E.B.O. 134

IN THE MATTER OF the Ontario Energy Board Act, R.S.O. 1980, Chapter 332;

AND IN THE MATTER OF a Review by the Ontario Energy Board of the Expansion of the Natural Gas System in Ontario.

BEFORE: J.C. Butler
Vice-Chairman and
Presiding Member

J.A. DeKort
Member

M.A. Daub
Member

REPORT OF THE BOARD

June 1, 1987

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1. INTRODUCTION

1.1 In the summer of 1986, the Ontario Energy Board (the Board) examined six applications by The Consumers' Gas Company Ltd. (Consumers') to provide service to the Town of Deep River, the Village of Chalk River and the Township of Rolph, Buchanan, Wylie and McKay (E.B.L.O. 216 et al.). The Board denied these applications and, in its Reasons for Decision, the Board concluded that the criteria used by the utilities to assess and justify system expansion should be reviewed.

1.2 On January 9, 1987, Notice of a Review by the Ontario Energy Board of the Expansion of the Natural Gas System in Ontario (the Review) was issued.

2. BACKGROUND

2.1 There are three major gas distributors in Ontario which together serve approximately 1,500,000 customers: Consumers', ICG Utilities (Ontario) Ltd (ICG) and Union Gas Limited (Union). Each distributor operates within a franchised area.

2.2 Consumers' is Canada's largest natural gas distributor, serving about 850,000 customers in southern, central and eastern Ontario, western Quebec and northern New York State. The company has assets of about $1.4 billion and distributes about 9,000 $10^6 m^3$ of gas annually through its network of 18,657 kilometres of mains.

2.3 ICG operates a natural gas distribution system consisting of approximately 5,600 kilometres of pipeline in northwestern, northern and eastern

Ontario. ICG's utility assets are valued at almost $400 million. ICG delivers approximately 3,100 10^6m^3 of gas annually and serves approximately 163,000 customers.

2.4 Union operates a fully integrated gas distribution system employing storage, transmission and distribution facilities in southwestern Ontario. It sells over 7,300 10^6m^3 of gas annually. Union also transports and stores about 5,700 10^6m^3 of gas annually for other utilities and is Ontario's largest operator of underground storage pools with a developed capacity of 2,700 10^6m^3. Union's utility assets are approximately $900 million.

2.5 In 1958, TransCanada Pipelines Limited (TCPL) completed its interprovincial pipeline from the Alberta-Saskatchewan border to Quebec, and western Canadian natural gas became widely available in Ontario. During the next two decades, the demand for natural gas in Ontario grew rapidly due to its abundant supply and relatively low price. This demand in turn led to a major expansion of distribution facilities by Ontario's natural gas utilities.

2.6 By the late 1970's, most of the system expansion taking place pertained to new subdivisions, upgrading of existing pipeline capacity and development of storage facilities.

2.7 In the early 1980's, expansion of the natural gas distribution network was stimulated by federal government programs designed to reduce Canada's dependence on imported oil. One of these programs, the Distribution System Expansion Program (DSEP), administered by The Department of Energy, Mines and Resources (EMR) provided funds to the gas utilities of Ontario in the form of contributions in aid of construction to assist in expansion of their distribution system.

2.8 DSEP was designed to facilitate specific types of system expansion projects. The key criteria for funding such projects were the lack of financial viability and the volume of oil that gas would displace.

2.9 Another program, the Canada Oil Substitution Program (COSP), provided a grant to homeowners who converted from oil to natural gas. This program encouraged oil customers to convert to natural gas.

2.10 These EMR programs which encouraged expansion of the natural gas distribution system were phased out in 1984 and 1985.

Need for Review

2.11 As noted above, in the summer of 1986 the Board examined six applications from Consumers' for

leave to construct gate stations and pipelines and for franchises and certificates to serve the Village of Chalk River, the Town of Deep River and the Township of Rolph, Buchanan, Wylie and McKay, in the County of Renfrew.

2.12 The Board denied the applications as the project did not meet Consumers' fifth-year rate of return feasibility test. In its Reasons for Decision the Board noted that the impact on the public interest, through either granting or denying gas service to the municipalities in question, was not adequately presented in the evidence.

2.13 The Board indicated in its Reasons for Decision that certain important questions concerning system expansion to smaller communities should be considered:

- with DSEP discontinued, what are the means whereby marginally uneconomic areas of Ontario are to be served, if at all;
- what is the role of the Board in the light of the removal of DSEP and to what extent should it be encouraging gas service to marginally uneconomic areas;
- with Ontario utilities facing mature markets, is expansion into uneconomic areas appropriate;
- should the shareholders or customers of utilities subsidize uneconomic expansion into smaller communities;

- o are there lower limits of return that should be permitted on a project basis? Are size of project or amount of subsidy factors that should be considered in assessing a project;

- o have the changing circumstances with respect to energy resulted in the test of public interest being changed;

- o are the current methods used by the utilities for assessing the economic feasibility of projects appropriate and what changes, if any, should be made;

- o should the economics of system expansion be considered on the basis of marginal/incremental costs or on a fully allocated cost basis?

2.14 The Board indicated that these issues would best be addressed outside the context of a specific application and that it would call a special hearing for this purpose some time in early 1987. The Board anticipated that the recommendations from that special hearing would assist in determining whether new guidelines should be developed for leave to construct applications.

3. THE REVIEW

3.1 The Board's Notice of January 9, 1987, invited any party interested in system expansion in Ontario to participate in the Review. The procedure set out in the Notice was designed to obtain input by way of written submissions from participants responding to a discussion paper (the Discussion Paper) developed by Board staff. The procedure also provided for technical conferences or workshops to review outstanding issues.

3.2 Although public participation through written submission has not been used previously by this Board it has been successfully used in other jurisdictions (e.g. the National Energy Board). It was considered that this procedure would encourage a valued input from many parties who might not wish to incur the expense or invest the time required for an oral hearing. By adopting this process the Board hoped to obtain

a broader and more diverse input to the Review in the most cost effective manner.

3.3 The Notice also set out the deadlines for each phase of the Review. Most were extended in order to accommodate the wishes of the participants.

3.4 The Notice was served on the Clerks in every Municipality in Ontario and was published in approximately 42 newspapers.

3.5 Parties who wished to participate in the Review were directed to indicate their intent, in writing, by January 28, 1987. That deadline was extended with the last participant being granted status on February 4, 1987. A total of 129 Letters of Participation were received.

The following is a list of Participants:

Gas Distributors

The Consumers' Gas Company Ltd.	P.Y. Atkinson K. Walker
ICG Utilities (Ontario) Ltd	D.E. Gibbons J. Roland
Natural Resource Gas Limited	W.K. Ferguson
Union Gas Limited	J.B. Jolley

Municipalities	
Township of Bosanquet	C.P. McKenzie
County of Brant	C.G. Spencer
Township of Brock	G.S. Graham
Township of Burford	B.M. Cadman
City of Burlington	G.E. Goodman
Town of Chesley	J. Albright
Town of Cobourg	R.G. Stinson
Township of Dawn	J. Langstaff
Town of Deep River	R. Adam
Town of Dundas	J.R. Gerrie
Township of Elma	G.S. Tucker
Town of Flamborough	R.G. Stewart
Township of Glanbrook	H. Kooyman
Township of Golden	R.G. LaCroix
Township of Haldimand	M.P. Bosetti
The Regional Municipality of Hamilton-Wentworth	L.D. Turvey
Town of Kincardine	G.R. Sutton
City of Kitchener	J.A. Ryder
Township of Moore	R.H. Whitman
Town of Napanee	K.D. Deyo
The Regional Municipality of Niagara	A.R. Pierson

Municipalities (cont'd)

City of North Bay	R.F. Barton
Township of North Dorchester	C. Walton
Township of Oro	R.W. Small
The Regional Municipality of Ottawa-Carleton	J.D. Cameron
Town of Paris	P.H. Dearling
Town of Parry Sound	W.E. Ewing
County of Peterborough	W.D. Armstrong
Town of Simcoe	D. Brunton
City of Toronto	J. Rabinowitz R.M. Feig
The Regional Municipality of Waterloo	S.A. Thorsen
Township of Westmeath	P. Burn
Township of West Nissouri	C.E. Babb
Town of Wiarton	R.J. Kastner

Citizens

Trevor Allinson

Neil Baird

Charles and Shirley Barlow

Mr. & Mrs. J. Blakely

Harold A. Boswell

Reg Bright

Denine Brown

Citizens (cont'd)

Harold and Judith Cottom

A.H. and Ella de Quehen

David Dingwall

Dr. Mauro G. Di Pasquale

F.E. and W.F. Dix

William J. Eakins

Lynda Forbes

Tom Gammage

Lorne Greig

Jennifer F. Hardacre

Judy and Stew Herod

Hans I. Huitema

W.K. Hunt

James R. Innis

Owen James

Harry Jones

Mrs. K. Kopal and Ms. M. Kopal

Jim Landon

Lynda Lapeer

Marc A. Larose

Mr. and Ms. W.G. Loader

Thomas Loughlin

Norma Martin

Citizens (cont'd)

Mr. & Mrs. E.S. & V.L. Morrison

L.G. McIlroy

Donna S. McGillis

Beverly Nicholls

Daniel A. Nicholls

Joan M. Nolasco

Don Mikel

Barry Octeau

Dr. B. Quarrington

George R.J. Rapai

Mr. & Mrs. Brian Rapsey

Graham & Jean Rogers

Steve Rowe

Mr. & Mrs. K. Savage

W.J., Violet and Steve Sawyer

Dirk J. Schmachtel

Daniel Scobie

Mark Scott, Edward E. Scott, Jane Scott

Richard Shapcott

Michael Sheehy

Mr. & Mrs. Donald E. Smith

Scott and Susan Stanley

Charles Stimac

Citizens (cont'd)

Jo Anne St. James

Pat and Birgit Tunney

Mervyn Wells

Mr. & Mrs. George Welton

J.D. Williamson

Marilyn Williamson

P.W. Wilmer

G.M. and Glorya Woods

Other Participants

Alberta Petroleum Marketing Commission	S.F. McAllister
Association of Municipalities of Ontario	M. Dunbar
B.C. Hydro and Power Authority	E. C. Eddy
Brant County Federation of Agriculture	M. Sharp
Canadian Enerdata Limited	R. Zarzeczny
Canadian Petroleum Association	D.B. Macnamara
C-I-L Inc.	P.D. Jackson
Committee of Southwestern Ontario Municipalities	A.C. Wright
Concerned Citizens of Haldimand	G. Hinton
Dow Chemical Canada Inc.	F.G. Marcinkow

Other Participants (cont'd)

Eastont Integrative Services Incorporated (E.I.S.I.)	C.B. Walker
Energy Probe	D.I. Poch
Foothills Pipe Lines (Yukon) Ltd.	H.N.E. Hobbs
Great Lakes Forest Products	J.L. Davies
H. Rentsch Associates Ltd.	H.E. Rentsch
Inco Limited	T.W. Leishman
Independent Petroleum Association of Canada	R.G. DeWolf
Industrial Gas Users Association	P.C.P. Thompson, Q.C. T. Bjerkelund
Lambton Gas Storage Association	A. Kimpe
Ministry of Energy	I.B. MacOdrum
Monenco Consultants Limited	D.H. Stevenson
Ontario Corn Producers' Association	D. LeDrew
Ontario Hydro	C.R. Chorlton
Parry Sound Area Economic Development Commission	M.B. Stagg
Polysar Limited	G.P. Sadvari
PSR Gas Ventures Inc.	P.H. McMillan
Tecumseh Gas Storage Limited	P.Y. Atkinson
Thunder Bay-Atikokan	Iain Angus, MP

Other Participants (cont'd)

TransCanada PipeLines Limited	C.C. Black
Twin Elm Estates Ltd.	G. Brothers

Board Staff Discussion Paper

3.6 The Discussion Paper outlined criteria previously used by the Board when assessing the public interest in system expansion projects and examined economic feasibility tests currently used by the gas distributors' when evaluating system expansion projects. In the Discussion Paper, Board staff also presented alternative feasibility tests to stimulate discussion and a critical re-evaluation of the tests now in place.

3.7 A copy of the Discussion Paper and Procedural Order-1 were provided to all participants. Procedural Order-1 set out the format for responses to the Discussion Paper. All responses were distributed to all participants and all participants were given the opportunity to reply to each others' responses.

3.8 The Board received 25 responses to the Discussion Paper and seven replies to those responses.

Technical Conference

3.9 On March 8, 1987, Procedural Order-2 was issued indicating that a Technical Conference (the Conference) would be held on April 6, 1987, to discuss matters arising from the responses and replies of participants.

3.10 Procedural Order-3, issued March 27, 1987, indicated that the Conference would be held on April 9, 1987, and it would be conducted by Board staff. It also indicated that the following matters would be discussed:

- Public Interest;
- Existing Economic Tests;
- Economic Feasibility Tests presented in the Discussion Paper; and
- Contributions in Aid of Construction.

3.11 The Conference extended over two days and was attended by the following participants:

B. Taylor D. Rewbotham P. Davis	on behalf of Consumers'
J. Hunter D. Gibbons	on behalf of ICG
J. Anderson P. Pastirik D. McCash	on behalf of Union

L. Smith N. Williamson	on behalf of the Town of Deep River
E. de Quehen	on behalf of the Public Interest Participants
D. Poch P. Muldoon	on behalf of Energy Probe
A. Ryder	on behalf of the City of Kitchener
T. Loughlin	on his own behalf
J. Thorne	on behalf of the City of Toronto
K. Taylor	on behalf of Western Gas Marketing Limited, an affiliate of Trans-Canada PipeLines Limited

3.12 The NDP Caucus, although not a participant, was represented by M. McVea.

3.13 A transcript of the Conference was taken and was made available to the Board along with all submissions by all participants in connection with the Review. These transcripts and all documents submitted to the Board as part of this Review are part of the Board's files and are available for public review.

4. THE ROLE OF THE BOARD

4.1 There are three items of legislation which provide a comprehensive means to ensure the orderly and equitable provision of natural gas to Ontario consumers. These are the Ontario Energy Board Act (the OEB Act), R.S.O. 1980, Chapter 332, the Municipal Franchises Act, R.S.O. 1980, Chapter 309 (the MF Act) and the Public Utilities Act, R.S.O. 1980, Chapter 423 (the PU Act).

4.2 Before a utility can supply natural gas to a community, the utility is required under section 46 of the OEB Act to make an application for a Board Order granting leave to construct. If granted, it would permit the construction of the gas transmission line. Pursuant to section 8 of the MF Act, Board approval is required for the construction of works to supply gas and the actual supply of gas itself. Board approval is signified by the issuance of a certificate of public convenience and necessity.

4.3 Under section 9 of the MF Act, the Board's approval is required of the terms and conditions contained in the municipal by-law and the Franchise Agreement under which the utility serves the municipality.

4.4 Under this legislation a distributor seeks Board approval to undertake a project and the Board is required to give or withhold such permission according to whether or not the Board judges the proposed project to be in the public interest. As part of its consideration of the public interest, the Board considers the impact of the proposed project on other customers and requires, in either the leave to construct or in the certificate of public convenience and necessity application, that an economic analysis be produced.

4.5 The Board also is required under section 19 of the OEB Act to examine the cost of all property, plant and equipment included in the utility's proposed rate base, including the current capital budget, to assess whether these items will be "used or useful" in deciding if they should be included in rate base. This assessment includes all transmission, distribution and storage facilities which the distributor proposes to include in the capital budget. Rates are ultimately set by the Board to reflect the costs associated with those items in the rate base.

5. THE PUBLIC INTEREST

5.1 The Board has a statutory obligation to consider the public interest before it makes a determination to grant or reject a leave to construct application for a proposed pipeline or station (Section 48 (8) of the OEB Act).

5.2 In the Discussion Paper and at the Conference, Board staff indicated that the Board typically employs a broad definition of the public interest which takes account of the facts and particular circumstances of each case.

5.3 Board staff presented a list of criteria related to the public interest. These are as follows:

1. Economic feasibility;

2. Community benefits
   - o Industrial development
   - o Alternative fuel considerations
   - o Increased revenues to government (e.g. taxes)

- Local employment
- Regional development;

3. Utility benefits;

4. Security of supply and safety;

5. System flexibility;

6. Route/site selection and landowners' concerns;

7. Environmental impact;

8. Government policy; and

9. Other factors.

Participants' Positions on the Public Interest

Consumers'

5.4 Consumers' stated that the principles that the Board should consider in determining public interest should be broad and wide ranging.

ICG

5.5 ICG noted that Board staff had included most of those public interest factors that the Board should consider. ICG advocated the view that each case is unique and the Board has to consider each application on its own merits to determine exactly what are the public interest concerns.

Union

5.6 Union indicated that in its opinion the tendency over the last five or six years has been to consider the cost to existing customers as the primary public interest factor in evaluating system expansion projects. It also indicated that the other factors discussed by Board staff are probably equally important.

The City of Kitchener

5.7 The City of Kitchener submitted that decisions regarding uneconomic expansion of rate base should be made by the government and were thus beyond the scope of the Board's mandate.

**Concerned Citizens of Haldimand;
Lynda Forbes and
Public Interest Participants**

5.8 These groups generally supported the Board's broad interpretation of the public interest but expressed concern that public interest factors not be incorporated into a formula. They also stressed the importance of a hearing for each application so that all matters regarding public interest could be considered by the Board.

W. K. Hunt;
Brant County Federation of Agriculture;
Ontario Corn Producers' Association and
Working Committee for the Expansion of
Natural Gas Service in the Burford -
Oakland Project Area

5.9 Several participants expressed a view that the widest public interest in Ontario would be served by provision of natural gas service to more rural municipalities. They expressed the concern that the agricultural sector has been forced to compete for system expansion with concentrated urban areas. Some groups argued that rural expansion should be heavily weighted in terms of public interest considerations since a healthy agricultural sector contributes to the well-being of the province as a whole.

Western Gas Marketing Limited

5.10 Western Gas Marketing Limited stated that public interest is a dynamic concept and also argued that none of the public interest factors are necessarily fully quantifiable at any given point in time.

IGUA

5.11 IGUA indicated that the costs associated with uneconomic system expansion ought to be borne by the customer classes that directly benefit from that expansion.

Kincardine and District Recreation Board and Parry Sound Area Economic Development Corporation

5.12 This group expressed concern that with the end of DSEP, smaller communities in Ontario may not receive gas service.

The Board's Findings

5.13 The Board finds that it has jurisdiction to review all matters relating to the production, distribution, transmission and storage of natural gas. Mr. Justice Keith in reviewing the history and origins of the OEB Act, stated:

> In my review the statute makes it crystal clear that all matters relating to or incidental to the production, distribution, transmission or storage of natural gas ... are under the exclusive jurisdiction of the Ontario Energy Board ... .
>
> These are all matters that are to be considered in the light of the general public interest and not local or parochial interests. The words "in the public interest" ... which I have quoted would seem to leave no room for doubt that it is the broad public interest that must be served. (Union Gas Limited vs. Township of Dawn, (1977) 76 D.L.R. 613)

5.14 The Board reiterates that the concept of public interest is dynamic and it must change according to the circumstances. The Board considers that the relevant criteria from those listed above,

and others depending on the circumstances, should be addressed as fully as possible so that the Board has complete information on which to base its determination as to whether or not a project is in the public interest.

5.15 There can be no firm criteria for determining the public interest and the Board will not attempt to define these criteria closely. The weighting the Board attaches to each criterion considered can also change with the circumstances of a specific application.

5.16 When considering the public interest in prior proceedings the Board has been satisfied if the welfare of the public is enhanced without imposing an undue burden on any individual, group or class. The Board will continue to be guided by this general principle in determining the extent to which gas service should be extended into other areas of the province.

5.17 The Board considers that system expansion should not be unlimited and that it is required to continue to determine whether the expansion of gas service is in the public interest.

5.18 The Board has concerns with the concept of "economic feasibility" as it has been used in these proceedings. These concerns will be examined in detail below. The Board considers

that regardless of the "economic feasibility" test used to evaluate a project, it has not been, nor will it be, the sole criterion examined. Even though "economic feasibility" is an important factor, it may be given more weight in some situations, and less in others such as safety or security of supply projects.

5.19 Any application to the Board should include evidence on all public interest criteria considered relevant by the participants. Any data that can be quantified in a meaningful fashion should be presented that way with assumptions clearly stated.

5.20 The Board recognizes that the views of a local community may differ from those of an industrial customer or of a utility. In reaching its decision, the Board attempts to accommodate differing interests in its assessment of the public interest. The greater the number of interests that are represented at a hearing, the more confidence the Board can have in its judgement regarding the public interest.

5.21 The Board therefore encourages wide participation in hearings regarding these matters.

6. TESTS OF ECONOMIC FEASIBILITY

6.1 Because of its important influence on how the public interest is viewed, the question of economic feasibility will be examined in detail and the existing and proposed "tests" to assist judgements about economic feasibility will be considered. In so doing, the Board's concerns with the concept of economic feasibility will be developed.

6.2 Over the years, the Ontario gas distribution utilities have refined the economic feasibility tests used to evaluate system expansion projects. These tests have been examined from time to time in rate application hearings before the Board. However, the examination of each utility's economic feasibility tests has been on an individual basis without benefit of a common public review. A summary of these economic feasibility tests is contained in Appendix A.

6.3 In the Discussion Paper, Board staff outlined what it perceived to be the weaknesses of the feasibility tests currently employed by Union, Consumers' and ICG.

1. The tests are based on a measure of feasibility which is too narrowly defined. Therefore these tests fail to recognize many of the additional benefits which accrue to an individual customer and to the area served by a new project, such as, savings on energy costs and major regional or more macroeconomic benefits.

2. Existing customers are serviced by facilities built at historical capital costs which have been significantly depreciated. These are significantly lower than current costs used in project assessment. A new project where current capital costs are used and where the annual costs are tested at a point in time when depreciation is low (5th year) is obviously at a disadvantage.

6.4 The first group of these are the "Five-Year, Rate of Return Tests".

Five-Year, Rate of Return Tests

6.5 Five-year, rate of return tests are presently employed by Consumers' and ICG to demonstrate the economic feasibility of projects submitted to the Board in leave to construct applications. ICG also uses this methodology to assess all extensions involving more than 60 metres per customer. The test is based on the rate of return on investment to be achieved in the fifth year. The forecast of the annual incremental revenue from the project less its annual incremental gas costs, operation and maintenance expense, municipal and capital taxes, depreciation and income taxes, divided by the estimated cost less accumulated depreciation, equals the estimated rate of return on investment. This estimated rate of return is then compared with the Board approved rate of return on rate base for the distributor to determine if a particular project will be self-supporting. Generally, a project is considered economically feasible if the fifth-year rate of return on rate base equals or exceeds the Board approved rate of return on rate base.

6.6 The "five-year rule" has traditionally been considered a reasonable time frame since this is the period in which it was considered that the majority of the customer attachments would occur. It has also been considered by the

Board as a reasonable time period for existing customers to subsidize new projects.

Participants' Positions on the Five-Year Rule

Consumers'

6.7 Consumers' indicated that they continue to use this method because of the Board's preference but the company considered that its Discounted Cash Flow (DCF) tests used to assess feasibility for other projects provide a better measure of the benefits and costs to existing customers from such projects.

6.8 Consumers' indicated that the five-year target for customer additions is an arbitrary and stringent target. It ignores load and revenue growth in the sixth and subsequent years when a surplus can occur which could create an overall surplus on a net present value basis. Therefore it does not account for the very long period of time in which the project may be producing greater than the allowable rate of return, which could offset the short subsidization period of up to four years.

ICG

6.9 ICG is of the view that its five-year rate of return test should be retained. ICG supports

forecast economic life. At the Conference parties tended to agree that it becomes relatively insignificant to the end result if the DCF analysis is extended beyond twenty years. It was evident that, in general, incremental costs were used.

6.14 The three utilities confirmed that they use a five-year horizon for customer additions with the revenues from these customers being assessed over the longer time horizon for the DCF test.

6.15 At present only Consumers' employs a formal risk analysis in the DCF feasibility test through the use of different time horizons for each class of customer to reflect the different risk that each imposes on the utility's system.

6.16 Union presently provides no such measure of risk in its DCF economic feasibility. However, in projects involving contract customers, the utility's risk exposure is eliminated by requiring that all capital costs be recovered over the contract period. Union indicated that it would not be opposed to performing sensitivity analyses on the factors incorporated in its tests to aid in establishing the risks involved.

an expanded feasibility test which mirrors the rate of return approach by which the utilities are regulated.

Union

6.10 Union opposed the use of this test for evaluation of its system expansion projects.

Brant County Federation of Agriculture and Town of Kincardine

6.11 Both these Participants expressed concern with the five-year rate of return test as they felt that the five-year period should be extended.

Other Economic Feasibility Tests Presently In Use

6.12 Union and Consumers' use DCF analysis to assess the economic feasibility of most projects. DCF tests relate the net present value of the cash in-flows generated from a project to the net present value of its capital costs and other cash out-flows. The discounting of cash in-flows and out-flows gives recognition to the time value of money (i.e. that a dollar spent today has a different value than a dollar spent in the future).

6.13 Most of the DCF tests employed by Union and Consumers' evaluate incremental costs and revenues of system expansion projects over their

6.21 ICG submitted that the five-year test allows for easy measurement of cross-subsidization.

6.22 ICG noted that the DCF method can be subjective depending on the discount rate employed. It considered that the DCF methodology was difficult for its salesmen to perform.

Union

6.23 Union supported the position of Board staff that current economic feasibility tests, as presently defined, produce a measure of feasibility which is too narrowly defined.

6.24 Union considered that storage and transmission expansion should be assessed separately and should not be included in the feasibility evaluation of the distribution projects that cause such expansion.

Alternative Tests

6.25 During the Review, five alternative tests were presented. The Comparative Cost Test (Cost Test) and the Aggregate Customer Net Benefit Test (Benefit Test) were described in the Discussion Paper and Union Gas presented three tests of its own.

6.17 Union and Consumers' both agreed that the DCF methodology provides the best measure of the subsidy required from existing customers for a particular project. Each company noted, at the Conference, that they had refined the DCF methodology so that it could be easily adapted to assessing economic feasibility in the field.

Participants' Positions on Existing Tests of Economic Feasibility

Consumers'

6.18 Consumers' indicated a concern that neither of the tests it presently uses for financial feasibility allow for consideration of broad public interest benefits.

6.19 The company indicated that it supports changes which would allow these other beneficial factors to be considered.

ICG

6.20 ICG noted that its existing test is easily understood by its staff, the Board, and the municipalities as it follows the principles involved in rate of return on rate base determination.

(e.g. geographical location, relative load concentration, security of supply).

6.29 A project will be acceptable if its adjusted unit cost of service is less than or equal to the utility's system-wide unit replacement cost of service.

Participants' Positions on the Cost Test

Consumers'

6.30 Consumers' submitted that the Cost Test has three major strengths: it recognizes the inequity in current tests with respect to the requirement that the cost of system expansion at current replacement costs should equate to the historical system average; it broadens the definition of feasibility to include total benefits and costs to society; and it will lead to a wider access to natural gas throughout the province.

6.31 Consumers' noted the weaknesses: the difficulty in calculating the PIF value beyond the point of valuing the energy savings to end use customers; and the revaluation of Existing System Unit Cost may require an extensive and costly study on an ongoing basis.

6.26 As previously noted, the Board has concerns with economic feasibility tests, in particular how best to represent the appropriate benefits and costs. It is also concerned with the implications which flow from these tests as to the amount of subsidy required from existing customers. The five alternative tests address some of these concerns.

The Cost Test

6.27 The underlying assumption in the Cost Test is that it is unreasonable to expect a new project's costs to be fully recovered by rate schedules which are based, in part, on historic depreciated capital costs (see Appendix A for details of the test).

6.28 Feasibility for the Cost Test is thus determined by comparing a project's estimated fifth-year unit cost of service, excluding gas costs, to the utility's unit replacement cost of service. The project's fifth-year unit cost of service could then be adjusted by a load-risk factor (LRF) and/or a public interest factor (PIF). The LRF will adjust the project's unit cost upwards if its forecasted load is more uncertain or volatile than average. On the other hand, the PIF can be used to scale down a project's cost of service if it has specially meritorious public interest characteristics

one. That is to say, a project will be accepted if it does not require a subsidy from Union's existing customers.

6.37 Union's first alternative would be to accept projects with profitability indices less than one, say 0.7 or greater.

6.38 The second alternative would employ historical costs instead of current costs in evaluating a system expansion project. A project would be accepted if its profitability index is greater than or equal to one.

The Board's Findings on the Cost Test (and on Union's Alternatives)

6.39 The Board recognizes that the Cost Test is a very explicit attempt to substitute "fairness" for economic feasibility as the principal criterion for project evaluation. However, the Board is of the view that public interest factors will vary from case to case and therefore cannot be assigned a numerical value as is proposed in the Cost Test.

6.40 The Board also notes that the test lacks two of the principal strengths of Consumers' and Union's DCF tests. First, it does not take into account the time value of money. Second, it does not quantify the system expansion project's required subsidy and hence rate impact.

6.32 Consumers' also criticized the use of the fifth-year reference point for cost of service comparison.

ICG

6.33 ICG noted that the PIF and the LRF adjustments are likely to be very subjective. The company indicated that attempting to quantify these factors may detract from the importance that should be given to the issues.

Union

6.34 Union indicated that an important strength of this test is that it addresses formally the public interest aspect of system expansion and in particular the problem that, as the utility system matures, the expansion of that system will be more costly.

6.35 Union submitted that the subjectivity involved and the difficulty in administering the test are its two major weaknesses.

Union's Alternatives to the Cost Test

6.36 Union presented two tests as alternatives to the Cost Test. At present, a system expansion project will pass Union's DCF test if its profitability index is greater than or equal to

customers. The cost to the existing customers of proceeding with a system expansion project which does not satisfy the DCF analysis is an increase in their gas bills. Both the costs and the benefits of a project would be discounted by the social discount rate used in the DCF analysis. If the present value of the customer benefits is greater than or equal to the present value of the customer costs, then the project could be accepted.

Participants' Positions on the Benefits Test

Consumers'

6.46 Consumers' submitted that the major strength of the Benefit Test is that it considers the broad effects beyond the pure economics of adding incremental projects to the system.

6.47 The company also asserted that the test provides a satisfactory indicator properly balancing factors over the life of the project.

6.48 Consumers' submitted that the main problem will be in determining and justifying the social discount rate.

6.49 Consumers' expressed concern that some customer benefits are not quantifiable.

6.41 The Board is further concerned that the calculation of the utilities' system replacement costs would be time consuming and imprecise.

6.42 In the opinion of the Board, Union's alternative tests are too narrow in scope to fully assess all the quantitative and qualitative costs and benefits of system expansion.

6.43 The second suggested test does not quantify the magnitude of the subsidy required from the utility's existing customers and has the same faults regarding public interest factors as the Cost Test itself.

The Benefit Test

6.44 The Benefit Test provides an analytical two-stage cost-benefit framework for evaluating system expansion projects. The first stage is a DCF financial feasibility test. This test is similar to the DCF tests presently employed by Consumers' and Union with the notable exception that a social discount rate is used instead of the utility's cost of capital.

6.45 At the second stage, the customer benefits and costs of a system expansion project are compared. The benefits of system expansion are mainly the fuel cost savings of the new gas

6.54 Union proposed modifying the Benefit Test to address its concerns (see below).

The Board's Findings on the Benefits Test

6.55 The Board considers that the Benefit Test has some advantages: it employs a DCF financial feasibility test; it uses a social discount rate; and, it helps to quantify some of the major costs and benefits of the system expansion project.

6.56 Although the Board sees merit in this test, one of the other alternative tests suggested by Union is considered to be preferable.

Union's Alternative to the Benefit Test

6.57 The alternative test proposed by Union to the Benefit Test is a three-stage test which is a broader and more sophisticated version of the Benefit Test. Although the description employs Union's financial feasibility test, Union suggested that each utility could adopt the methodology it prefers for the first stage.

6.58 The first stage is Union's DCF financial feasibility test. If a project passes this test, it would be accepted, subject to the provision that it does not entail significant other social costs (e.g. environmental damage) that are not

ICG

6.50 ICG submitted that the greatest strength of the Benefit Test is its consideration of societal benefits. The company submitted that the Benefit Test requires excessive judgement in several areas, particularly in establishing the appropriate social discount rate.

6.51 ICG also indicated that careful consideration should be given before adopting a test which is premised on the assumption that natural gas will continue to be priced favourably to alternate fuels.

Union

6.52 Union noted that a strength of the Benefit Test was the fact that it quantifies a wide range of public interest benefits that result from project implementation. The company also mentioned other strengths: the test is flexible enough to be applied to most types of system expansion; it employs the widely supported DCF methodology; and the test accounts for rate impacts that result from project evaluation.

6.53 The major weakness of the test, in Union's view, is its subjectivity. Considerable judgement will have to be exercised in the determination of several factors notably the social discount rate.

6.62 At the third stage, the results of the first and second stages are considered together with any relevant unquantifiable costs or benefits and a judgement is made as to whether the project is in the public interest. If a project's second-stage benefit/cost ratio is greater than or equal to one, it may receive third-stage acceptance unless the resulting rise in rates (due to the subsidy) would cause a serious loss of the utility's existing load or it had significant unquantifiable social costs.

6.63 Alternatively, a project with a benefit/cost ratio less than one could be approved if it had significant unquantifiable social benefits.

Participants' Positions on Union's Alternatives to the Benefits Test

Union

6.64 Union recommended that the Board adopt its three-stage methodology as a framework for system expansion decision-making.

Consumers'

6.65 Consumers' agreed that Union's Alternative to the Benefit Test is preferable to Union's other proposals.

included in the feasibility calculation. If a project fails the first-stage test, then it can proceed to the second stage for further evaluation.

6.59 At the second stage, all the quantifiable benefits not quantified in the first stage are quantified (e.g. energy cost savings to the new customers).

6.60 The subsidy required from the existing customers as well as other quantifiable social costs are calculated. The present values of all the above benefits and costs are determined using a social discount rate (the customers' cost of capital).

6.61 A sensitivity analyses on the key variables (e.g. social discount rate, gas prices, alternative fuel prices, inflation) is performed to assess the project's risk. If the analysis shows a project is relatively insensitive to major changes in the key variables, it is an added factor in favour of the project. A benefit to cost ratio is calculated by dividing the present value of the stage-two benefits by the present value of the stage-two costs. If the resulting ratio is greater than one, the project could be accepted subject to the provision that it does not entail significant other costs that still cannot be strictly quantified.

ICG

6.66 ICG conceded that this test seems to be an improvement over the Benefit Test. However, ICG stated that it did not endorse any of the Alternative Tests but preferred to modify its existing fifth-year rate of return test. It considered that the proper forum for deciding whether or not to change the current test is a public hearing involving an application, not at a technical conference. ICG also expressed the hope that any new guidelines adopted by the Board would be restricted to information requirements only and that the utilities would retain the right to present this information as they see fit.

The Board's Findings on Economic Feasibility Tests

6.67 The Board finds that of the tests currently in use by the utilities, the DCF analysis provides a superior measure of the subsidy required from existing customers for a particular project.

6.68 The Board directs all utilities to employ DCF analysis as part of its assessment of the feasibility of projects for system expansion.

6.69 The Board encourages the use of more formal risk measurement in the feasibility test and it

would not discourage the use of sensitivity analyses of variables being regularly employed in the test.

6.70 The Board finds that incremental costs should be used in evaluating the feasibility of system expansion.

6.71 The Board will continue to assess the adequacy of the DCF analysis and any other tests used for project evaluation at the time of a utility's rate case hearing.

6.72 The Board finds that Union's three-stage test has considerable merit. The Board requires each utility to develop a three-stage process as outlined below to aid the Board in its determination of the public interest.

6.73 The first stage is a test based on a DCF analysis.

6.74 The second stage should be designed to quantify other public interest factors not considered at stage one. All quantifiable other public interest information as to costs and benefits should be provided at this stage.

6.75 The third stage should take into account all other relevant public interest factors plus the results from stage one and stage two.

6.76 A project could, therefore, be accepted if it passed the DCF analysis of stage one and if the disadvantages and quantifiable costs from stages two and three do not disqualify it. If a project is not acceptable because it fails the DCF analysis or has significant other disadvantages, then stages two and three must be completed before the project can be said to be fully evaluated.

6.77 The Board is aware that each utility will continue to approve internally projects that lie within areas for which a franchise and a certificate of public convenience and necessity have been issued. At subsequent rate hearings the Board may assess the analyses employed before approving the inclusion in rate base of any specific project.

6.78 Any project brought before the Board for approval should be supported by all data used by the Applicant in reaching its conclusion that the project is viable. The utilities and other interested parties may use alternative analyses, but these and the results must be presented at the relevant hearing. The Board will continue to weigh the various benefits against the various disadvantages as it always has in reaching its decision in the public interest.

6.79 The Board continues to hold the opinion that it is appropriate for existing customers to subsidize, through higher rates, financially non-sustaining extensions that are in the overall public interest if the subsidy does not cause an undue burden on any individual, group or class.

7. THE ISSUE OF SUBSIDY

7.1 One of the major reasons for this Review is that much of the remaining expansion available to a utility and the public in a mature market area is generally uneconomic as judged by existing tests and a subsidy or a contribution in aid of construction is required. The preceding sections have dealt with changes that should be made in the determination of the subsidy or contribution required, and the public interest considerations. This section considers the potential expansion available and who should be required to make the contribution or provide the subsidy should it be required.

7.2 Eash distributor provided a list of projects or municipalities that are currently not being served with natural gas but might be considered for system expansion.

7.3 Union indicated that approximately 37 communities in its franchise area fall into this category and expansion into a sample of 13 of these communities would represent an $8.8 million dollar investment.

7.4 Consumers' review of possible expansion in or adjacent to its franchise areas indicated that there were a possible 43 projects that could be considered for its long term system expansion program. A sample of 13 of these projects represented about $21 million dollars of investment.

7.5 ICG indicated that there were 80 communities in its distribution area, with a customer potential of about 21,000, that presently do not have gas service. ICG stated that it would not consider expansion in gas service to any of these communities in the absence of a capital contribution.

Participants' Position on Subsidies

The City of Kitchener

7.6 Kitchener considered that economic feasibility as currently determined should be paramount in any decision relating to system expansion. It recommended that the Board should not take into account many of the public interest factors

proposed by Board staff. Kitchener submitted that it is the responsibility of government to make decisions regarding uneconomic expansion. It stated that it makes no sense to impose the burden of this expansion on existing customers.

Consumers'

7.7 In the case of significant economic burden, Consumers' observed that it is neither fair nor logical for existing customers to bear the entire burden of subsidy for expansion.

7.8 Consumers' nevertheless supported the concept that areas of Ontario that are marginal with respect to gas service should be served if there are public interest benefits (including economic) beyond pure financial feasibility and where the extra cost to existing customers resulting from the extension will not be onerous.

7.9 Consumers' indicated that when broad public interest benefits accrue to Ontario, consideration should be given to the use of provincially-administered funds for subsidizing system expansion. It was Consumers' view that a provincial fund similar to DSEP could be used to encourage expansion of service to customers who would not otherwise receive natural gas.

7.10 Another alternative discussed by Consumers' would be to recover some of the cost from the local community benefiting from the project. This could be accomplished through a municipal contribution-in-aid of construction or in the form of a time-limited surcharge on the rates charged to gas customers within the municipality.

7.11 Consumers' advocated that costs resulting from uneconomic expansion strictly defined should only flow through the utility's cost of service when the amounts involved will not impose a significant burden on existing customers.

ICG

7.12 With respect to subsidization, ICG proposed various alternatives. It noted that subsidization could be a provincial government responsibility. It discussed the possibility of subsidizing projects through the total utility cost of service and ultimately through rates but noted that there must be a limit to the burden imposed on existing customers. In addition ICG noted that contributions-in-aid of construction could be collected from the customers that would benefit from the gas service.

7.13 ICG asserted that the concept of a fair return to the utility's shareholders and its ability

to raise capital at the lowest cost possible should not be compromised when considering the public interest aspects of system expansion.

Union

7.14 In terms of subsidization, Union stated that, in the absence of government funding, uneconomic areas could only be serviced through rate increases or contributions-in-aid of construction as there is no justification for shareholder subsidization because a higher rate of return would then be required.

Energy Probe

7.15 Energy Probe stated that extending service to marginal areas should only occur where existing customers are not asked to subsidize new ones. Energy Probe believes that government policy on this matter must be clear before decisions can be made regarding the subsidization of system expansion. It considered that it would be difficult to proceed without knowing what the provincial government deemed to be in the public interest.

7.16 Energy Probe asserted that the provincial government must not only determine whether or not expansion is appropriate but also whether natural gas is the preferred energy alternative.

If the government perceives a public interest in taxpayers or existing customers subsidizing extension, the subsidy should be explicitly initiated by government.

7.17 In Energy Probe's view the Board must have explicit policy direction from the government regarding what constitutes the public interest before the Board incorporates broader public interest factors into the decision making.

Parry Sound Area Economic Development Commission

7.18 This group indicated that the government should determine the priority in which marginal areas are to be served and that a government subsidy should be provided.

Deep River

7.19 This municipality indicated the importance to a community of having natural gas service and stated that both the federal and provincial governments should encourage service of natural gas to small towns in Ontario by way of subsidies. It stated that it would not refuse to provide a contribution towards construction but that municipal funds for such projects would be difficult to raise.

Public Interest Participants

7.20 This group stated that the policy of subsidization must be resolved by the government before any matters concerning feasibility tests should be considered.

City of Toronto

7.21 This municipality opposed system expansion which would impose an undue burden on existing customers.

Committee of Southwestern Ontario Municipalities

7.22 This group indicated that it is the role of federal and provincial governments to provide financial assistance where needed for system expansion into areas not currently served.

7.23 It submitted that municipal contributions in aid of construction would be inappropriate as such contributions would have implications on a municipality's financial integrity and would suggest the involvement of the Ontario Municipal Board.

The Board's Findings on Subsidy

7.24 As noted earlier, the Board considers that in general, the public interest is satisfied if

the welfare of the public is enhanced without imposing an undue burden on any individual, group or class.

7.25 The Board has previously stated herein that the economic feasibility of a project should not be the sole criteria examined nor the determining factor in the approval process.

7.26 The economic feasibility tests currently employed by the utilities result in projects being accepted that require a degree of subsidy from existing customers. With the five-year rate of return test the project may require a subsidy from existing customers for the first four years. Similarly the DCF methodology may result in approval of a project which requires a subsidy from existing customers in its early years, with the subsidy being offset by the benefits in later years. The Board has, in the past, considered that subsidy as reasonable, recognizing that future benefits may offset the subsidy in later years.

7.27 The implication of accepting an economic test which has a broader definition of economic feasibility than that employed in the past is that the subsidy required may in general be greater than that which was deemed reasonable by the Board in the past.

7.28 The Board notes that several projects that received DSEP funding did not meet the fifth-year rate of return test. Nevertheless the Board accepted that the projects were in the public interest and approved these projects even though a subsidy would still be required from existing customers in the fifth year of the project.

7.29 The Board finds that a contribution-in-aid of construction should be required for those projects where the sole purpose is to supply gas into a new area and where the evaluation process demonstrates an undue burden on existing customers.

7.30 The Board would expect an agreement to be reached between the utility and the community regarding the contribution before an application is made to the Board.

7.31 In certain cases, the Board considers that special rates and/or loans by the utility to finance a contribution-in-aid of construction, may facilitate the expansion of the natural gas system.

7.32 A number of the participants strongly suggested that the provincial government encourage expansion of the natural gas system in Ontario by

developing a program to fund uneconomic projects. The Board considers that, in addition to the methods of subsidy referred to above, some government support might be justified where the overall benefits to the community as a whole warrant such action.

Completion of the Proceedings

7.33 The Board will issue a procedural order in future proceedings to adopt the Board's findings in this Report.

Dated at Toronto this 1st day of June, 1987.

J.C. Butler
Vice-Chairman and
Presiding Member

J.A. DeKort
Member

M.A. Daub
Member

Appendix A

Economic Feasibility Tests

	Consumers'		ICG	Union	Comparative Cost Test	Customer Benefit Test
	Leave to Construct	Cash Flow & CR Test				
CAPITAL COSTS	Incremental Estimates					
OVERHEAD COSTS	Incremental	Incremental	Incremental	Incremental	-	Incremental
INFLATION ADJUSTMENT	No	No	No	No Yes - Cost Reduction	No	Yes

Corrected at E.B.O. 134 Technical Conference, April 9, 10, 1987

Legend

BACC	Board approved cost of capital
G.S.T.	General service test
LRMC	Long run marginal cost
LTC	Leave to construct
MATCC	Marginal after tax cost of capital
SD	Social discount rate

Economic Feasibility Tests: A Summary

	Consumers'		ICG	Union	Comparative Cost Test	Customer Benefit Test
	Leave to Construct	Cash Flow & CR Test				
TIME HORIZON (Yrs)	5	50-Res. 25-Comm. 5-Ind. 3-Inter.	5	20 for GST, LTC Contract Period for Ind. Economic Life for Cost Reduction	5	Economic Life
DCF METHODOLOGY	No	Yes	No	Yes - GST, Cost Reduction No - Contract (Payback) Sometimes - LTC	No	Yes
DISCOUNT RATE	—	MATCC	—	GST- BACC Cost Reduction, LTC Marginal Cost of Capital	—	SD
REQUIRED RATE OF RETURN	Marginal Regulatory Return	MATCC	BACC	BACC or marginal cost of capital	BACC	Customer-specific marginal cost of capital
RISK ADJUSTMENT	No	Yes	—	Yes	Yes	Yes
REVENUE	5th Year Volume Build-Up	5 Year Volume Build-Up	5th Year Estimate	5 Year Volume Build-Up	5th Year Estimate	Economic Life Build-Up
GAS COST	Estimated Incremental Gas Cost		(Using today's rates)		Not Included	Forecast Incremental Gas & Oil Costs
STORAGE COSTS	LRMC	LRMC	Not a Capital Cost	Not Included	Replacement Cost	LRMC
O&M COSTS	Incremental	Incremental	Incremental	Incremental Average	Average	Incremental

Consumers' Gas
Feasibility Cash Flow Test (cont.)

Capital Cost	Years 1-5: Budget average unit costs or field estimates Year 6+ : 0 Salvage Value?
Overhead Cost	Incremental Overhead cost relating to the system expansion program is capitalized and allocated to each project in proportion to the capital cost of mains
Discount Rate	Marginal after tax cost of capital (M.A.T.C.C.)
Risk Adjustment	see Time Horizon
Inflation Adjustment	none
Required Rate of Return	see Discount Rate
Taxes	Incremental taxes are estimated
Feasibility Calculation	A project is feasible if the cumulative after tax net present value of operating cash flows is greater than or equal to the net present value of capital expenditures.

Economic Feasibility Tests: Details

A. Consumers' Gas Feasibility Cash Flow Test

Type	Discounted Cash Flow (DCF)
Applicability	- Large Volume Customers (340 $10^3 m^3$/year+) Mains cost $50,000 +
Time Horizon	Residential 50 years Small commercial and industrial 25 years Large volume 5 years Interruptible 3 years
Revenue	Years 1-5: estimated incremental revenues (assuming today's rates) Year 6+ : 5th year estimate used
Gas Cost	Years 1-5: estimated incremental gas costs (assuming today's incremental price of gas) Year 6+ : 5th year estimate used
Storage Cost	Storage costs (average incremental) are included in gas cost estimate
O&M Costs	Years 1-5: estimated incremental O&M costs Year 6+ : 5th year estimate

B. Consumers' Gas
Capital Requisition Test

Type	DCF
Applicability	Small system expansion projects
Time Horizon	Same as CFT
Revenues	Same as Cash Flow Test (CFT)
Gas Costs	Same as CFT
Storage Costs	Same as CFT
O&M Costs	Same as CFT
Capital Costs	Same as CFT
Overhead Costs	Same as CFT
Discount Rate	Same as CFT
Risk Adjustment	See Time Horizon

Consumers' Gas
Feasibility Cash Flow Test (cont.)

Calculation of Contribution in Aid of Construction	Capital contribution required to make the project's net present value equal zero.

C. Consumers' Gas
Short Main Extensions

Applicability	Main extensions of 300 metres or less
Feasibility Criteria	Approved if average main extension, exclusive of road crossings, is 18 metres or less

Consumers' Gas
Capital Requisition Test (cont.)

Required Rate of Return	Marginal after tax cost of capital
Taxes	Incremental municipal, capital and income taxes are estimated as a % of capital and miscellaneous costs
Feasibility Criteria	A project is feasible if its 5th year annual revenues are greater than or equal to its 5th year annual costs (operating and maintenance, gas, capital and taxes). The fifth year annual costs also include a return on the estimated capitalized revenue short fall during the first four years.
Calculation of Contribution in Aid of Construction	Capital contribution required to make 5th year annual cost equal to 5th year annual revenue.

Consumers' Gas
Leave to Construct Test (cont.)

Required Rate of Return	See Feasibility Criteria
Taxes	Incremental taxes are estimated
Feasibility Criteria	A project is feasible if its estimated 5th year rate of return [5th year annual incremental revenues less 5th year annual incremental gas costs, operating and maintenance expense, municipal and capital taxes, depreciation (an "accounting value") and income taxes divided by estimated rate base (an "accounting value")] equals the company's marginal regulatory cost of capital.
Calculation of Contribution in Aid of Construction	Capital contribution necessary to make project feasible

D. Consumers' Gas
Leave to Construct Test

Type	5th Year Rate of Return
Applicability	Leave to Construct Applications
Time Horizon	See Feasibility Criteria
Revenues	Same as CFT
Gas Cost	Same as CFT
Storage Cost	Same as CFT
O&M Costs	Same as CFT
Capital Costs	Same as CFT
Overhead Costs	Same as CFT
Discount Rate	Not applicable
Risk Adjustment	None

F. Union Gas
General Service Test (GST)

Type	DCF
Applicability	Non-Contract customers
Time Horizon	20 years
Revenues	Years 1-5: Estimated incremental distribution revenues (assuming today's rates) Year 6 + : 5th year estimate
Gas Costs	Years 1-5: Incremental volumes per year x current average cost of gas Year 6 + : 5th year estimate used
Storage Cost	Not included
O&M Cost	Years 1-5: Number of customers added per year x Union's average O&M costs Year 6 + : 5th year estimate used
Capital Cost	Project Specific estimate Salvage value not inluded

E. Consumers' Gas
Upgrading or Replacing Existing Facilities

Type	DCF if quantifiable
Applicability	Capital projects to upgrade or replace existing facilities
Time Horizon	Economic life of project
Revenues	Incremental if applicable
Discount Rate	Marginal cost of capital
Feasibility Criteria	Choose the minimum cost alternative. N.B.: Unquantified factors such as safety will be taken into consideration

G. Union Gas
Contract Customer Test

Type	Pay Back
Applicability	Contract customers
Time Horizon	Contract length
Revenues	Contract volumes x contract rate
Gas Costs	Contract volumes x the current average cost of gas
Storage Costs	Not included
O&M Costs	Number of customers x average incremental operating cost of a contract customer
Capital Costs	All incremental capital costs associated with supplying gas to customers
Overhead Costs	See GST
Discount Rate	Not applicable

Union Gas
General Service Test (GST) (cont.)

Overhead Cost	Incremental
Discount Rate	Board approved cost of capital (B.A.C.C.)
Risk Adjustment	None
Inflation Adjustment	None
Taxes	Incremental income taxes are calculated Municipal taxes are estimated to be 1% of total capital expenditures.
Required Rate of Return	See Discount Rate
Feasibility Criteria	A project is feasible if the net present value of cash inflows divided by the net present value of capital costs is greater than or equal to one.
Calculation of Contribution in Aid of Construction	Capital contribution necessary to make project feasible

Union Gas
Contract Customer Test (cont.)

Calculation of Contribution in Aid of Contribution

The contribution is:

F-X

where:

$$X = \frac{YN}{1+(YR)}$$

F = Facilities Capital Costs
X = Union's contribution
Y = Contract term in years where Y cannot be greater than 3
N = Gross Margin
R = Pre-tax rate of return
F-X = cannot be less than zero

Union Gas
Contract Customer Test (cont.)

Risk Adjustment	All risk borne by customer
Inflation Adjustment	None
Required Rate of Return	Board approved pre-tax cost of capital
Taxes	Analysis conducted on a pre-tax basis
Feasibility Criteria	A project is feasible if the payback period is less than or equal to the contract period. The payback period is: $X = \frac{F}{N-(RF)}$ where: X = The number of years required to return the facilities investment plus a required rate of return on invested capital; N = Gross Margin (Revenue less cost of gas less other operating and maintenance costs); R = Pre-tax rate of return on rate base; F = Facilities capital costs

Union Gas
Leave to Construct Test (cont.)

Discount Rate	Marginal Cost of Capital
Risk Adjustment	Same as GST
Inflation Adjustment	Same as GST
Required Rate of Return	See Discount Rate
Taxes	Same as GST
Feasibility Criteria	Same as GST
Calculation of Contribution in Aid of Construction	N.B. Unless there is one major customer for whom the line is being built, Union will not attempt to collect an aid to construct.

H. Union Gas
Leave to Construct Test

Type	DCF or 5th Year Rate of Return
Applicability	Leave to Construct applications
Time Horizon	Same as GST
Revenues	Years 1-5: Estimated incremental distribution revenues (assuming today's rates) Year 6 + : 5th year estimate
Gas Costs	Estimated volume per year x (current average cost of gas
Storage Costs	Not included
O&M Costs	Estimated number of customers per year x average O&M cost as approved in last rate case; plus incremental compression fuel and operating expenses
Capital Costs	Project specific estimate of transmission costs plus average distribution cost x number of new customers
Overhead Costs	Incremental

Union Gas
Cost Reduction Test (cont.)

Risk Adjustment	None
Inflation Adjustment	Yes
Taxes	Incremental income taxes are calculated. Municipal taxes are included if applicable.
Required Rate of Return	See Discount Rate
Feasibility Criteria	A project is feasible if the net present value of the savings associated with the capital project are greater than the net present value of the total project costs. Where there are alternative ways of meeting a particular need the project alternative with the lowest revenue requirement, on a net present value basis, is considered the least cost alternative.

I. Union Gas
Cost Reduction Test

Type	DCF
Applicability	Distribution main replacements, storage wells, compressors etc.
Time Horizon	Economic Life
Revenues	Incremental savings resulting from the capital expenditure
Gas Costs	Not Applicable
Storage Costs	Not Applicable
O&M Costs	All incremental expenses associated with project
Capital Costs	Incremental capital costs plus salvage value
Overhead Costs	Incremental
Discount Rate	Marginal cost of capital

ICG
Earnings and Expenses Test (cont.)

Risk Adjustment	See Feasibility Criteria
Inflation Adjustment	None
Taxes	General taxes = 0.88% of the investment in mains, regulator stations and service lines Incremental income taxes are calculated
Required Rate of Return	Board approved rate of return
Feasibility Criteria	A project is feasible if its 5th year operating income (revenues minus operating costs minus income taxes) as a percentage of its 5th year rate base (90.6% of net plant investment) is greater than or equal to the Board approved rate of return. A higher rate of return is required for projects that serve industrial customers.
Calculation of Contribution in Aid of Construction	$C = \frac{.1274R - OI}{.0831}$ C = contribution required OI = operating income in 5th year without contribution R = 5th year rate base without contribution

J. ICG
Earnings and Expenses Test

Type	5th Year Rate of Return
Applicability	All projects which are not approved by the 60 metre rule
Time Horizon	5 Years
Revenues	Estimated incremental revenues (assuming today's rates)
Gas Costs	Estimated load x incremental gas costs
Storage Costs	Incremental costs (Union's current rates)
O&M Costs	Average incremental costs
Capital Costs	Estimated incremental capital costs
Overhead Costs	Incremental overhead costs are included
Discount Rate	Not applicable - methodology does not discount cash flows

L. Comparative Cost Test

Type	5th Year Rate of Return
Applicability	All distribution system expansion projects
Time Horizon	5 years
Revenue	Not applicable
Gas Cost	Not applicable
Storage Cost	5th year depreciated project specific cost
O&M Costs	5th year project specific cost
Capital Cost	5th year depreciated project specific cost
Overhead Cost	?
Discount Rate	Not applicable
Risk Adjustment	Load risk factor (measures relative certainty of load forecast by customer class)

K. ICG
60 Metre Rule

Applicability	Extensions up to 300 metres
Feasibility	An extension averaging 30 metres per customer is automatically approved An extension averaging 60 metres per customer is automatically approved if for every customer there is also one potential customer

M. Aggregate Customer Net Benefit Test

Type	DCF
Applicability	All distribution system expansion projects
Time Horizon	Economic life of project
Revenue	Not applicable
Gas Cost	Incremental gas costs
Storage Cost	Incremental storage cost
O&M Costs	Incremental O&M costs
Capital Cost	Incremental capital cost
Overhead Cost	Incremental overhead cost
Discount Rate	Project-specific, risk-adjusted, customer-oriented social discount rate
Risk Adjustment	See Discount Rate and Required Rate of Return

Comparative Cost Test (cont.)

Inflation Adjustment	None
Required Rate of Return	Board approved cost of capital
Taxes	5th year project specific taxes
Feasibility Criteria	A project is feasible if: $SC \times LNF \geq EPC \times \frac{LRF}{PIF}$ where: SC = existing system's depreciated (5th year) unit replacement cost; LNF = load normalization factor $\left(\frac{\text{Actual Load}}{\text{Normalized Load}}\right)$; EPC = expansion project's depreciated (5th year) unit cost; LRF = load risk factor; PIF = public interest factor (measures project's relative public interest merit, e.g., 1.0 to 1.5)

Aggregate Customer Net Benefit Test (cont.)

Inflation Adjustment	Implicit in forecast of customer benefits of using gas over alternate fuels
Required Rate of Return	The utility's project-specific, marginal cost of capital, reflecting the risk impact of the project from a shareholder's perspective, is incorporated in the capital recovery factor
Taxes	Incremental taxes
Feasibility Criteria	A project is feasible if the sum of the discounted life cycle marginal benefits to the new customers is greater than or equal to the sum of the discounted life cycle marginal costs to existing customers. The marginal benefits are the value of customers' total fuel cost savings resulting from the ability to purchase natural gas instead of the next cheapest energy source (typically oil). The marginal costs are the incremental changes in the gas bills of the utility's existing customers.

Symbolically,

$$\sum_{i=0}^{n} \frac{MB}{(1+s)^i} \geq \sum_{i=0}^{n} \frac{MC}{(1+s)^i}$$

where:

MB =	the marginal benefits to the new customers
MC =	the marginal cost to the existing customers
s =	the social discount rate
n =	the project's economic life in years.