Legislative Council Panel on Economic Services

YEAR 2000 COMPLIANCE: ELECTRICITY, GAS AND OIL SUPPLIERS

INTRODUCTION

This paper informs Members of the progress made towards Y2K compliance by the companies supplying electricity, gas and oil. The companies concerned are -

- The Hongkong Electric Co., Ltd (HEC)
- CLP Power Hong Kong Ltd (CLP Power)
- Hong Kong Nuclear Investment Co. Ltd (HKNIC)
- The Hong Kong and China Gas Company Ltd (HKCG)
- The five oil and LPG suppliers.

2. The electricity and towngas companies have each prepared a position paper for Members setting out in detail the progress made. The following paragraphs summarise the progress reported in the papers. The position as regards the oil and LPG suppliers is also summarised.

PRESENT POSITION

The Hongkong Electric Co., Ltd

(Paper at Annex A)

3. HEC report that all rectification work on their computer systems and embedded systems has been completed and that these systems were Y2K compliant as of 30 June 1999. The compliance status of all of the systems concerned has been verified through thorough testing. The tests included setting forward the system clocks of generating units to December 1999 and operating the units in normal production use for more than 60 days.

4. HEC's contingency plans against Y2K-induced problems in different functional areas were prepared in May 1999. An integrated company-wide contingency plan will be ready by August 1999. Drills to evaluate the validity of the plans have been started and will be completed in August 1999. HEC will run four to five generating units during the rollover

period, more than are needed to meet normal demand in winter time. Of these, three have analogue controls (which have no digital components), and are therefore are not at risk from Y2K. During the rollover period, HEC will set up a Y2K co-ordination centre equipped with diversified communication systems, double the operational staff at Lamma Power Station and have engineers standing by at all zone substations to ensure fast response to any unforeseen events.

5. All aspects of HEC's Y2K preparations have been reviewed by independent consultants. The review concluded that HEC's compliance programme was appropriate and satisfactory and that the risk of having serious disruption of operations due to date-related failure of any of HEC's systems is very low.

CLP Power Hong Kong Ltd
(Paper at Annex B)

6. CLP Power report that all rectification work has been completed and that all of their electricity supply and delivery and other operational and business systems are Y2K compliant as from 22 June 1999. The compliance status of all of the systems concerned has undergone thorough testing, including the setting forward of the system clocks of generating units. The preparations have been reviewed by the company's internal auditors and will be examined in depth during July 1999 by independent consultants.

7. CLP Power have produced contingency plans against Y2K- induced problems in different functional areas and an integral company contingency plan. Training and drills will be conducted in August 1999. Demand on CLP's system during the rollover period is expected to be about one third of the available generating capacity. The demand will be met from separate power stations, using a variety of fuels and generating technologies, so as to minimise the risk of a single failure causing a major lack of electricity supply. Standby spinning reserve will be increased substantially. Engineers will be on standby at critical system facilities. On-site and standby engineering and operational staff will exceed 1,500 people. Diversified communication systems will be used.

8. CLP Power have maintained close contact with HKNIC on Y2K readiness efforts at the Guangdong Nuclear Power Station and have consulted their counterparts at HEC and the Guangzhou Pumped Storage Power Station, as other parties with whom they are interconnected, over their Y2K readiness and have received satisfactory responses.

Hong Kong Nuclear Investment Co. Ltd
(Paper at Annex C)

9. HKNIC report that the Y2K readiness programme for the Guangdong Nuclear Power Station (GNPS) has been prepared by specialist teams with support from technical, internal audit and quality assurance teams within the Guangdong Nuclear Power Joint Venture Company (GNPJVC) and is based on international guidelines and practices. All rectification work has been completed and the GNPS is 100% Y2K ready. HKNIC also report that nuclear safety at the GNPS will not be affected by the Y2K issue. Whereas Y2K is a computer-related issue, the operation of the nuclear safety protection functions in the GNPS does not require a computer. The protection function is activated by events and not by time. Y2K issues, therefore, could only affect plant availability, not safety. The Y2K readiness work at the GNPS has been reviewed and endorsed by the International Atomic Energy Agency.

10. The GNPJVC completed an integrated contingency plan by the end of June 1999. Work will continue to train GNPS personnel, conduct drills and refine the contingency plan throughout the remainder of 1999. HKNIC has engaged a consultant to conduct an independent review of the Y2K readiness work and contingency planning at the GNPS.

The Hong Kong and China Gas Company Ltd
(Paper at Annex D)

11. HKCG report that their compliance programme was planned and implemented based on international standards. All rectification work on systems relating to the safe and reliable supply of gas, customer services and internal systems has been completed and these systems are Y2K compliant as of 30 June 1999. The compliance status of all of the systems concerned has been verified through testing. The tests included setting forward the clocks of critical systems in the gas production plant and the pressure monitoring system of the gas distribution network. HKCG's Y2K compliance programme has been reviewed by the company's internal auditors and independent consultants and assessed to be appropriate and satisfactory.

12. HKCG have produced contingency plans to cope with any Y2K-induced problems in different functional areas. The validity of these plans was tested in May and June 1999. HKCG have arranged for additional

supplies of fuel for their back-up power generators in the unlikely event of loss of electricity supply. During the rollover period, an emergency control centre will be set up and more than 1,000 staff will on standby at different critical points in the towngas network. A recovery plan for resumption of gas supply within two hours has been prepared for use in the unlikely event that gas production is interrupted as a result of Y2K-related problems.

Oil and LPG Suppliers

13. Three of the five oil/LPG suppliers operating in Hong Kong report that they achieved 100% Y2K compliance as of 30 June 1999. The remaining two companies which to date have achieved 92% and 98% compliance, respectively, report that the remaining rectification work required is at least 95% completed and that they expect to achieve full compliance by August 1999. The non-compliant systems still to be rectified are business systems that are not mission-critical. As regards contingency planning, all companies have indicated that adequate contingency plans are in place for dealing with possible system failure during the rollover period. The Electrical and Mechanical Services Department (EMSD) has asked the companies to provide their contingency plans and Y2K audit reports for review.

CONCLUSION

14. The electricity and towngas suppliers have reported that they are fully Y2K compliant. They are confident that their systems will not experience any disruption as a result of the Y2K problem and consider that they are well prepared to cope with any unexpected difficulties. The companies will continue to provide monthly progress reports until the end of 1999.

15. Officers of the EMSD are maintaining close liaison with all of the companies concerned over Y2K compliance and have visited the companies to examine their compliance programmes and contingency plans.

16. The Bureau and the Department will continue to keep the position under review.

Economic Services Bureau
July 1999

Annex A

The Hongkong Electric Co., Ltd.

香港電燈有限公司

Progress Report on Year 2000 Compliance

July 1999

INTRODUCTION

We understand that one of the most critical problems facing the world today is the upcoming millennium change. As an essential service provider in Hong Kong, we are committed to achieving Year 2000 (Y2K) compliance well before the turn of the century.

We formulated our strategy for Y2K compliance in early 1997. As the first step, an aggressive Y2K awareness programme was launched in the same year to ensure that the complexity, extensiveness and impact of the Y2K problem was fully understood and communicated throughout the organisation. A special task force, led by a top executive who reports directly to the Managing Director, was also set up to manage the Y2K compliance efforts, monitor project progress and provide necessary technical support and assistance.

APPROACH

Based on the best practices and guidelines published by authoritative bodies such as the US Electric Power Research Institute (EPRI) and British Standard Institution (BSI), we devised a six-step methodology to manage our Y2K rectification project:

C **Inventory of Assets -** Detailed inventory of our computer-based information systems, databases, procedures, computer hardware, and system software has been established. In addition, a complete list of technical equipment and embedded systems such as transformers, switchgears, protection, remote terminal units, portable data terminals, and telephone exchanges that are critical to our generation and delivery systems has also been compiled.

C **Impact and Risk Analysis -** Based on a "failure-consequence" assessment methodology, assessment of risks to the entire company was done in 1997 to identify potential risk areas and to formulate a comprehensive plan to resolve the Y2K problem. The result of the assessment revealed that several operating areas were subject to Y2K vulnerability. Rectification and system upgrade works were required to achieve Y2K compliance. As a result of our initial assessment, individual IT or embedded systems were categorised into one of the following:

1. Mission-critical systems
2. Non mission-critical systems and have not been planned to be replaced
3. Systems that have been planned to be replaced before Year 2000.
4. Systems that should be replaced by new ones.

C **Finalise Strategies, Priorities and Plans -** Judging from the level of importance and other feasibility considerations, strategies, priorities and plans were finalised. In general, our schedule for Y2K compliance was established with an objective of having critical systems achieved compliance before the others.

C **Implementation -** Depending on the characteristics and Y2K compliance status of each system, appropriate measures such as data conversion, system replacement, modification, etc., were carried out to achieve Y2K compliance.

C **Testing -** Functional, performance, and Y2K compliance tests have been performed on all converted or upgraded systems. For IT systems, separate testing computing platforms were set up to conduct functional, performance and compliance tests in order to ensure that all systems will be functioning properly on critical dates in general and during rollover in and out of critical dates in particular. For generating units, on-load tests have been performed. On load test implies that the system clock of each generating unit was set forward to end of December 1999 and put it back for production use for a period of more than 60 days. Our observation concluded that our generating units shall be functioning properly during critical dates.

C **Installation -** All tested systems have been re-deployed to the operational environment.

CRITICAL DATES

The potential dates that are critically related to Y2K are categorised and prioritised into four categories. They are listed below in the order of likelihood of failure.

Priority 1 Dates

C	31/12/1999 to 01/01/2000	Rollover to the new millennium
C	28/02/2000 to 01/03/2000	Rollover in and out of leap year date

Priority 2 Dates

C	31/12/2000 to 01/01/2001	Rollover to 2001
C	28/02/2004 to 29/02/2004	Leap date in year 2004
C	28/02/2008 to 29/02/2008	Leap date in year 2008
C	21/08/1999 to 22/08/1999	GPS satellite clocks

Priority 3 Dates

C	08/09/1999 to 09/09/1999	Special value: Date =090999

Priority 4 Dates

C 31/12/1998 to 01/01/1999 Special value: Year =99

All Y2K compliance tests included priority 1 and 2 dates. For more critical systems, testing on priority 3 and 4 dates have also been carried out.

For Y2K contingency planning, the potential critical dates considered are the transition periods through:

C 31/12/1999 to 01/01/2000
C 28/02/2000 to 29/02/2000
C 29/02/2000 to 01/03/2000

EXTERNAL SUPPORT

In order to share the world best knowledge and practices on Y2K compliance, we have joined the EPRI (Electric Power Research Institute) Year 2000 Compliance Programme for Embedded Systems as corporate member. The valuable information provided by this programme can be accessed through EPRI's special website. Besides, there are quarterly workshops for members to share experience in dealing with the Y2K problem.

We have also engaged Universal Dynamic, a reputable engineering consultant firm, to help us prepare the Lamma Power Station Y2K Compliance Implementation Manual.

INDEPENDENT REVIEW

Arthur Andersen has performed an independent review to assist the management in evaluating the Year 2000 preparations of Hongkong Electric. The review covered the following aspects of our Year 2000 compliance process:

C Management & organisation awareness
C Inventory list
C Impact analysis and project planning
C Rectification & resolution
C Testing
C Contingency planning

The result of the review concluded that the Y2K compliance programme is on track and the risk of having serious disruption of operations due to date-related failure is very low.

SUPPLY CHAIN MANAGEMENT

We realised that there are things beyond our control that may cause disruption to our operations. Relationships with major business partners have been evaluated to ensure that our ability to supply electricity and to deliver quality customer services will not be affected.

We also sent out official letters and questionnaires to all suppliers requesting their assurance and the state of their respective compliance programmes. We are also collaborating with key suppliers to ensure that their products and services do not have date-related problems.

CURRENT Y2K COMPLIANCE STATUS

As of 30 June 1999, all computer systems and embedded systems are already Y2K compliant. Contingency plans from different functional areas have been prepared. The integrated corporate-wide contingency plan will be ready by August 1999. Drills to evaluate the validity of our plans have already been started and will be completed in August 1999.

EXTERNAL COMMUNICATION

Keeping our customers, investors, business partners, and the Hong Kong SAR Government abreast of the progress of our Y2K programme is critical to the success of our strategy for Y2K compliance. As Year 2000 looms closer, public concern about the Y2K vulnerability of essential service providers is growing. As a co-operative and responsible utility company, we are not only exercising our due diligence to ensure the Y2K compliance of our systems, but also doing our very best to keep our stakeholders informed. Specifically.

C We are reporting to the Hong Kong SAR Government on our Y2K compliance progress on a monthly basis.

C We have participated in Y2K seminars organised by the Hong Kong SAR Government, the Hong Kong Productivity Council, and other professional organisations such as Hong Kong Institute of Engineers (HKIE) and Institute of Electrical Engineers (IEE).

C We are also disclosing information about our Y2K programme in the format of FAQ (Frequently Asked Questions) through our corporate website (www.hec.com.hk) to help customers understand our approach to achieving Y2K compliance and boost the Y2K awareness of the general public.

- As the only member of the EPRI (Electric Power Research Institute) Year 2000 Compliance Programme for Embedded Systems in Hong Kong, we hosted the first EPRI Asia Pacific Workshop on Y2K Compliance of Embedded Systems in Hong Kong during 28 to 30 June 1999. Other utilities and government departments have been invited to attend and share their experience in dealing with the Y2K compliance issue with our overseas counterparts.

- We have conducted meetings to share our experience in driving Y2K compliance projects with corporate customers such as the Hong Kong Jockey Club and Hutchison Telecom, investors such as Morgan Stanley, and government departments such as the Fire Services Department.

- We have attended experience-sharing meeting organised by industry bodies such as the Hong Kong Retail Management Association, and major customers such as the Mass Transit Railways Corporation.

CONTINGENCY PLANNING

Despite the efforts we have made and the fact that every Y2K compliance project is on track, nobody can guarantee that systems that have been renovated and tested will not suffer from unanticipated Y2K-induced problems. To facilitate our planning work, the Nuclear Utility Year 2000 Readiness Contingency Planning (NEI/NUSMG 98-07) from the Nuclear Energy Institute and Nuclear Utilities Software Management Group has been adopted as the planning methodology. References have also been made to the NERC (North American Electric Reliability Council) Contingency Planning Guide Version 1.0 over the course of our planning. By May 1999, all functional units have devised their contingency plans to deal with different failure scenarios.

A series of drills to evaluate the validity of our contingency plans was started in February 1999 and will be completed in August. For example, the execution of contingency plan to cater for the scenario where the Energy Management System fails to operate and engineers have to be deployed to zone substations to assume local control have been rehearsed two times by the end of April 1999. These exercises not only offered excellent opportunities for us to verify our plans, but also helped our employees get familiar with the alternative ways of supporting our critical operations.

Major risk mitigation and contingency measures are:

- Depending on the load forecast, we will run 4 to 5 generating units and the total capacity will be more than the normal demand in winter time. Besides, of all the units to be run, 3 are units with analog control (i.e. no digital components, including real-time clock) and therefore shall not have any date-related problem.

- Materials like water, coal, oil, gases, chemicals, limestone, sulphur, etc., will be stocked up to the maximum level prior to the transition period(s). For example, our coal yard will be filled to its highest permissible level that is adequate to support 6 weeks of consumption. Besides, we will arrange a fully loaded coal ship at our jetty during the key rollover periods. For water, we will fill up all reservoirs to maximum operating level that is sufficient to supply the Lamma Power Station for 10 days.

- To cater for any unforeseen situation, operation staff at Lamma Power Station will be doubled during critical transition periods. In addition, a special Y2K emergency response team will be on-site to resolve any unanticipated date-related problems. Engineers stand by at home will be contacted and, when necessary, return to the power station immediately.

- To minimise the impact of Y2K-induced problem on our transmission and distribution network, we will have engineers stand by at all zone substations during critical dates. If necessary, they will take switching and operational instructions from system control centre and monitor the network through local alarm panels. When necessary, we will mobilise stand-by engineers at other strategic locations such as North Point Electric Centre to handle emergency repair works.

- Interconnection circuits between Hongkong Electric and CLP Power are in proper working condition and electricity can always be exported to or imported from CLP Power when necessary. No maintenance works on these interconnectors will be performed on critical dates in order to maximise the resilience of the power grid of Hong Kong.

- To avoid potential disruption of operations due to equipment and network maintenance activities, no equipment outages during critical dates will be scheduled.

- All technical and management staff will be either on duty or stand by at home during critical dates. As a result, vacations will be scheduled away from key rollover periods.

- A Y2K co-ordinating centre will be set up and management representatives at the centre will be responsible for co-ordinating internal operations and communicating with external organisations during critical dates. We will employ different communication facilities such as PABX, trunk radio, fixed telephone line, mobile phone, and in-house video conferencing facilities for both external and internal communication.

CONCLUSIONS

As a responsible essential service provider, we have invested financial and technical resources to implement our strategy for Year 2000 compliance. Our Y2K compliance programme is based on best practices. To date, all our systems are already Y2K compliant and we have also devised contingency plans to deal with different credible failure scenarios. We believe that the Y2K issue will not have impact on our ability to maintain a reliable supply of electricity and quality customer services before, during and after Year 2000.

Annex B

中華電力
CLP Power

CLP Power Hong Kong Limited
Year 2000 Programme
Progress Report
July 1999

Presented to the Economic Services Panel
Legislative Council, HKSAR

CLP Power Hong Kong Limited
Presented to the Economic Services Panel, Legislative Council

Executive Summary

CLP Power Hong Kong Limited commenced a comprehensive company-wide Year 2000 Programme in May 1996. On 22 June 1999, all the Company's 1,516 systems were certified Y2K ready.

In June 1999, CLP Power completed its Y2K contingency plans that will be integrated into the existing operational plans during July. Training and drills will be conducted during August to ensure that staff are well trained and that the plans are validated in the field.

Risks and scenarios for the various Y2K-critical dates have been assessed and addressed. CLP Power has investigated and is satisfied with the stock levels and the preparedness of its major suppliers. The situation will be monitored through to the Leap Year rollover to ensure that the potential effects of any interruption to the supply of vital goods and services can be dealt with.

The Year 2000 Programme has been reviewed by CLP Power Internal Audit and external business partners. Infrastructure Control Services, an international engineering consulting group, have been contracted to conduct independent reviews on CLP Power's Y2K preparedness during July to identify further improvement areas, if any.

CLP Power has conducted many symposiums, forums and communication sessions to Government, major customers, investors and to the community through bill inserts, radio and TV interviews, and will continue to invest in a proactive and responsible communications programme.

CLP Power is confident that it will provide its customers with reliable power through the Y2K period.

CLP Power Hong Kong Limited
Presented to the Economic Services Panel, Legislative Council

Introduction

CLP Power Hong Kong Limited commenced a comprehensive company-wide Year 2000 Programme in May 1996 to protect its business and customers from problems arising from the Millennium Bug. The Company prioritised its systems from high to low impact, and began solving the Y2K problem based on the following principle:

To ensure the reliability of CLP Power's electricity supply, the fulfillment of performance pledges, and the integrity of CLP Power's business systems and to protect CLP Power's position in its business relationships with third parties, before during and after all Y2K-critical dates.

The purpose of this report is to inform the Honourable Members of the progress of our Year 2000 Programme covering:

1. current position and status,
2. contingency planning,
3. risk mitigation activities,
4. independent assistance and assessments, and
5. communications.

1. Current Position and Status

100% of CLP Power's systems are now Y2K ready. This has been achieved by using a Programme structure that is co-ordinated centrally and reports to the Managing Director. The Programme has focussed on resolving the Y2K issue rather than being constrained to a budget. Almost 10,000 man-days have been utilised and HK$ 57 million spent up to 30 June 1999 with the majority of this being spent on process control systems.

The work on the Year 2000 Programme has followed the British Standards Institution's definition of Y2K compliance and the Engineering Standards of the Institute of Electrical Engineers for process control systems when diagnosing and fixing the Y2K problems. The Programme has used a formal methodology and all stages have been documented and signed off to ensure quality and thoroughness.

Systems	% Ready	Date completed
Business IT Systems	100	May, 1999
Facilities (building, PABX etc.)	100	June, 1999
Process Control (Electricity Supply/Delivery)	100	June, 1999
Contingency Plans	100	June, 1999

The stages of the Y2K Programme are:

- Inventory, where all systems were identified (total of 1,516).
- Prioritisation, where 311 systems were identified to have high impact.
- Testing, all systems were tested for Y2K sensitivity.
- Remediation, where problems were identified, remediation work carried out by either in-house staff or externally contracted resources.
- Testing afterwards, so as to verify the efficacy of the remediation measures.
- Certification and sign off, which has documented the completion of testing in accordance with the formal methodology and ensures accountability.

2. Contingency Planning

A Y2K contingency planning team was set up at the end of 1998 specifically to plan for potential failures that might still occur, despite the thorough Y2K remediation Programme. To ensure that CLP Power is ready for the Y2K-critical dates, specific contingency plans have been drawn up to cover the following critical dates: 22 August 1999, 9 September 1999, New Year's Eve and the Leap Year in 2000. CLP Power has established contacts with utilities in New Zealand and Australia, i.e. east of Hong Kong's time zone, that will experience the Y2K rollovers 4 hours and 2 hours respectively earlier than Hong Kong, so that useful reference information may be obtained prior to our own rollovers.

In developing the Y2K contingency plans, the experience and guidelines of leading world organisations were utilised. These include a number of organisations in U.S. including the North American Electric Reliability Council (NERC), the Electric Power Research Institute (EPRI), the Edison Electric Institute (EEI) and the Nuclear Regulatory Commission (NRC).

The Y2K contingency plans supplement the company's existing emergency and contingency procedures. They have been developed through a study of the entire electricity supply process and ensure that response measures and accountable staff have been identified to handle abnormal occurrences resulting from Y2K issues. In addition they include a range of risk mitigation measures explained later.

To ensure that the staff members are conversant with the Y2K contingency plans, regular progress updates are issued through newsletters and company-wide team briefings. In addition, training and specific drills will be conducted during August 1999 to ensure that staff members are adequately trained, and the plans are tested in the field.

CLP Power has also discussed Hong Kong wide contingency planning with the Hong Kong SAR Government and has offered to participate in a Government led initiative that would help ensure consistent messages being sent to the public. CLP Power has already been in contact with Fire Services, ITBB, ESB and EMSD on this matter, and stands ready to assist.

3. Risk Mitigation

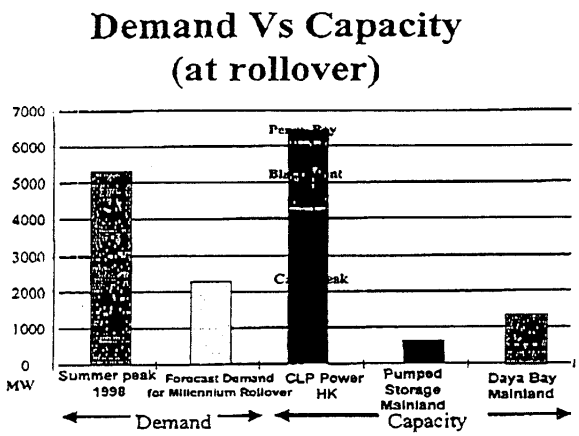
An important aspect of the contingency planning is the identification and implementation of risk mitigation measures. These includes:

- Generation
  - A wide mix of generation from a spread of units using different fuels and technologies
  - Standby spinning reserve 6 times that normally scheduled
  - Strategic stocks of fuel for more than 60 days' consumption
  - Additional standby staff on duty
  - Refresher training for staff in manual plant operation
- System Control Centre
  - Comprehensive training for operators
  - Duplicate operations manning at the backup control centre
  - Additional standby staff on duty
- Substations
  - Engineers on standby at critical facilities
- Overall
  - Diversified telecommunications -satellite phones, internal radios, in addition to normal public and internal telephone systems
  - On site and standby engineering and operational staff will exceed 1,500 people

Training has been continually reviewed during the Year 2000 Programme, and numerous staff have attended courses in the USA, Singapore, Australia and Hong Kong, to learn from others as worldwide experience has been gained on the various issues involved.

Interconnected parties have been consulted on the readiness of their systems. Specifically, Guangzhou Pumped Storage Power Station and Guangdong Nuclear Power Station have been reporting their progress, which is satisfactory so far. In addition, CLP Power has maintained close contact with Hong Kong Nuclear Investment Company (a 25% shareholder of Guangdong Nuclear Power Joint Venture Co., Ltd.) on Y2K readiness efforts at Guangdong Daya Bay Nuclear Power Station. Hong Kong Electric has also reported satisfactory progress. Whilst these interconnected parties have made positive declarations of Y2K progress, CLP Power has normal Operational Plans so that in the event of a supply disruption by an interconnected party, CLP Power is able rapidly to disconnect, and rely on its own generated power.

CLP Power generation demand over the New Year and the Leap Year periods is expected to be about one third of its internally available capacity. The demand will be met from separate power stations, using a variety of fuels and multiple technologies. This will reduce the risk of a single failure causing a major disruption of electricity supply.



CLP Power has investigated and is satisfied with the progress of its major suppliers and will continue to maintain a careful watch through to the Leap Year. To mitigate the short to medium term effects of shortage of supplies, CLP has planned its stockpiles as follows:

- Coal — two months' supply stored at Castle Peak
- Natural Gas — 3 days' supply is stored in the pipeline with gas fired generation able to be switched over to oil in less than a minute
- Oil — approximately 6 days' supply is stored on site with local replacement available
- Water — two weeks' supply is stored on site

4. Independent Assessments and Assistance

Apart from conducting internal audits and arranging reviews by business partners such a Exxon Energy Limited of the U.S., CLP Power has commissioned Infrastructure Control Services (ICS) to conduct independent reviews of its Y2K preparedness and its contingency plans to identify further improvement areas, if any. Based in Australia, ICS has undertaken Y2K audits of over 20 power companies around the world and is therefore well qualified to review CLP Power's Programme.

5. Communication

CLP Power will continue to communicate with its suppliers and interconnected parties and monitor their progress over the months up to and over the various Y2K critical dates.

CLP Power has been issuing monthly Y2K updates to the Hong Kong SAR Government. The Information Technology & Broadcasting Bureau, Economic Services Bureau, Office of the Telecommunications Authority and Information Technology Services Department and Electrical and Mechanical Services Department have also inspected the CLP Power Year 2000 Programme work and seen first hand the progress made and the plans put in place.

CLP Power welcomes meaningful discussions with the Hong Kong SAR Government and pledges full support to its territory-wide Y2K contingency planning.

CLP Power has been communicating fully with its customers and the general public in an open and pro-active manner, through various means such as bill inserts, press, radio and TV interviews, and our Internet website:*www.clpgroup.com.* It will continue to invest in a proactive and responsible communication programme.

Conclusion

With the satisfactory completion of all readiness tests. CLP Power is confident that it will continue to provide reliable electricity services to the Hong Kong community over all Y2K-critical dates.

Even in the unlikely event of a Y2K-related incident affecting any part of our supply chain, CLP Power's contingency plans are in place to ensure that resources will be available to maintain supply reliability.

Year 2000 readiness work for
Guangdong Daya Bay Nuclear Power Station

For Presentation to the Legislative Council Panel on Economic Services

on

19 July 1999

by

Hong Kong Nuclear Investment Company Limited

(12 July 1999)

EXECUTIVE SUMMARY

- Hong Kong Nuclear Investment Company (HKNIC) is a minority investor owning 25% of the Guangdong Nuclear Power Joint Venture Company (GNPJVC), which operates the Guangdong Daya Bay Nuclear Power Station (GNPS).

- Despite its minority shareholding, HKNIC has actively carried out its role in monitoring the safe and efficient operation of GNPS, by contributing managerial expertise and monitoring the operation of GNPS. In keeping with its policy of transparency, HKNIC keeps Hong Kong SAR Government and the public informed of all events of safety significance.

- The objectives of the Year 2000 (Y2K) readiness work at GNPS are to ensure that nuclear safety is not affected by the Y2K issue, and that the issue will not affect electricity generation at GNPS.

- GNPS has been working to international guidelines in its Y2K readiness programme and contingency planning. The work is supported internally by quality assurance and audit activities, and externally by overseas peer utilities, IT consultants and equipment suppliers. The work has also been reviewed and endorsed by established national and international organisations, including International Atomic Energy Agency (IAEA) of the United Nations and National Defense Science and Technology Commission of the State Council.

- The expertise of HKNIC at GNPJVC has contributed to the technical management of the Y2K programme, and HKNIC has engaged an external consultant to review progress.

- All work to achieve Y2K readiness for the station has been completed in early July 1999 and GNPS is 100% Y2K ready.

- The work leads to the conclusion that nuclear safety at GNPS will not be affected by the Y2K issue. This is because Y2K is a computer-related issue, but the protection operation of safety systems in GNPS does not require a computer, and the protection function is activated by events and not by time. The findings are consistent with the findings in Western countries using similar reactor equipment.

- GNPJVC completed an Integrated Contingency Plan by the end of June 1999. The plan has been reviewed by IAEA. The purpose of the plan is to mitigate or restore from the consequences of a potential Y2K induced event and to maintain smooth operation. GNPS also has plans for operating during the millennium rollover and other computer-sensitive dates. Work will continue to train station personnel, conduct drills and refine the plan throughout the year.

1 BACKGROUND

Hong Kong Nuclear Investment Company Limited (HKNIC), a member of the CLP Group, is an investor owning 25% of Guangdong Nuclear Power Joint Venture Company (GNPJVC). GNPJVC is the owner-operator of Guangdong Daya Bay Nuclear Power Station (GNPS). HKNIC buys 70% of the electricity from GNPJVC, for sale to CLP Power Hong Kong Limited which supplies electricity to customers in Hong Kong.

As an investor and a corporate citizen of the Hong Kong community, it is in HKNIC's interest to monitor the safe and efficient operation of the nuclear power station. HKNIC has been actively carrying out this role by contributing managerial expertise through its experienced assignees in key managerial positions at GNPJVC. HKNIC also monitors the operation of GNPS by obtaining regular reports from GNPJVC. HKNIC reports the operation of GNPS to its Board of Directors which comprises two senior government officials, the Secretary for Security and the Secretary for Economic Services.

In keeping with its policy of transparency, HKNIC also keeps the Hong Kong SAR Government and public informed of all events of safety significance at GNPS. This has been done through reports to the Government and a monthly operational bulletin to the media and community leaders. The bulletin has been replaced by an internet website (www.hknuclear.com) earlier this year for reaching out to a wider audience. Information on the website is updated on a monthly basis.

This paper is prepared since the Year 2000 computer (Y2K) issue has become a subject of general and topical concern, and there have been occasional speculations on whether the safety of a nuclear power station will be affected by this issue.

It is widely recognised that the Y2K comes from the practice of using only the last two digits to express the year in a computer data. The use of such two-digit dates in data processing or computation over the change from 1999 to 2000 will lead to inconsistency, which if not properly allowed for, may give incorrect records or results. This issue may also affect process control computers and instruments containing microprocessors. Since a modern nuclear power station employs computers and instruments in its operation, concerns have been raised on the extents to which a nuclear power station may be affected.

This paper demonstrates that GNPJVC has a robust case in its Y2K readiness programme. At GNPJVC, Y2K remedial work and contingency planning have been completed in line with international practice. The work is similar to nuclear utilities in the West in terms of quality assurance and time scale. Salient findings of the work are that the Y2K issue will not affect nuclear safety, and that the Y2K risk to station availability is very low. These findings are consistent with those in the West. This paper will elaborate on these statements.

2 THE METHOD

2.1 Objectives of the work

A system is Y2K ready if it will function into the next millennium as intended. The Y2K readiness programme for GNPS has two main objectives. The first one is to ensure, through remedial work if necessary, that the issue will not affect nuclear safety at GNPS. The second objective is to ensure that the issue will not have a material impact on the supply of electricity from GNPS to Hong Kong and Guangdong.

Nuclear Safety

Nuclear safety requires that the Y2K issue will not lead to an unsafe operation of the station that in turn leads to an unwarranted release of radioactivity, causing a health risk or damage to the environment. It therefore requires that the reactor will shutdown safely if required.

Availability of supply

Availability of electricity supply requires that the Y2K issue will not affect electricity generation at GNPS.

2.2 External Y2K references

The Y2K readiness programme for GNPS can be divided into two broad categories, namely, Y2K readiness and Y2K contingency planning.

Work on Y2K readiness is based on the guidelines of the Nuclear Energy Institute in the US on Y2K readiness, and of the British Standards Institution in the UK on managing Y2K conformity, and the Institution of Electrical Engineers in the UK on embedded systems.

Experience of members of the World Association of Nuclear Operators (WANO) leading in Y2K work has also been used as reference.

Work on Y2K contingency planning is based on the guidelines of Nuclear Energy Institute on contingency planning.

2.3 Resource and support

The Y2K programme for GNPS is under the responsibility of a deputy general manager. The work is led by various line managers and is carried out by their specialist teams. The teams are responsible in their normal duties for the operation and maintenance of the equipment or software. They are supported by peer technical groups, internal audit and quality assurance teams within GNPVC, as well as external resources. GNPJVC has used 600 man-months for the work.

The work is supported by active exchanges with equipment suppliers, members of WANO and Framatome Reactor Operator Group formed by the six utilities who share the same reactor equipment supplier Framatome, and services from local and overseas IT consultants.

The above exchanges and review activities, held on a regular basis, bring in current international experience and enable GNPJVC to adopt the world's best practice.

2.4 Scope of Work

The scope of remedial work and contingency planning covers all systems containing process computers or embedded computing devices within the station premises or related to the operation of the station. There are 214 items and they belong to:

- electrical/electronic systems graded under nuclear safety classifications
- off-line monitoring and data acquisition systems
- power transmission systems
- telecommunication systems
- data controlled maintenance equipment

The items are classified according to their significance to station monitoring, protection, control and operation for situation appraisal and priority action.

2.5 Y2K Programme for GNPS

GNPJVC began preparation to address the Y2K issue in early 1997 and launched its Y2K programme in February 1998.

Overall guidance for the work is given in a Y2K project manual developed by GNPJVC, covering the overall approach, work procedures, internal audit, quality assurance programmes and contingency planning guidelines specific to the Y2K activities, based on the references given in section 2.2. The Y2K programme for GNPS is divided into the following main categories:

<u>Y2K Readiness</u>

- Initial investigation, liaison for supplier certification, confirmation and review
- Impact analysis
- Planning, testing and investigation
- System modifications
- Testing for acceptance
- Documentation

<u>Y2K Contingency Planning</u>

- Contingency Plans
- Millennium rollover plan
- Staff familiarisation, training and drills

2.6 Quality requirements for the Y2K work

Y2K programme activities comply with the Quality Assurance Programme of GNPJVC. This in turn complies with the relevant safety codes of National Nuclear Safety Administration and International Atomic Energy Agency. Quality is enforced by the Quality Assurance Department through regular surveillance and audit activities.

The Quality Assurance Department also requires the activities of a contractor or supplier to GNPS to be subject to the same Quality Assurance Programme. Different quality assurance levels are required from a contractor/supplier depending on the nature of the work, but will not be lower than the relevant International Organisation for Standardisation (ISO) quality standards.

Procurements are also subject to the Y2K conformity requirements as stipulated by the British Standards Institution.

3 CURRENT STATUS

3.1 Progress

All work to achieve Y2K readiness for GNPS has been completed in early July 1999 and the station is 100% Y2K ready.

Under an Integrated Contingency Plan, there are 40 contingency plans for essential systems and items and the plan was completed by the end of June 1999.

GNPJVC has begun testing and refining the contingency plans. Staff training and preparation for drills have begun and will complete by the end of October 1999, to be followed by drills. Further staff training will be provided and refinement of the plans will be made, if needed.

3.2 Major findings for GNPS

The detailed Y2K work at GNPS leads to the following conclusions:

- Nuclear safety at GNPS will not be affected by the Y2K issue. This is because Y2K is a computer-related issue, but the protection operation of safety systems in GNPS does not require a computer, and the protection function is activated by events and not by time. Moreover, the station will always be fail-safe, that is, it will enter a safe condition should a failure occur.

- The risk to station availability is very low, since the equipment directly associated with station operation is not affected by the Y2K issue.

The above conclusions are in line with the findings of the international nuclear industry on the Y2K issue.

The Y2K issue is found to affect only systems peripheral to the operation of the station. As indicated in section 3.1, all rectification work has been completed and the station is now Y2K ready.

4 VERIFICATION

Verification is an essential element since it provides evidence to the quality of the work and its credibility. At GNPJVC, verification activities are held regularly to lend support to the quality of its Y2K work. In addition, independent third-party verification activities are held to substantiate GNPJVC's programme and its findings.

4.1 Internal Verification

GNPJVC's quality assurance and audit teams have held internal inspections according to its quality and audit programmes. The inspections concluded that both the progress and quality are satisfactory.

4.2 External Reviews

HKNIC has engaged an external consultant James Martin & Co to conduct an independent third-party review of the Y2K readiness work and contingency planning at GNPS. The review programme began in mid June 1999 and will continue to the end of the Y2K programme in March 2000.

- There have been independent, external reviews on the Y2K work at GNPJVC by:

- International Atomic Energy Agency of the United Nations

- International Atomic Energy Agency (IAEA) is a United Nations organisation for promoting the peaceful use of nuclear energy. It offers review activities to nuclear utilities in the world on best practices in operating nuclear power stations.

- National Defence Science and Technology Commission of the PRC State Council

  The National Defence Science and Technology Commission reports directly to the PRC State Council and oversees national development in scientific, technological and defence activities.

- Hartford Steam Boiler Inspection and Insurance Company

  Hartford Steam Boiler Inspection and Insurance Company is the largest provider of equipment breakdown insurance in the world. Its parent company, the HSB group, is a leading provider of insurance products and engineering management consulting services in 80 countries. In electricity generation, HSB provides insurance to about one quarter of power generating capacity in the US.

- Electricite de France and Framatome

Electricite de France (EdF) is the national electricity utility in France. Its 58 nuclear power generating units supply about 75% of the electricity in France. Framatome is the designer/supplier of the nuclear power stations for France and has a number of exports to five countries.

These reviews endorsed the Y2K readiness programme and the quality of the work at GNPJVC.

4.3 Relevant international experience

Various international bodies have confirmed that the Y2K issue is not a nuclear safety risk to their nuclear power stations. The experience is relevant to GNPS and is consistent with its findings.

Since GNPS shares the same reactor supplier with France, favourable findings in France offer assurance to the reactor equipment at GNPS.

In addition, since the Y2K work at GNPS is based on the guidelines of the US and UK, favourable reviews of the Y2K readiness work carried out in these countries support the method adopted for GNPS.

Relevant experience in France, the US and UK is presented in Appendix 1.

5 Y2K contingency and operation planning

Apart from its work on Y2K readiness, GNPJVC has developed plans for possible contingencies and is finalising plans for operation during the millennium rollover and other computer-sensitive dates, in line with its practice for “defence-in-depth” and follows similar practice adopted in Western countries.

Contingency Planning

GNPS has Integrated Contingency Plan which includes 40 contingency plans. These plans cover essential systems and items to meet potential events that may affect the safe generation of electricity. Contingency plans for Y2K are developed following risk identification, risk analysis, risk management and verification. The activities define response actions to hypothetical Y2K induced events, so as to mitigate or restore from their consequences and to maintain smooth operation, with the most serious possible consequence being the safe shutdown of a nuclear generating unit.

The contingency plans cover systems (outlined in section 2.4) that are required for or provide to electricity generation and transmission. These plans make reference to the relevant GNPS procedures for operations and contingency actions and form an integral part of the existing emergency response procedures.

Progress in contingency planning has been given in section 3.1.

Proposed operation plan for millennium rollover

The operation plan aims at minimising the impact of a disruption on the operation of the station and on the grids during the rollover period. The plan is being developed and will be continuously refined during the year. Salient points in the plan are:

- Unit 2 on planned annual refuelling outage
- Unit 1 on reduced power output
- Increasing manning level for operation

The millennium rollover coincides with the usual practice of conducting annual refuelling outage for GNPS in winter. With the operating Unit 1 at reduced output, it will reduce the impact of an unplanned loss of generation on the grid and mitigate the consequence of a disruption to the customers.

The increased manning level will provide additional support to the operators in monitoring the status of the power station and in effecting measures in the contingency plans, if needed.

Similar level of attention is also given to other computer-sensitive dates such as the leap year problem dates of 29/02/2000 and 01/03/2000.

6 Conclusions

Year 2000 readiness work at GNPJVC has been carried out to international practices, to similar level of quality assurance and along a similar time scale as in the West. The work has been reviewed and endorsed by established national and international organisations. GNPS is now 100% Y2K ready.

The above work leads to the conclusions that nuclear safety will not be affected by the Y2K issue at GNPS, and that the risk to its station availability is very low. These findings are consistent with findings in Western countries using similar reactor equipment or similar Y2K work methodology.

In addition, GNPJVC has put in place a set of contingency plans and is developing operational plans for the millennium rollover and other computer-sensitive dates, in preparation for unlikely disruptions and to mitigate their impacts. This is in line with Western practices.

APPENDIX 1

RELEVANT INTERNATIONAL EXPERIENCE ON Y2K READINESS ACTIVITIES

France

In France, the national electric utility EdF announced in April 1999 that "in case of failure of data processing systems, the safety of nuclear power plants is ensured by mechanical safety devices (such as rod cluster control assemblies) which are not concerned by the changeover to the year 2000."

The EdF finding is consistent with and gives support to the finding at GNPS on the nuclear safety of its reactor equipment.

The US and UK

In the US, the North American Electricity Reliability Council reported to the United States Department of Energy in April 1999 that "no utility has found a Y2K problem that would have prevented safety systems from shutting down a plant, if conditions required after the turn of the century. Thus, Y2K problems in nuclear facilities do not represent a public health and safety issue."

The United States Nuclear Regulatory Commission (NRC) has carried out audits to evaluate the effectiveness of the measures undertaken by the operators of US nuclear utilities to identify and correct Y2K problems. In April 1999, it announced that "the NRC has no indication that significant Y2K problems exist with safety-related systems in nuclear power plants for those systems that directly affect the ability to safely operate and shut down the plants. All plants can be shut down safely, if necessary, after January 1,2000."

British Energy is the main operator of the nuclear power stations in the UK, supplying some 25% of its electricity. 99% of its "essential" and "business-critical" systems were completed in May 1999. It announced that it "has not identified any residual problems or issues that will interfere with our objectives of ensuring that we achieve safe and continuous operation."

In addition, the Director of the Nuclear Safety Directorate in the UK reported in September 1998 that "a UK nuclear installation would safely shutdown if a serious date-related failure were to arise."

Consistent findings between the utilities and the regulators in these two countries offer confidence in the thoroughness in their Y2K readiness programmes. Since GNPJVC is based on their guidelines in its Y2K work, favourable reviews of the Y2K readiness work carried out in these countries support the method adopted for GNPS.

Towngas' Report

to Economic Services Panel

of the Legislative Council

on Year 2000 Compliance

19 July 1999

Contents

Introduction

Hong Kong and China Gas Company (Towngas) launched a comprehensive corporate-wide programme back in 1996 to handle the Year 2000 (Y2K) issue. We aim at eradicating the Y2K problem in all systems and equipment especially the mission-critical computer and embedded systems related to the safe and reliable supply of gas. At the same time, we will minimize the Y2K exposure caused by third parties including customers, suppliers, contractors and business partners.

Purpose of this Report

This report addresses the following three areas of Y2K concern:

1. The present state of Towngas' progress of work to rectify the Y2K problems; and
2. The status of Towngas' Y2K compliance position; and
3. Towngas' contingency plans and measures.

Towngas' Priorities with regard to Y2K

1. Gas production and network systems which safeguard a safe and reliable supply of gas
2. External customer service covering all relevant information which must be kept intact
3. Internal management and operation systems

Critical Dates:

- **8 September 1999-9 September 1999**
- **31 December 1999-1 January 2000**
- **28 February 2000-29 February 2000**
- **29 February 2000-1 March 2000**

Approach

Towngas has adopted a comprehensive approach comprising system review and upgrade, risk mitigation, contingency planning and resumption planning.

I. System Review and Upgrade

System review and upgrade is divided into three phases with well-documented results and follow-up actions.

Phase 1 Planning

In 1996, the project methodology and organization were established to form the "backbone" on which comprehensive project plan, milestones, deliverables, resources allocation and framework were devised.

Phase 2 Risk Assessment

In 1997, all the items were reviewed to identify the ones that might be affected by the Y2K issue. This was followed by an assessment of their impact on the business and each item was classified according to their impact and the above-mentioned priorities while resources were prioritized accordingly. Finally, detailed action plan and resources requirement were established.

Phase 3 Implementation

In 1998, retrofit/upgrade was performed on non-Y2K compliant items (Towngas follows the standard used by the SAR government that is the BSI standard). This was followed by due diligence user acceptance tests. Sample verification tests were also carried out on critical items which had the supplier's/vendor's written confirmation claiming the item was Y2K compliant. Our approach was the more critical the item, the more extensive the test.

Current Status of Y2K Compliance

As of 30 June 1999, all of the systems relating to the safe and reliable supply of gas, the provision of external customer services; and the smooth internal operation are already Y2K compliant:

Systems relating to:	% of Compliance	Date of completion
Safe and reliable supply of gas	100%	1Q1999
Provision of external customer services	100%	1Q1999
Internal systems	100%	2Q1999

II. Risk Mitigation Measures

Gas Production Plant

In order to ensure the smooth rollover of critical systems, the clocks of these systems in our gas production plant have been rolled forward to the Year 2000. The clocks in the Emergency Operator Stations (EOS, which is the parallel backup of the TDC3000 gas production control system) and Programmable Logic Controllers (PLC) of the gas production control systems have been rolled forward since the end of Year 1998. To date, the rollover has been implemented and our gas production system has been operating smoothly without any exceptions.

In addition, local monitoring devices are being installed at the Tai Po gas production plant to assist plant operators to perform manual control in case the gas production control computer system fails during Y2K rollover.

Gas Distribution Network

Since May 1999, the clock in the Supervisory Control And Data Acquisition (SCADA, which performs the remote pressure monitoring control) backup computer system has been rolled back one year to prepare for any possible switchover from the main system. Testing have been performed to ensure the remote control monitoring can function properly in the backup system.

Before the critical dates, the remote control in all of the offtake stations (which reduce the pressure of towngas before it is distributed to the gas consumers) will be disabled by switching the control to “local”. Electronic clocks of most of the governors (which is another type of pressure reducing stations) will also be disabled beforehand. Pneumatic and electric control functions of the valve actuator control systems in all of the outstations (i.e. three tunnels, which host the gas pipelines, telemetry and gas detection equipment, and one pigging station, which facilitates the inspection and cleaning of gas pipelines) will also be disabled.

III. Contingency Planning

By May 1999, each functional area has established contingency plans (and business resumption plans) to address various scenarios of unanticipated Y2K interruptions. Physical rehearsals to verify the validity of these plans were performed during May and June 1999. Our Internal Audit has witnessed the execution of the rehearsals. Towngas has also invited the Electrical & Mechanical Services Department (EMSD) to observe these rehearsals. They selected the rehearsals for:

- Tai Po gas production plant's control systems, namely, Honeywell TDC3000 (total distributed control system to perform fully automated remote monitoring and control of the gas production process) and EOS; and

- Network Operation's SCADA system and simulation of third party failure in providing electricity and telecommunication to network operation.

For the mission critical systems in the Tai Po production plant, three tiers of contingency have been planned:

1. Honeywell TDC3000;
2. Emergency Operator Stations; and
3. Manual operation as a last resort.

Towngas has aligned with the oil companies to arrange diesel tank stand-by during the critical dates to provide additional fuel for our backup power generators. There will also be adequate naphtha and water reserve on these dates to prepare for Y2K contingency. Meanwhile, we have coordinated with the gas appliance suppliers to arrange for additional safety stock.

A Corporate Y2K Emergency Working Group comprising senior managers has been set up to facilitate coordination among departments and align resources across departments to stand by on the critical dates. This Working Group is overseen by the Managing Director, Executive Committee; and Internal Audit who reports the progress directly to the Board Audit Committee.

Several Y2K scenarios requiring staff stand-by on the critical dates have been identified. Detailed procedures for each of the scenarios are clearly defined. Checklists are prepared to verify the readiness of emergency arrangements before the rollover and the proper functioning of our systems after the rollover. Manpower and equipment requirements are identified. There will be more than 1,000 staff stand-by at different locations ready to be mobilized when necessary. For example, for the operation of the entire network, Towngas will dispatch staff to stand by at the Ma Tau Kok Back-up Grid Control Centre. Also, two persons will stand by each and every offtake stations in our supply network. Critical governors in each of the geographic zones, namely, Hong Kong Island, Kowloon, and New Territories will be manned on these dates.

In order to prepare for the possible failure of the telephone communication systems, we have prepared an alternative communication means using Towngas' exclusive radio system. Additional repeater stations will be placed in Tai Mo Shan and Victoria Peak to ensure radio messages are relayed clearly across geographic zones.

Corporate Emergency Control Centre and Y2K Hotline will be set up during stand-by period on the critical dates to manage and monitor the handling of the Y2K issues and communicate with major business partners and external parties when necessary.

IV Recovery Plan - Resumption of Gas Supply

As all the related equipment and systems have been tested and confirmed Y2K compliant, it is unlikely that there will be any territory-wide gas disruption resulted from the Y2K issue. Nevertheless, to make our contingency plan complete, a Y2K resumption plan has been prepared. The objective of the plan is to ensure the fastest resumption of gas supply to customers so as to minimize the inconvenience to the public.

Gas Production Plant

In the unlikely event that the gas production plant is interrupted due to Y2K issues, a plant restart procedure will be invoked. We estimate that about one-third of the total gas production capacity will be back on line producing gas in one hour and the remaining will be restored in the next hour.

Gas Distribution Network

The resumption process consists of the following steps:

1. Once a major gas interruption is identified, the Corporate Emergency Control Center (CECC), comprising the Managing Director and all senior managers, will be established to direct the gas resumption process.

2. CECC will divide the affected geographic districts into different zones.

3. CECC will mobilize the necessary resources, including Towngas' employees, contractors, tools, equipment and vehicles, to the affected zones.

4. The on-site personnel will ensure the service control valves of each affected building are closed.

5. The on-site personnel will re-commission the underground network from the nearest governor or isolation valves of the affected zone. Air and other gases will be purged out from the underground network. The network will be tested to confirm there is only towngas.

6. The on-site personnel will resume gas supply to the gas riser pipes and internal service pipes to each building. Resumption priority will be given to those critical customers, such as hospitals and clinics.

7. In order to ensure safe and normal supply of gas, the on-site personnel will perform a pressure test to confirm there is no gas leakage. Then, the main

gas supply of the building riser pipes will be turned on and purging will be performed. The on-site personnel will carry out a “door-to-door” visit to test and confirm gas appliances operate normally and inform customers that the gas supply has resumed to normal.

8. Throughout the gas resumption process, CECC maintains close collaboration with government departments, other public bodies and the media to communicate the latest development and to solicit external assistance if required.

Independent Third Party Assessment

In order to ensure our Y2K programme is adequate and the approach is appropriate to cover the basic requirements and to provide added assurance to gas consumers, we have taken the initiative to invite the Hong Kong Productivity Council, Price WaterhouseCoopers to assess our Y2K preparation and readiness.

The Hong Kong Productivity Council has been appointed to review the management support, project methodology and the project team's management of both internal and external risks on highly critical business areas including Gas Production, Network Operation, Marketing and Customer Services, revenue and payment collection systems. The assessment was completed in June 1999 and the report will be ready in July 1999. The feedback from the Hong Kong Productivity Council is satisfactory and no major exceptions have been identified. See Appendix 1 for the summary assessment report provided by the Hong Kong Productivity Council.

Our external auditor Price WaterhouseCoopers has assessed our Y2K programme in the "going concern" perspective and verbally concluded that Towngas is able to continue its operation as a going concern. As such, there is no need for a separate in-depth special assessment.

We have also invited the EMSD to review our Y2K programme and witness the physical rehearsals of our contingency plans. To date, no exceptions have been identified. Its added assurance has strengthened our confidence of achieving the Y2K compliance target properly.

Supply Chain Management

In order to manage the possible risks from critical vendors and customers in the supply chain, we have extended our Y2K programme to major suppliers, customers and utilities:

- Our senior managers have paid special visits to some of our major suppliers, such as Rinnai in Japan, Mobil in Singapore, to confirm their Y2K preparation. More visits may be scheduled when necessary.

- Towngas has initiated experience sharing discussions with major suppliers; such as CLP Power, Cable & Wireless HKT and Water Services Department; with customers, such as John Swire & Sons (HK) Limited, Swire Coca-Cola HK Limited, the Hong Kong Airport Authority, the South China Morning Post; with investors, such as Warburg Dillon Read; and with insurers, such as Engineering Insurance Limited, Royal & Sunalliance.

- We have also attended a number of cross-company meetings organized by major customers such as the Hong Kong Hospital Authority, Hong Kong Retail Management Association; and by government departments, such as Fire Services Department.

To secure the supplies reliability, we are considering alternative suppliers for critical items or alternative products to perform the same functions.

The Remaining Tasks in the Second Half of the Year 1999

In the third quarter of 1999, Towngas will conduct tabletop walk-throughs to confirm validity of coordination arrangements. By that time, we will invite the EMSD to attend.

During the third and fourth quarter of 1999, we will step up the comprehensive communication programme with our stakeholders to inform them our Y2K compliance status. In order to prepare for the stand-by on critical dates, emergency staff will be trained. Meanwhile, Towngas will initiate or attend more information sharing meetings and discussions among customers, suppliers and other business partners. The Corporate Y2K Emergency Group will facilitate continuous coordination among departments to ensure adequate and appropriate resources are aligned for stand-by on the critical dates.

In the fourth quarter of 1999, we will periodically review the Contingency Plans to ensure they are maintained up-to-date.

Conclusion

Towngas has long recognized the Y2K issue and has been implementing a series of measures to tackle it. By 30 June 1999, we have retrofitted/upgraded all our existing systems to be in use after 31 December 1999 and are confident that they are fully Y2K compliant. Any additional new systems to be put in place will also be Y2K compliance. For the sake of good management, contingency plans have been developed and will be rehearsed to ensure effective manual operation to override the automatic operation in the event of any failure occurrence.

With these measures, Towngas believes that Y2K will not lead to interruption of a reliable gas supply or any incident that affects safety.

*** *** ***

Letterhead of Hong Kong Productivity Council
香港生產力促進局的信頭

Executive Summary

Since 1996, the Hong Kong and China Gas Company (TownGas) has been examining the effectiveness of relevant initiatives to address the Year 2000 (Y2K) Problem. Under an internal Y2K Project Team, TownGas completed all renovation and testing work of their mission-critical systems at the end of 1998. To ensure that all the necessary measures have been taken with regard to the Y2K problem, TownGas invited the Hong Kong Productivity Council (HKPC) to conduct a third party review/audit on the readiness of the company's systems for the advent of the new millennium.

HKPC completed the review in June 1999. The major findings are summarized as follows:

1. There is high awareness of the Y2K problem among TownGas staff. In particular, both the company's Executive Committee and its senior executives are well informed on a regular basis.

2. TownGas has conducted a thorough assessment of all its inventory items for Y2K compliance, and has formulated renovation action plans for all the non-compliant items identified.

3. TownGas has taken remedial actions with regard to all the non-compliant items which have subsequently been renovated, replaced and tested for productive use.

4. TownGas has formulated the necessary contingency plans for all its mission-critical systems. Some of these contingency plans have been tested in the second quarter of 1999.

5. TownGas has also conducted renovation and testing of non mission-critical systems and has formulated and tested corporate-wide contingency plans.

6. TownGas has targeted the management of third parties risks well, though some suppliers have yet to respond the company's questionnaire.

7. The Y2K initiatives of TownGas are well documented in terms of correspondence with different parties, meeting minutes, inventory items reports, action plans and their implementation and testing reports.

The consultants of HKPC take the view that TownGas has undertaken a thorough assessment of the company's needs with regard to the demands of the Y2K Problem. HKPC consultants have nevertheless recommended some enhancement measures for TownGas and they have been accepted by the Company for rectifying actions.

In view of the comprehensiveness of the assessment, the rectifying measures implemented and the existence of contingency plans, the consultants of HKPC conclude that TownGas has attained a very high degree of readiness with regard to the Y2K problem for a smooth transition to the next millennium.