Regarding the latter, the IMO has established appropriate lines of credit, banking facilities and insurance as per the table below:

Financial condition	Details
Lines of credit	A \$CAD 100 million line of credit has been established with a major Bank.
Banking facilities	Five market related bank accounts have been opened and activated with a major Bank — Settlement Clearing, Prepayment, Transmission Rights, Adjustment, and a Reserve Account. The last account is effectively the \$100 million line of credit, and once the market opens, this bank account may be closed if appropriate. Additionally, any transactions that may require \$US (for example purchases of Emergency Power from neighbouring ISOs) will be handled on a one-off basis as agreed to with IMO's Bank. If the volume of \$US transactions increases, a \$US Bank account may also be opened.
Insurance	The following statutory insurance programs are in place: Fiduciary Liability, Crime, Errors and Omissions, Directors and Officers, General Liability (Umbrella and Comprehensive), Professional Liability, Property and miscellaneous insurances

– End of Section –

8. Condition 2 – Participant readiness

In assessing participant readiness, consideration has been given to the number of participants compliant today, the actions underway to move non-compliant entities into compliance before market commencement, and the availability of practical contingency arrangements. The information available to the IMO indicates that there is sufficient participant readiness for a viable market opening. The Market Commissioning Task Force has confirmed this assessment.

Work continues on the three process streams that are the current focus of market entry. To date, 99% of the expected Market Participant applications have been received, 68% of the delivery points have been signed off by the Metering Service Provider (MSP), and 75% of the facilities registration work for required facilities has been completed.

- There are currently 259 expected market participants, 151 Directly Connected (Wholesale Consumers, Generators and Transmitters), 67 Embedded and 41 remaining (Wholesale Seller, Retailer, Financial Markets).
 - Of the 259, there are 95 LDC's of which 60 are Direct and 35 are Embedded.
 - Of the 259, Wholesale Consumers represent 98 consisting of 72 Direct and 26 Embedded. Generators consist of 17 Direct and 6 embedded.
- The current status of facilities registration work is as follows: For non-transmission facilities connected to the IMO Controlled Grid (304) and Embedded Facilities (99), the IMO has 75% of the technical information for required facilities.
- There are approximately 1,986 delivery points to be set up for the market . Of these 68% are signed off by the MSP, 22 % are pending action by MSP and 10% pending action by the IMO.
- About 68% of Participants have submitted emergency preparedness plans, representing over 95% of Ontario load. About 50% of Participants have submitted System Restoration Plans, representing over 75% of Ontario load.

Other milestone activities are indicated below, the dates in the table reflect the market readiness schedule current on December 17, 2001.

As noted in the last paragraph of Section 1 of this document, ultimately Participants confirm their own readiness when they sign the Participation Agreement. Full execution of the Participation Agreement by the IMO will occur after the Participant posts prudentials two weeks prior to market in-service.

The key process activity details are as follows:

MILESTONE		MILESTONE DATE	total applicable	COMPLIANT		NON-COMPLIANT			
						ONLY SANCTIONS APPLY		CONTINGENCY ARRANGEMENTS REQUIRED	
AUTHORIZATION REQUIREMENTS (all participants)									
1	Conditional Authorization Received	Oct. 26, 2001	259	204	79%	N/A		55	21%
	Connected		151	122	81%	N/A		29	19%
	Embedded		67	54	81%	N/A		13	19%
	Non Facilities		41	28	68%	N/A		13	32%
2	Ability Test Complete	Oct. 26, 2001	259	166	64%	93	36%	N/A	
	Connected		151	108	72%	43	28%	N/A	
	Embedded		67	33	49%	34	51%	N/A	
	Non Facilities		41	25	61%	16	39%	N/A	
3	Digital Certificates Operational (Production)	Dec. 14, 2001	259	4	2%	N/A		255	98%
	Connected		151	3	2%	N/A		148	98%
	Embedded		67	0	0%	N/A		67	100%
	Non Facilities		41	1	0%	N/A		40	98%
4	Emergency Preparedness Plan Submitted	Nov. 16, 2001	259	187	72%	72	28%	N/A	
	Connected		151	114	75%	37	25%	N/A	
	Embedded		67	52	78%	15	22%	N/A	
	Non Facilities		41	21	51%	20	49%	N/A	
5	Participation Agreement Signed	Jan 15, 2001	259	3	1%	256	99%	N/A	
	Connected		151	3	2%	148	98%	N/A	
	Embedded		67	0	0%	67	100%	N/A	
	Non Facilities		41	0	0%	41	100%	N/A	
6	OEB License Received	before market open	259	148	57%	111	43%	N/A	
	Connected		151	93	62%	58	38%	N/A	
	Embedded		67	36	54%	31	46%	N/A	
	Non Facilities		41	19	46%	22	54%	N/A	
7	Prudential Support Information (updated Form 1044)	Feb. 15, 2002	249	112	45%	N/A		137	55%
	Connected		143	70	49%	N/A		73	51%
	Embedded		65	27	42%	N/A		38	58%
	Non Facilities		41	15	37%	N/A		26	63%
FACILITIES REQUIREMENTS (metered participants only)									
8	Facility Information Sent	Sept. 14, 2001	218	118	54%	N/A		100	46%
	Connected		151	76	50%	N/A		75	50%
	Embedded		67	42	63%	N/A		25	37%
9	Delivery Point Relationship Documents Signed	Nov. 16, 2001	218	155	71%	N/A		63	29%
	Connected		151	110	73%	N/A		41	27%
	Embedded		67	45	67%	N/A		22	33%
10	Meter Registration Complete	Nov. 16, 2001	218	0	0%	148	68%	68	31%
	Connected		151	0	0%	112	74%	37	25%
	Embedded		67	0	0%	36	54%	31	46%
11	Emergency Restoration Plan Submitted	Nov. 16, 2001	89	46	52%	43	48%	N/A	
12	Connection Agreement Signed	Dec. 14, 2001	158	19	12%	139	88%	N/A	
	Connected		144	19	13%	125	87%	N/A	
	Embedded		14	0	0%	14	100%	N/A	

– End of Section –

9. Condition 3 – Contingency procedures

Introduction

At this juncture, this section is primarily a description of strategy and intent. The specific numbers of non-ready participants that will be accommodated under contingency arrangements will be updated as market opening date approaches. It should be noted that this section recognizes that the market rules that give the IMO the necessary authorities to implement contingency arrangements have been approved by the IMO Board but are yet to come officially into force.

Overview

It is possible that some prospective participants in the IMO-administered markets will not have completed all the authorization, facility and registration activities, or provided all the data specified by the market rules, in time for market opening. For the purposes of this document, such participants will be referred to as “non-ready participants”. Many of those non-ready participants are directly connected to the IMO-controlled grid, and currently cause or permit electricity to flow into, through, or out of that grid. Section 27 of The Electricity Act, 1998, provides that such entities must operate in accordance with the market rules. Therefore, although those non-ready participants that are directly connected to the IMO-controlled grid will not have completed all the necessary market entry activities, they will be accommodated within the IMO physical market.

For those non-ready participants that are not directly connected to the IMO-controlled grid, the IMO will exercise its discretion as to whether or not to accept such participants into the IMO physical market. For those non-ready participants that are embedded within, and connected to, a host Distributor, denial of access will require them to remain a customer of that host Distributor. Non-ready participants will be denied access to the IMO financial market.

Contingency arrangements are the activities associated with accommodating the appropriate non-ready participants within the IMO-administered markets.

Contingency Arrangements and the Market Rules

The market rules require the IMO to establish and publish deadlines for authorization activities, and to remedy the effects of missed deadlines. That remedy includes contingency arrangements such as the IMO making estimates and assumptions for information that the non-ready participant is required to provide but has not. Such estimates and assumptions will become the basis for operation and settlement of the IMO-administered markets. In addition, the market rules limit a non-ready participant’s access to certain other provisions of the rules e.g. access to the Notice of Disagreement and Dispute Resolution processes for data estimated under contingency arrangements.

Any participant that is operating in the IMO-administered markets, but that has not completed all the authorization, facility and registration activities, or provided all the data specified in the market rules, is considered to be non-compliant with the obligations specified in the market rules. The market rules give the IMO the necessary authority to apply penalties for such non-compliance.

Contingency Arrangement Implementation

As a pre-cursor to the implementation of contingency arrangements, any prospective market participant that missed a milestone has been reminded that the IMO cannot guarantee that they will have access to the IMO-administered markets, or that their participation may be in a role other than the one that they have requested. In addition, for those embedded non-ready participants that the IMO may require to remain with their host Distributor, that host Distributor will have been forewarned by the IMO

The IMO will publish a description of the contingency arrangement process, including the estimates and assumptions that will be used to remedy the lack of data from non-ready participants and the penalties that may be applied for non-compliance items.

Before the commencement of the stability period as described in Section 4 any participant that has not:

- completed all the necessary registration activities; or
- provided all the data specified by the market rules

will be informed that they will be accepted into the IMO-administered markets under contingency arrangements, or will be denied access. In the case of embedded participants, a denial of access will mean that they will be required to remain with their host Distributor.

In accordance with the market rules and with the published contingency arrangements' process, the IMO will estimate the missing data for non-ready participants and will populate the IMO systems as necessary. At market commencement date, that estimated data will form the basis for operation and settlement within the IMO-administered markets. Prior to the start of Coupled ODR, non-ready participants under contingency arrangements will be provided with details of the data that has been estimated for them.

Financial penalties may be applied from the market commencement date, and the IMO may recover the additional costs incurred as a result of implementing contingency arrangements.

Any non-ready participant accepted into the IMO-administered markets will be required to remain under contingency arrangements or in the assigned role until the later of the end of the stability period or the date when they have completed all the authorization, facility and registration activities or provided all the data specified by the market rules. The IMO will continue to accept missing data from market participants during the stability period; however the processing of such data will be at the discretion of the IMO until the end of the stability period and for such additional time beyond the stability period as the IMO may reasonably require. Once accurate data has been provided to the IMO, any non-compliance penalties resulting from contingency arrangements will cease.

Market Participants Operating Under Contingency Arrangements

At the present time, it is projected that it might be necessary to estimate some or all meter registration or delivery point data for:

- five Distributors
- nine Wholesale Consumers, and
- three Generators.

Estimates applied under contingency arrangements will have a relatively minor impact on the overall settlement results for a particular participant.

In addition, it is projected that it might be necessary for some or all delivery points to remain with the host Distributor for:

- eight Distributors
- fifteen Wholesale Consumers, and
- three Generators.

Such delivery points will not be accommodated within the IMO-administered markets.

It should be noted that the above projections might change prior to the market commencement date. Also, it will be necessary to estimate administrative-type data for a number of other participants that are under contingency arrangements; however those estimates will not have an impact on the settlement results.

In addition to the above actions, many participants will not have completed other authorization, facility and registration activities specified in the market rules and, therefore, will be liable to non-compliance penalties.

– **End of Section** –

10. Condition 4 – Reliable operations

A significant accountability of the IMO is to direct the operation and maintain the reliability of the IMO-controlled grid and also to ensure that activities within the Ontario control area do not adversely impact its neighbouring interconnections. The ability to carry out this accountability is the culmination of the successful implementation and integration of rules, agreements, systems, processes and people. This is true of not just the IMO but involves the cooperation of all market participants. While the effectiveness of these various components has been demonstrated through various stages of individual and combined testing, these elements can only be brought together completely during the final stage of integrated testing. Listed below are the areas of demonstration and the IMO's current assessment.

- Energy Management System-related reliability and Back-up Operating Center readiness. The Energy Management System serves as the IMO's primary source of operational information and is the platform for commercial activity within the IMO-administered market place. A high level of sustained reliability is required to ensure effective operation of the power system and the market. Although both design and preventative measures have been undertaken there always exists a remote possibility that the main IMO control center could be rendered unavailable. To ensure the effects on both the IMO-administered markets and the IMO-controlled grid are minimized, a back-up operating centre must be in a state of ongoing readiness.

Assessment: The new Energy Management System is in regular use as part of MRSO and is performing reliably. The backup operating center is in service and has been exercised with respect to managing operations in today's environment. Fail over / Fall back / Fall forward testing, which tests the ability to switch from the primary to the back-up site, is partially completed and is scheduled to complete by December 20, 2001 (C4.1).

- Control performance. The NERC based Control Performance Standard (CPS) and Disturbance Control Standard (DCS) define a standard of minimum control performance. Each control area is to have the best performance above this minimum that can be achieved within the bounds of reasonable economic and physical limitations.

Assessment: The new Automatic Generation Control is in almost continuous use in MRSO and performing well. During our testing no degradation of CPS performance has occurred. Acceptable Control Performance in the new market will have to be confirmed during CODR (C4.2).

- Operating reserve. Capacity in excess of that required to meet the anticipated requirements for energy must be available to meet unforeseen contingencies and for load forecast uncertainties. To meet this obligation the IMO must procure sufficient 10 minute operating reserve and 30 minute operating reserve. The IMO must also ensure that reliability policies for local area supplies are addressed as per the market rules.

Assessment: The mechanisms to procure reserve have been successfully tested in UODR and are being exercised through MRSO. Demonstration of the effectiveness of the mechanisms will be through later stages of MRSO and CODR (C4.2).

- Outage scheduling. The IMO must be able to review and assess the impact of maintenance outages scheduled within the Ontario control area. This process will allow the IMO to engage in outage

scheduling activities such as advance approve, approve, prioritize, publish, deny, defer, exempt, revoke or recall outages that could have an impact on the reliability of the IMO-controlled grid.

Assessment: The outage scheduling tools and processes have been successfully tested in UODR and have recently been put into operational practice.

- Communications. To allow the IMO to direct the operations and maintain the reliability of the IMO-controlled grid, communications between the IMO, Market Participants and other entities (e.g. neighbouring control areas) must be consistent, efficient and effective at all times.

Assessment: Effective communication between the IMO and various parties is demonstrated daily as part of our ongoing operational obligations today. Communication requirements are articulated in the market rules, market manuals, operating agreements and interconnection agreements. The new communication protocols were used successfully in a recent restoration plan exercise. Effectiveness of some additional communication content, practices and parties will be demonstrated in CODR (C4.2).

- Ancillary services. The IMO must operate the IMO-administered markets to ensure that sufficient ancillary services, such as automatic generation control, voltage support and black start capability are procured to meet the variations of the integrated power system.

Assessment: Ensuring sufficient ancillary services is an everyday activity for the IMO today. The new contractual mechanisms to procure these services are nearly finalized (C4.3).

- Operating security limits. The IMO must have in place an adequate set of operating security limits such that the IMO-controlled grid can be operated within power system transfer capabilities in accordance with defined criteria to ensure system reliability is maintained.

Assessment: Operating Security Limits are in regular use today. Their use with the new market tools and processes is being exercised through MRSO and have not had a detrimental affect on our ability to manage within Operating Security Limits.

- Emergency preparedness: As dictated by the market rules and also by industry standards the IMO has the responsibility to coordinate and manage activities surrounding emergency preparedness within the Ontario electricity sector. This includes establishing planning criteria, and reviewing market participant plans and coordinating the execution of drills and exercises with the involvement of the Ministry of Energy, Science and Technology and Emergency Measures Ontario.

Assessment: The IMO's Emergency Preparedness Plan and the Ontario Power System Restoration Plan were filed with the Ministry of Energy, Science and Technology in June 2000. The first simulated exercise of the Restoration Plan was successfully conducted on November 28, 2001.

- Load forecast uncertainty. To ensure adequate energy, capacity, transmission and related ancillary services are available, the IMO must forecast and publish conditions within the IMO administered markets on an ongoing basis. These forecasts must be detailed, timely and accurate to allow market participants the opportunity to meet the reliability needs of the marketplace.

Assessment: The IMO forecasts future load expectations today. The tools and processes for publishing forecasts were demonstrated through UODR. The response by market participants to these forecasts will be demonstrated in CODR (C4.2).

- **End of Section** -

11. Condition 5 – Market design

Performance of IMO-Administered markets “bid to bill”

This area of demonstration relates to performance according to the timelines stipulated within the market rules. The key criteria are set out in the table below along with comments on the proof obtained through testing.

Criterion	Source of evidence	Detail of evidence
Bids and offers can be submitted	UODR, MRSO, CODR, Performance Tests	UODR proven [***To be completed] MRSO proven CODR unproven [***To be completed] (C5.3) Performance tests unproven (C5.2)
Pre-dispatch schedule produced according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #4, MRSO proven CODR unproven Criterion #4 (C5.3)
Real time schedule timeliness according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #5, MRSO proven CODR unproven Criterion #5 (C5.3)
Provisional market schedule and prices published according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #6, MRSO proven CODR unproven Criterion #6 (C5.3)
Dispatch instructions issued according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #7, MRSO proven CODR unproven Criterion #7 (C5.3)
Dispatch scheduling undertaken according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #8, MRSO (C5.1) CODR unproven Criterion #8(C5.3)
Participants able to respond to dispatch instructions according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #19, MRSO (C5.1) CODR unproven Criterion #8 (C5.3)
Participants able to access metering data	UODR, Retail Feeds, CODR, Performance Tests	UODR proven Retail feeds proven CODR unproven (C5.3) Performance tests unproven (C5.2)
Publication of preliminary market prices according to market rule timelines	UODR, MRSO, CODR	Criteria tba (C5.3)
Publication of final market prices according to market rule timelines	UODR, MRSO, CODR	Criteria tba (C5.3)

Criterion	Source of evidence	Detail of evidence
Issuing of preliminary settlement statement according to market rule timelines	UODR, Retail Feeds, CODR, Performance Tests	UODR proven Criterion #9, Retail feeds proven CODR unproven Criterion #9 Performance tests unproven (C5.2)
Issuing of final settlement statement according to market rule timelines	UODR, Retail Feeds, CODR, Performance Tests	UODR proven Criterion #10, Retail feeds proven CODR unproven Criterion #10 Performance tests unproven (C5.2)
Issuing of invoices (both physical and financial markets) according to market rule timelines	UODR, Retail Feeds, CODR	UODR proven Criterion #21, Retail feeds proven CODR unproven Criterion #11
Publication of operational load forecasts according to market rule timelines	UODR, MRSO, CODR	UODR proven Criterion #11, MRSO (C5.1) CODR unproven Criterion #12
Completion of operational security assessments according to market rule timelines	CODR	CODR unproven Criterion #13 (C5.3)
Market start-up, suspension and restart	CODR	Criteria tba (C5.3)
Participant suspension and re-entry	CODR	Criteria tba (C5.3)

UODR results can be found in IMO document IMP_REP_0044 (Uncoupled Operational Dry Run (UODR) Exit Report and CODR results in document IMP_REP_xxxx (Coupled Operational Dry Run (CODR) Exit Report). MRSO does not produce a formal written report, but conclusions are based on the experiences of control room staff.

– End of Section –

12. Condition 6 – Legal framework

The legislative authority for the market rules is contained in the *Electricity Act, 1998*. Subsection 32(1), which was proclaimed into force on November 7, 1998, contemplates that there will be made rules governing the IMO-controlled grid and establishing and governing the IMO-administered markets related to electricity and ancillary services. The *Market Rules for the Ontario Electricity Market* state that “The body corporate responsible for the administration and supervision of the market rules is the IMO.”

In support of this obligation, the IMO has developed a comprehensive legal framework which consists of the following components:

- Market Rules;
- Market Manuals;
- Agreements;
- Contingency arrangements for non-ready participants.

Market Rules

The *Market Rules for the Ontario Electricity Market* constitute the market rules made under the authority and purposes of the *Electricity Act, 1998*.

On December 13 the Minister made all of the rules recommended by the IMO Board as of their October, 2001 Board meeting. The Board has approved additional rule amendments in November and December of 2001. The Minister will be requested to make these rules in January. While this largely completes the rules required for market opening, there is the possibility that additional amendments will be required based on the results of continued testing.

The IMO understands that the Minister intends that rule making authority be passed to the IMO immediately on market opening. During the period of testing prior to market opening, MoEST will support an “urgent rule amendment process” to respond to any additional amendments needed to support market opening.

Market Manuals

The Market Manuals consolidate the market procedures and associated forms, standards, and policies that define certain elements relating to the operation of the IMO-administered markets. Market procedures provide more detailed descriptions of the requirements for various activities than is specified in the *Market Rules for the Ontario Electricity Market*. Standards and policies appended to, or referenced in, these procedures provide a supporting framework.

The market procedures have been consolidated into seven market manuals:

- Market Entry, Maintenance and Exit;

- Market Administration;
- Metering;
- Market Operations;
- Settlements;
- Participant Technical Reference; and
- Systems Operations.

To ensure coverage and completeness, the market procedure workflows have been mapped to the IMO and market participant obligations, derived from the market rules.

Current versions of all of these market manuals have been included in the IMO baseline and posted on the IMO's web site. Further amendments will be posted as part of Baseline 7.0 in January and subsequently, as required (C6.2).

IMO Agreements

To satisfy certain terms and conditions contained in the market rules, the IMO has developed a set of standard and participant specific agreements. The terms and conditions have the effect of a contract between each market participant and the IMO by virtue of the execution of these agreements.

There are nine standard agreements:

Agreement	Signatories	Status
Participation	All participants	Approved by IMO Board
Credit support	All participants	CSA being incorporated into Market Rules, completion expected December 17
Confidentiality Agreement for Dispute Resolution	Dispute Resolution Panel	Being drafted (C6.4).
Electronic Authentication (PKI)	All participants	Final version has been circulated for signature and a number of signed copies received (C6.5).
Preliminary assessment	All connection applicants	Implemented
System impact assessment	All connection applicants	Implemented
Metering Service Provider Agreement (valid from market in service)	Metering Service Providers	Approved by IMO Board
Transitional meter service provider (valid until market in service)	Metering Service Providers	Implemented
Participant Network	All participants connected to the IMO network	Back-to-back contract (AT&T) with service provider being concluded (C6.7).

There are also five participant specific agreements :

Agreement	Signatories	Status
Transmission operating	Hydro One Networks	Approved, signed, effective on market commencement.
	Great Lakes Power	Settled in principle, awaiting execution (C6.8).
	Canadian Niagara Power	Approved, signed, effective on IMO commencing direction of CNP transmission facilities.
	Five Nations	Approved , signed and implemented
Interconnection	New York - ISO	Approved, signed, effective on termination of current agreement.
	New York Power Authority	Awaiting signature by both Parties (C6.9).
	Niagara Mohawk Power Corporation	Ready for signature by IMO. NMPC addressing implementation concerns (C6.10).
	TransEnergie (Hydro-Quebec)	In final discussions, signing anticipated January (6.11)
	International Transmission Company Detroit Edison)	In final discussions, signing anticipated January (C6.12).
	Minnesota	In process, signing anticipated January (C6.13).
	Manitoba	In final review, signing anticipated January (C6.14).
	Maclaren	Approved, signed and implemented
Market Power Rebate Settlement	OPGI	Approved, signed and arrangements in place
Operating Reserve Bid Cap	OPGI	Principles for establishing the Bid Cap approved by OPG and IMO Board. Agreement under development (C6.16)
Ancillary services	As required to ensure reliability	Voltage Control and Reactive Support approved and signed by IMO and OPG. Black Start approved by IMO Board and signed by IMO. Regulation/AGC Agreement approved by IMO Board subject to further approval of price by Independent Directors and agreement with OPG (C6.17).

– End of Section –

13. Condition 7 – System adequacy

Each quarter the IMO undertakes and publishes an assessment of the adequacy of the Ontario Electricity system for the next 18-month period. The assessment is based on a forecast of electricity demand and available supply combined with current information on the configuration and capability of the transmission system. The most recent known outage plans of generators and transmitters, as well as information related to proposed transmission and generation facilities additions are incorporated in the assessment.

The message in the December 2001 assessment is similar to the previous 18-month Outlook report published on October 1, 2001. Sufficient resources are expected to be available to Ontario to provide adequate reliability, and existing and proposed transmission is forecast to be adequate for reliable supply. While the reserve margins for the upcoming winter are tighter than in the previous Outlook, resources remain adequate and the situation generally improves thereafter. During this Outlook period, Ontario generating capacity is expected to increase with the new generation additions and generators expected to return to service. As is always the case with these forecasts, it should be recognised that certain combinations of extreme weather and/or lower than forecast resources, could result in lower than desired levels of reliability.

– End of Section –

14. Exceptions

The following items remain outstanding as at December 17, 2001:

Cross Reference	Issue	Readiness Report version
Condition 1 – IMO Readiness		
C1.1	Market assessment and compliance – monitor markets. Procedures are in place. Tools expected in place for March 1 st	Version final
C1.2	Finance – manage prudential risk. Additional reports to assist in the daily monitoring are scheduled for January 14.	Version final
C1.3	Market operations and forecasts – address constraints. An updated version of the 115kv model is required to address issues identified during MRSO. This will be available in January.	Version 2
C1.4	Market operations and forecasts – facilitate transmission rights market. Modifications to the system are required to address public reporting and web site access.	Version final
C1.6	Market operations and forecasts – process market contracts (see exceptions under C6)	See exceptions under C6
C1.7	Market services – acquire market participant. Delays to the set-up of the production PKI service have delayed the process for issuing production certificates. This process is anticipated to complete in early January	Version 2
C1.8	Market services – maintain and retire market participant. Work rounds to cope with defects in the PLC system are under development	Version 2
C1.9	Market services – contingency trading arrangements. Population of contingency data is planned to complete by the end of December.	Version 2
C1.10	Market services – process revenue metered data. Additional monitoring and support is being deployed to ensure that the meter data collection systems function as required. This should be in	Version 2

	place by the end of December.	
C1.11	Market services – register meter service provider. Approved by IMO Board awaiting participant signatures	Version 2
C1.12	Market services – publish notification. IMO procedures will be completed by end of December.	Version 2
C1.13	Market services – Testing of some outstanding charge codes that relate to the disbursement of the OPGI power mitigation rebate are scheduled for January.	Version final
C1.14	Market services – commercial reconciliation for real time markets. (see C1.13)	See C1.13
C1.15	Market services – process market rule changes. Rule making authority has not yet been passed to the IMO.	Version final
Condition 2 – Participant Readiness		
	Status report	Version 2, Version final
Condition 3 – Contingency Arrangements		
	Status report	Version 2, Version final
Condition 4 – Reliable Operations		
C4.1	All fail over, fall back and fall forward testing of the EMS systems that is considered necessary is scheduled to be completed by late December.	Version 2
C4.2	Final verification of IMO’s system operations function’s ability to: • Achieve acceptable control performance; • Procure adequate operating reserve; • Communicate effectively with all participants; • Produce accurate forecasts. Will be provided during CODR	Version final
C4.3	See C6.16.	See C6.16
Condition 5 – IMO Readiness		
C5.1	As at the date of this report 5 minute dispatch has operated successfully on a manual basis and AGC has operated reliably. Testing of automatic 5 minute dispatch started on December 3 and will	Version 2

	continue until the start of CODR	
C5.2	Most performance tests have been conducted within the context of more general testing. Two areas require specific additional testing. This testing is scheduled for December and January	Version 2
C5.3	Final verification of IMO business processes and systems, already extensively tested, will be achieved when CODR completes	Version final
Condition 6 – Legal framework		
C6.1	Ministerial approval of the in service market rules	Version 2, Version final
C6.2	Posting of final amendments to market manuals on the IMO web site	Version 2
C6.4	Agreement is under draft.	Version final
C6.5	Circulated for signature	Version final
C6.7	Agreement is being concluded.	Version final
C6.8	Being prepared for signature	Version 2
C6.9	Awaiting signature	Version 2
C6.10	Final review by Niagara Mohawk	Version 2
C6.11	Signature expected by mid January	Version final
C6.12	Signature expected by late January	Version final
C6.13	Signature expected by lat January	Version final
C6.14	Signature expected by late December	Version 2
C6.16	Agreement under development	Version final
C6.17	Price to be negotiated with OPG	Version final
Condition 7 – System Adequacy		
	None	

– End of Section –

Appendix A – Readiness Checklist

	Process	Status	Workaround Required	Remarks
	Market Assessment & Compliance (MACD)			
036	Monitor Markets	Y	-	Procedures sufficiently in place. Tools expected in place end January (LMP) and March 1st for priority tools.
038	Process Non-Compliance Issues	G	-	Tools, procedures and training initiatives sufficiently in place for CODR and Market Open
039	Resolve Disputes	G	-	Tools, procedures and training initiatives sufficiently in place for CODR and Market Open
	Finance			
031	Manage Cash	G	-	Systems, internal procedures & personnel ready for CODR. Funds Transfer Dry Run test with MPs successful.
033	Manage Prudential Risk	Y	Manual workarounds currently being fine tuned	1. BRIO reports to assist in daily calculation of daily ANEs targeted for 14 January 2002
030	Invoice Participants	G	-	All tools and procedures ready for CODR
	Legal & Corporate Affairs		-	
088	Design Authority	G	-	Necessary processes are in place to perform CODR & Market Opening. Actual processes are being performed now.
	Market Operations & Forecasts (MOF)			

	Market Suspension Procedures	G	Work around has been developed, were the administrative prices can be manually placed in the tool by IT dept.	Internal and External procedure completed. Administrative pricing tool should be available with release 4.1 .If it is not we have a work around.
013	Address Constraints	Y	A variety of work-arounds are in place for MRSO to address noted problems	Work in progress to address problems with 115 kV model, Phase Shifter model and Thermal Limits identified during MRSO. Phase Shifter and Thermal Limits Models are not considered critical the CODR and Market Open -- adequate work arounds in place. The 115kV Model is currently in QA and will be released to the A/B C in early January (January 7/02) prior to CODR at which time this process will be green. Related to (024) Integrate Market Signals
016	Prepare Short-Term Forecasts and Assessments	G	-	Ready for Market Open (no part to play in CODR). Some areas need work (as outlined below) but none will affect overall in-service readiness.
018	Prepare Long-Term Forecasts and Assessments	G	-	Ready for Market Open (no part to play in CODR). Some areas need work (as outlined below) but none will affect overall readiness for Market Open.
020	Facilitate E&OR Markets	G	-	VBR problems have been resolved with latest patch.
022	Facilitate Transmission Rights Market	Y	-	Vendor continues to work on resolving outstanding tool problems - deployment date tentatively 21 Jan 02. However work around exists to minimize the probability of problem re-occurring. Public Reporting and web site development for TRA in progress Delivery date is expected to be prior to CODR.

023	Prepare Near Term Security & Adequacy Assessments	G	Manual workarounds in place for MRSO	Entry of outage & installed capacity data to PAR: solution planned for 1 February 2002
024	Integrate Market Signals into Operation of Grid	G		0 Minor tool and procedure problems that occur during unique system configurations. There are manual workarounds for these problems.
025	Predispatch Integration of Market and Grid	G	-	Ready for CODR/Market Open
026	Determine System Capability	G	-	Tools, procedures and personnel in place. All processes are currently exercised.
027	Develop IMO Emergency and System Restoration Plans	G	-	Restoration exercise completed 28 November 2001; objectives met; no significant findings. Ready for CODR & Market Opening
028	Process Market Contracts	Y	-	Work is in progress to complete contracts for ancillary services, operating agreements with OEB-licensed transmitters and interconnection agreements with neighbouring entities prior to CODR/Market Opening. See details below.
029	Process Outages	G	2. Clerical staff will input outages manually	1. Method of publishing transmission outages planned to be in place on 7 January 2002. 2.No means of entering outages into OS from MPs other than OPG & H1
	Connection Assessment & Approval	G	-	Process already in place; actual assessments are being performed.

Market Services				
010	Acquire Market Participant	Y	If distribution of production certs is delayed, they will be distributed on a priority basis prior to CODR, with low priority users receiving certs during CODR.	PKI - MP downloading of software and certificate initialization has commenced, but has yet to achieve needed efficiency due to participant difficulties in testing certs.
011	Maintain & Retire Market Participant	Y	Workarounds being developed for suspension, termination and withdrawal - a simplistic approach will be available prior to start of ramp-up. A more sophisticated approach will be available prior to market opening.	Functionality in PLC to handle suspension, termination & withdrawal is inadequate.
	Contingency Trading Arrangements (CTA)	Y	-	Plans have been developed. Publication of the process is scheduled for the week commencing December 17. Databases are scheduled to be populated by December 18.
034	Process Revenue Metered Data	Y	1. Additional monitoring and support will be provided to ensure that required availability will be achieved. 2. Additional clerical staff will perform this task manually	1. RMS reliability and stability - MV90 experiencing reliability problems. 2. No email notification capability with MTR
048	Commercial Reconciliation for Energy Forward Market	G	-	> Settlement of TR auction is ready with the exception of internal procedures which are slated to be ready for baseline version 7
045	Manage Help Center Operation	G	-	>The IMO Help Centre has been operational now for almost 2 years.
046	Register Meter Service Provider	Y	-	MSP Agreement approved on 7 December by Board but needs to be signed by all relevant parties

047	Publish Notification	Y	If some of the 5 missing reports will not be available for market open then possibility of manual reports will be examined, or a functional deferral will be raised. These reports are not viewed as of sufficient importance to delay market opening.	5 reports that are required to be published by Market Rules do not exist. Work scope being defined with target of market in service.
	Contingency Procedures for Commercial Reconciliation	G	-	Internal procedures to execute this scenario will be completed for baseline version 7.0.
035	Commercial Reconciliation for Real Time Markets	Y	-	Work progressing on the testing of software for outstanding charge codes.
	Processing Exemptions	G	-	Process is in place; exemptions are being processed. Plans being developed for exemptions not processed by market opening as part of contingency arrangements.
037	Process Market Rule Changes	Y	-	Not exercised during UODR. While we do not expect to exercise the market rule amendment process as part of CODR, there may be a need to process, via the urgent rule amendment process, critical rule amendments that are discovered during this period. We no longer expect that rule making authority to be passed to the IMO by the start of CODR. We will have to develop an interim process to deal with the critical amendments identified above. A number of rule amendments to the Market

				Rules related to rule amendments have been approved by the IMO Board are pending making by the Minister.
IT & Infrastructure		-	-	-
91	Organization	G	-	Basic IT support organization for UODR was in place. IT&I organization being revised for CODR. Although the organization with Tier 1 is in place, PKI support and on call support still needs to be finalized.
92	Tools	G	-	Most tools to support and monitor UODR were in place. Tool improvement will continue leading up to CODR. Some reports were provided on a manual basis.
93	Procedures	Y	-	Problem management, IT Help Desk and Troubleshooting in place for UODR. 7x24 IT support was implemented and was ready at the start of UODR. Additional procedures required to support ongoing operation are all underway.
94	Training	G	-	All training complete.
95	Vendor Support	G	-	All vendor support for hardware, software and applications is in place
96	Security	G	-	All immediate tasks undertaken. Logical security will be reviewed over the next year.

– End of Document –