May 6, 2016

BY COURIER & RESS

Ms. Kirsten Walli
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON
M4P 1E4

Dear Ms. Walli:

Re: EB-2015-0276 - Union Gas Limited - 2014 Disposition of Demand Side Management Deferral and Variance Accounts – Supplemental Interrogatory Responses

Please find attached Union's responses to the supplemental interrogatories received from Industrial Gas Users Association ("IGUA") and School Energy Coalition ("SEC") in the above noted proceeding. The numbering of the supplemental interrogatories continues from the interrogatories to which Union responded on March 7, 2016. The interrogatory responses will be filed in the RESS and copies will be sent to the Board.

If you have any questions concerning this application and evidence please contact me at (519) 436-5334.

Yours truly,

[*Original Signed by*]

Vanessa Innis
Manager, Regulatory Initiatives

cc: Alex Smith (Torys)
EB-2015-0276 Intervenors

Encl.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference**:** Exhibit B, Tab 1, Appendix N, page numbered 5.

If any two or more of the projects listed in the gas savings summary table apply to the same customer, please provide a table which is structured so as to indicate, for each applicable customer, which projects relate to that customer.

Response:

Project ID	**Customer**
2014-IND-0609	A
2014-IND-0612	B
2014-IND-0630	C
2014-IND-0608	D
2014-IND-0622	
2014-IND-0667	E
2014-IND-0615	F
2014-IND-0670	G
2014-IND-0632	H
2014-IND-0543	I
2014-IND-0522	J
2014-IND-0487	K
2014-IND-0620	L
2014-IND-0664	M
2014-IND-0649	N
2014-IND-0452	
2014-IND-0675	

2014-IND-0356	O
2014-IND-0431	P
2014-IND-0299	
2014-IND-0287	Q
2014-IND-0371	R

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference**:** Exhibit B, Tab 1, Appendix N, page numbered 13.

A number of the projects reviewed involved steam leak repairs, and the report in respect of many of these projects states as follows:

Leaks developed and were repaired on a continuous basis.

a) Please expand on this statement to indicate whether it applies only to the 2014 program year evaluated, or whether it refers to ongoing maintenance practices at the customers' facilities.

b) Did Diamond Engineering make any attempt to determine whether steam leak repairs were conducted prior to or following the program year being evaluated?

Response:

The following responses were prepared by Diamond Engineering Company:

a) The practice refers to an ongoing maintenance practice at the facility in question.

b) The start dates and stop dates of all activity was reviewed during the site interview. The project savings verified included only the savings resulting for the year stated in the application.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference**:** Exhibit B, Tab 1, Appendix N, page numbered 19.

For a number of the projects, the evaluator makes an assumption regarding work performed for safety reasons, versus work performed for energy conservation reasons. For example, the following statement appears at the referenced page:

It is assumed that 20% of the work performed was driven not by energy conservation, but due to safety concerns.

With respect to each project for which a savings allocation assumption such as the foregoing is made, please explain and detail the basis for the assumption.

Response:

The following response was prepared by Diamond Engineering Company:

The word "Safety" above applies to work that was performed to protect personnel from burns from contact with hot surfaces or leaking steam or ice buildup that could present a slip hazard.

A knowledgeable individual at the Union Gas Customer's location referenced in the projects above was contacted by the Verifier and asked specifically what portion of the work performed as outlined in the project would have been performed for safety reasons alone. Two customers reached the 20% value without prompting and the balance felt this was a reasonable estimate. The Verifier feels this value is appropriate. These interviews and assumptions were discussed with the Audit Committee during the project review conference calls and there were no objections raised by that group.

This agreement is understandable because the percentage of steam and process piping that could be touched or where a steam leak could injure a worker is roughly the same for each location. For this reason – the 20% reduction was applied to each project.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference**:** Exhibit B, Tab 1, Appendix N, page numbered 42.

The report contains the following statement at the referenced page:

Base Case assumes the Customer continues to operate with the failed traps. The Customer has sufficient steam raising capacity to operate with this steam loss. The cost of lost steam is far less than the cost of a complete system shutdown so operating with the steam loss would be a rational action.

Please explain how Union's program altered the foregoing cost/benefit position of the customer in order to allow the DSM project to proceed. Please include detailed calculations to explain this result, using the incentive value and substantiated project costs provided for this customer and any other information considered by Union in approving the project.

Response:

The customer in question is a participant in Union's Large Volume Direct Access ("Direct Access") program. The project was identified by the customer in its annual Energy Efficiency Plan – a requirement of the Direct Access program – and planned for accordingly. Union provided the customer with an incentive of $20,000 upon completion of the project, contributing approximately 9% to the total project cost of $218,000.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, page numbered 54.

The report contains the following statement at the referenced page:

The number of blowing traps reported does seem to be excessive given the population of traps inspected but there is no authoritative information to allow the CPSV to reduce the blowing trap count.

a) Please explain what *"blowing trap"* means, and how such characterization impacts gas savings derived/reported.

b) Please explain the basis upon which the evaluator formed the view that the number of blowing traps reported seemed excessive.

c) Please provide the evaluator's best view on what an appropriate number of blowing traps would be, given the view expressed.

d) Please restate the gas savings derived for the subject project using the view provided in response to part c.

Response:

a) A steam trap is used to manage condensate formation in a steam system, "trapping" steam but allowing for condensate to be collected and removed. A "blowing trap" is one that allows steam to pass with the condensate, and is no longer "trapping" steam effectively. As a result, "blowing traps" decrease the overall energy efficiency of a steam system.

b) The following response was prepared by Diamond Engineering Company:

The number of blowing traps was greater than that of the average of other studies where a large population of traps were evaluated using thermal and ultrasonic techniques.

c) The following response was prepared by Diamond Engineering Company:

Given a large populations of disc traps, of the traps that fail, 20% of the traps generally fail closed (blocked), 40% fail open (blowing) and 40% leak. This is based on our previous work reviewing the failure mode of large populations of traps confirmed by consultation with steam system experts.

d) The following response was prepared by Diamond Engineering Company:

Given that 624 blowing traps resulted in an incremental natural gas consumption of 3,353,000 m^3 / year – each blowing trap represents an incremental natural gas consumption of 5,373 m^3 / year.

Trap Failure Mode	Quantity of Traps That failed in this Mode	Incremental Gas Consumption per Year per Trap for this Failure Mode (m^3)	Sum of Incremental Gas Consumption for this Failure Mode per Year (m^3)
Closed (Blocked)	125	0	0
Open (Blowing)	250	2,687	671,800
Leaking	249	5,373	1,338,000
		Total Annual Savings (m^3/Year)	2,010,000

We must restate that there is no authoritative information to allow the Verifier to reduce the blowing trap count.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, pages numbered 88 – 92 (Project 2014-IND-0608)

The report indicates that this project received an $80,000 incentive, on estimated and actual installed project cost of $261,272. The report also indicates that:

[redacted]

a) Please confirm that the incentive paid on this project equates to more than 30% of the total project cost.

b) Please explain how Union determined that an incentive of this magnitude was appropriate for this project.

c) Please explain the view expressed in the statement referenced regarding the [redacted] in light of the fact that an incentive equal to 30% of the total project cost was required in order for the customer to proceed with the project.

Response:

Although the specific reference in the Diamond Report is redacted, the response is shared on the public record.

a) Confirmed. Union provided the customer with an incentive of $80,000 upon completion of the project, contributing approximately 31% to the total project cost of $261,000.

b) Union determined an appropriate incentive based on the customer's needs and the magnitude of cost effectiveness for the project.

c) Union measures cost effectiveness for its DSM program as the net lifetime savings per incentive dollar on a project. Union uses its discretion to provide additional incentives on projects with exceptional cost effectiveness.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, page numbered 109.

The report includes the following statement regarding the subject project:

The Customer was asked to apportion the savings based on the risk assessment performed to support the funding of the project. The Customer estimates that 80% of the savings was the result of the company's desire to save energy and 20% as (sic) the result of the safety hazard presented by the failed insulation. From this information, savings reported will be reduced by 20%.

a) Was any independent analysis or verification conducted to validate the customer's reported allocation of the rationale for the project as between safety and gas savings?

b) If the customer wanted to address only its safety concerns, how might it have addressed the repairs differently?

Response:

a) No. Please also see the response at Exhibit C.IGUA.13.

b) The customer would have evaluated the perceived risks for occupational safety hazards and concentrated on repairs to mitigate only those safety concerns.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, page numbered 121.

The report includes the following statement regarding the subject project:

It was estimated by the Customer that 20% of the repair efforts were required for safety reasons. This is in keeping with estimates of the percentage of piping in a [ ] [ ] facility that can be contacted by plant personnel.

a) Was any independent analysis or verification conducted to validate the customer's reported allocation of the rationale for the project as between safety and gas savings for the particular facility in question?

b) If not, why not?

Response:

a) No. Please also see the response at Exhibit C.IGUA.13.

b) Please see the response at Exhibit C.IGUA.13.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, pages numbered 127 and 128.

On page numbered 127 the following statement appears:

Repair and replacement of 8,328 linear feet of missing, damaged and/or wet mechanical insulation on the process piping located throughout the plant.

On page numbered 128 the following statement appears in respect of heat loss calculations for the same project:

All piping is considered to be located outside.

Please reconcile these two statements.

Response:

The plant refers to the interconnected equipment and facilities within the customer's property boundary. The piping that was insulated for this project is located outdoors.

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, page numbered 130.

The report includes the following statement regarding the subject project:

The Customer was asked to apportion the savings based on the risk assessment performed to support the funding of the project. The Customer estimates that 80% of the savings was the result of the company's desire to save energy and 20% as (sic) the result of the safety hazard presented by the failed insulation. From this information, savings reported will be reduced by 20%.

a) Was any independent analysis or verification conducted to validate the customer's reported allocation of the rationale for the project as between safety and gas savings?

b) If the customer wanted to address only its safety concerns, how might it have addressed the repairs differently?

Response:

a) No. Please also see the response at Exhibit C.IGUA.13.

b) Please see the response at Exhibit C.IGUA.17 b).

UNION GAS LIMITED

Answer to Interrogatory from
Industrial Gas Users Association ("IGUA")

Reference: Exhibit B, Tab 1, Appendix N, pages numbered 133 and 134.

On page numbered 133 the following statements appear:

Repair and replacement of 86,002 square feet of missing, damaged and/or wet mechanical insulation on the process piping located throughout the plant.

…

To calculate savings, it was assumed the distribution of various temperatures were equal to the distribution of steam piping within the facility.

On page numbered 134 the following statement appears in respect of heat loss calculations:

All piping is considered to be located outside.

Please reconcile these statements.

Response:

The plant refers to the interconnected equipment and facilities within the customer's property boundary. The piping that was insulated for this project is located outdoors. The customer's heating system distributes steam at various operating pressures and temperatures in the plant. The "outdoor" steam distribution system is understood to distribute steam at operating temperatures and pressures equal to the "indoor" system.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For each of the projects reviewed by Diamond Engineering, please advise what other projects that same customer did in 2014. If those other projects were also reviewed, please provide the project number. If those other projects have not been reviewed, please provide, for each such project for that customer:

a) Project number
b) Nature of project
c) In-service date of project
d) Claimed and Audited Net CCM
e) Project cost
f) Incentive paid
g) Simple payback

Response:

Attachment 1 lists each project reviewed by Diamond Engineering as a sub heading. Following each subheading are the projects completed in 2014 by the same customer that were not reviewed by Diamond Engineering Company.

Projects Reviewed by Diamond Engineering 2014

Project number a.	Nature of Project b.	In-Service Date of Project c.	Claimed Net Cumulative Natural Gas Savings (m^3) d.	Final Audited Net Cumulative Natural Gas Savings (m^3) e.	Project Cost as Audited (Gross) f.	Incentive Paid g.	Simple Payback w/o Incentive (years) h.
Project Verified by Verifier: 2014-IND-0371							
2014-IND-0313	Steam trap repairs	31-08-2014	819,081	704,410	$26,637	$13,319	0.9
Project Verified by Verifier: 2014-IND-0615							
2014-IND-0614	Install Baffle Walls on Rotary Furnace (to reduce air ingress and raise furnace pressure)	31-03-2014	6,239,946	4,867,158	$733,757	$27,429	2.9
2014-IND-0626	Burner replacement on process furnace	31-08-2014	13,130,893	10,242,097	$514,959	$20,000	2
Project Verified by Verifier: 2014-IND-0543							
2014-IND-0339	Replacement of many aspects of the furnace heating, control and conveying system (Production Line 4)	03/07/2013	554,953	432,863	$253,169	$20,000	1.5
2014-IND-0340	Replacement of many aspects of the furnace heating, control and conveying system (Production Line 1)	03/03/2014	330,551	257,830	$123,593	$20,000	1.2

2014-IND-0471	Replacing over-sized furnace pressure regulators (Shop 1)	24-10-2013	9,560,741	7,457,378	$61,693	$20,000	0.4
2014-IND-0496	Repairs to furnace, controls, radiant tubes and burners	22-04-2013	818,604	638,511	$257,763	$20,000	1
2014-IND-0544	Replacing over-sized furnace pressure regulators (Shop 3)	20-12-2013	27,908,034	21,768,267	$129,816	$10,000	0.3
2014-IND-0596	Repairs to furnace, controls, radiant tubes and burners	05/05/2014	319,470	249,187	$149,605	$10,000	1.5
Project Verified by Verifier: 2014-IND-0356							
2014-IND-0326	Insulation Repair and Replacement.	01/01/2014	1,404,776	1,208,107	$59,498	$15,269	3.3
Project Verified by Verifier: 2014-IND-0664							
2014-IND-0468	Replace existing direct steam injection heater with indirect heater	28-05-2014	30,483,087	23,776,808	$1,797,120	$31,661	3
2014-IND-0486	Steam leak repairs	25-09-2014	8,810,914	6,872,513	$89,571	$10,000	0.3
2014-IND-0662	Replacement of heat exchanger	28-05-2014	4,612,218	3,597,530	$51,257	$20,000	0.6
2014-IND-0663	Replacement of heat exchanger	03/03/2014	3,191,204	2,489,139	$51,257	$17,344	0.8
2014-IND-0671	Steam leak repairs	25-09-2014	5,807,863	4,530,133	$99,629	$10,000	0.4
Projects Verified by Verifier: 2014-IND-0608 and 2014-IND-0622							
2014-IND-0511	Steam leak repairs	09/05/2014	2,155,477	1,681,272	$10,181	$4,895	0.2
2014-IND-0611	Turbo-Generator condensate Heat Recovery	28-11-2014	17,102,800	13,340,184	$118,411	$50,000	0.3
2014-IND-0665	Reheat Furnace Tuning	31-08-2014	53,268,000	41,549,040	$14,976	$30,000	0.01

Projects Verified by Verifier: 2014-IND-0452, 2014-IND-0649 and 2014-IND-0675							
2014-IND-0432	Replacement of fire suppression system with alternative that eliminates need for space heating in the building	05/01/2013	1,406,772	1,209,824	$77,874	$15,291	4.3
2014-IND-0520	Steam leak repairs	10/01/2014	5,138,872	4,419,430	$30,609	$15,305	0.5
2014-IND-0645	Load reduction for on-site CHP	10/01/2014	121,308	104,325	$21,159	$1,199	14.9
2014-IND-0676	Load reduction for on-site CHP	10/01/2014	81,243	69,869	$36,176	$981	31.2
2014-IND-0681	Pipe insulation repairs	10/01/2014	39,753	34,188	$7,108	$432	13.9
Project Verified by Verifier: 2014-IND-0670							
2014-IND-0516	Steam and condensate leak repairs	30-09-2014	15,327,458	11,955,417	$694,429	$20,000	2.9
2014-IND-0517	Steam trap repairs	30-09-2014	7,119,243	5,553,009	$185,383	$10,000	0.6
2014-IND-0652	Heat transfer improvement	30-09-2014	8,930,594	6,965,863	$703,822	$10,000	1.3
2014-IND-0654	Steam trap repairs	30-09-2014	5,349,721	4,172,782	$162,208	$10,000	0.7
2014-IND-0655	Heat transfer improvement	31-05-2014	5,165,186	4,028,845	$765,960	$10,000	2.4
Project Verified by Verifier: 2014-IND-0522							
2014-IND-0625	Heat transfer improvement	31-12-2013	4,076,560	3,179,717	$353,454	$10,000	0.6
2014-IND-0679	Steam leak repairs	31-12-2013	5,845,496	4,559,487	$382,114	$10,000	4.2
2014-IND-0680	Steam leak repairs	31-12-2013	7,356,127	5,737,779	$586,124	$10,000	5.2
Project Verified by Verifier: 2014-IND-0287							
No other projects completed at this customer site.							
Project Verified by Verifier: 2014-IND-0620							
2014-IND-0619	Condensate heat recovery	31-08-2014	3,687,599	2,876,327	$104,014	$32,083	1.4

Project Verified by Verifier: 2014-IND-0487							
2014-IND-0551	Steam trap repairs	31-12-2013	1,655,573	1,291,347	$63,570	$20,000	0.9
2014-IND-0628	Pipe insulation repairs	31-12-2013	15,615,500	12,180,090	$138,687	$10,000	0.6
2014-IND-0653	Steam leak repairs	31-12-2013	2,368,816	1,847,676	$178,797	$10,000	4.9
Project Verified by Verifier: 2014-IND-0299 and 2014-IND-0431							
2014-IND-0373	Install blowdown heat recovery	07/01/2014	126,160	108,497	$20,000	$1,371	12.3
2014-IND-0453	Linkageless controls for Air/Fuel ratio improvement	07/01/2014	1,221,447	1,050,445	$20,500	$10,250	1.3
Project Verified by Verifier: 2014-IND-0630							
2014-IND-0504	Steam leak repairs	31-07-2014	8,301,758	6,475,371	$569,845	$20,000	4.4
2014-IND-0505	Steam leak repairs	31-07-2014	4,408,290	3,438,467	$287,955	$11,770	4.2
2014-IND-0545	Steam trap repairs	31-07-2014	4,108,936	3,204,970	$217,857	$10,000	1.2
2014-IND-0546	Steam trap repairs	31-07-2014	2,235,727	1,743,867	$118,860	$10,000	1.2
Project Verified by Verifier: 2014-IND-0632							
2014-IND-0470	Steam leak repairs	18-06-2014	17,431,645	13,596,683	$366,393	$10,000	1.4
2014-IND-0485	Steam trap repairs	31-08-2014	4,315,808	3,366,330	$138,496	$10,000	0.7
Project Verified by Verifier: 2014-IND-0612							
No other projects completed at this customer site.							
Project Verified by Verifier: 2014-IND-0667							
2014-IND-0656	Steam trap repairs	31-12-2013	245,177	191,238	$19,526	$3,807	1.8
2014-IND-0657	Steam trap repairs	31-12-2013	1,032,139	805,068	$80,271	$20,000	1.8
2014-IND-0658	Steam trap repairs	31-12-2013	843,485	657,919	$63,280	$20,000	1.7
2014-IND-0659	Steam trap repairs	31-12-2013	1,273,826	993,584	$97,341	$20,000	1.7
2014-IND-0660	Steam trap repairs	31-12-2013	979,505	764,014	$74,337	$20,000	1.7
2014-IND-0668	Pipe insulation repairs	31-12-2013	26,706,082	20,830,744	$254,962	$20,000	0.6
Project Verified by Verifier: 2014-IND-0609							
2014-IND-0669	Recuperator tube upgrade	30-11-2013	15,815,426	12,336,032	$228,426	$38,080	0.5

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For each of the projects included in this Exhibit, please reconcile the figure in Element #26 (CPSV firm ccm. recommendation) with the figure for the same project in C.SEC.1, Attachment 1.

Response:

The values in Element #26 are the Large Volume CPSV firm's recommendation on gross cumulative gas savings. These can be reconciled to the values in in Exhibit C.SEC.1, Attachment 1, column f 'CPSV Recommended Net Cumulative Natural Gas Savings (m^3)' by applying the Large Volume custom free rider rate of 54%. Please see the table below for the reconciliation.

Project Number a.	CPSV Firm Recommended Gross Cumulative Natural Gas Savings (m^3) b.	CPSV Firm Recommended Net Cumulative Natural Gas Savings (m^3) b * (1-0.54) c.
2014-IND-0649	39,080,000	17,976,800
2014-IND-0670	19,071,000	8,772,660
2014-IND-0487	17,104,000	7,867,840
2014-IND-0664	2,166,500	996,590
2014-IND-0356	8,218,000	3,780,280
2014-IND-0522	23,471,000	10,796,660
2014-IND-0452	48,360,000	22,245,600
2014-IND-0675	12,304,000	5,659,840
2014-IND-0371	3,456,000	1,589,760
2014-IND-0620	4,414,500	2,030,670
2014-IND-0612	145,180,000	66,782,800
2014-IND-0615	79,600,000	36,616,000
2014-IND-0608	86,850,000	39,951,000
2014-IND-0622	25,690,000	11,817,400
2014-IND-0431	737,400	339,204
2014-IND-0299	1,856,600	854,036
2014-IND-0287	3,040,000	1,398,400
2014-IND-0543	32,410,000	14,908,600
2014-IND-0609	179,520,000	82,579,200
2014-IND-0630	98,160,000	45,153,600
2014-IND-0632	32,620,000	15,005,200
2014-IND-0667	120,320,000	55,347,200

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For each of the projects included in this Exhibit, please provide a table, in the same format as the CPSV firm's "Calculated Gas Savings from Union Gas Project" table (for example, table 649.3) setting out the calculation of the claimed amount.

Response:

The calculation of gross savings for each 2014 verified Large Volume project is already set out by project in tables within the referenced report at Exhibit B, Tab 1, Appendix N.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For projects 0649, 0670, and 0487,

a) Please confirm that assuming a 20 year life implies that, in the baseline, the steam leaks would have been left unrepaired for the next 20 years. Please justify that assumption.

b) Please provide any analysis done to assess whether these projects, or any of them, should be treated as advancements.

c) Please provide evidence that these customers do not in fact repair steam leaks without addressing the root cause of the leaks. Please advise whether the CPSV firm verified the root cause of each of the leaks.

Response:

a) Confirmed. An equipment life of 20 years has been consistently applied by Union, and supported by multiple audits and verifications including those for the 2014 program year. The 20 year equipment life was also filed in the annual input assumptions filing EB-2014-0354, which was approved by the Board.

b) Steam leak repair, steam trap and pipe insulation projects are not considered advancements. This was addressed by Evergreen Economics in its response to EB-2014-0273, Exhibit B.Staff.12.

c) The following response was prepared by Diamond Engineering Company:

There is no direct evidence to supply. To repair the leak without addressing the root cause would be illogical and a poor business practice. The Verifier has confidence that the customers in question have sufficient expertise to identify and formulate a plan to address any deficiencies in the application of the piping system / components.

As stated in the Diamond Engineering report:

Rational Process Operator – Unless evidence is uncovered to the contrary, it is assume the person / people responsible for various decisions as to the operation, maintenance, and investment in the process or apparatus follow sound business principles. Unless otherwise noted, this analysis does not seek to understand why decision(s) are made, only the decision(s) impact on energy consumption.

If we had any reason to believe the customer was operating contrary to the above, we would have noted it in the report.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0649,

a) Please advise why a 20% safety factor was not applied, when that factor was applied to all of the other steam-related projects.

b) Please explain why a project with a one-month simple payback and a cost of less than $16,000 required Union Gas incentives or assistance.

Response:

a) The following response was prepared by Diamond Engineering Company:

The repairs in question were performed on a condensate return and not the steam system. The leaks occurred in typically unoccupied areas of the facility and were inside so burns and ice buildup was not a factor.

b) Union's incentives enable Large Volume customers, who were the subject of this CPSV process, to prioritize their maintenance and capital equipment projects among many other competing priorities. The project referenced was completed by the customer and, in Union's judgement, was a legitimate DSM project. As such, the project was not, as the question implies, an "obvious free rider". Consequently, funding for the project was approved. This approach is consistent with the evidence and extensive testimony provided by Union in its recently concluded 2015-2020 DSM Plan proceeding (EB-2015-0029) in which the Board rejected the idea of a minimum payback requirement.

Additionally, Rate T2 and Rate 100 projects completed through Union's Large Volume Direct Access program must be identified by customers in their annual Energy Efficiency Plans. Union reviews all customer plans to ensure they include viable DSM projects.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0670:

a) Please justify the use of a 20% safety factor, as opposed to some greater or lesser level.

b) Please confirm that the customer has a written protocol to repair steam leaks on a regular, year-round basis. Please provide the rationale for assuming that money or other assistance from Union Gas was a necessary cause of these steam leak repairs.

c) Please confirm that the CPSV firm did not independently verify the savings from the 9 condensate leaks or the 3 replaced steam traps referred to on page 17.

d) Please explain why the traps were assigned a life of 7 years, rather than a lesser amount representing the advancement of their replacement that would otherwise have occurred.

Response:

a) The following response was prepared by Diamond Engineering Company:

We assume the word "Safety" above applies to work that was performed to protect personnel from burns from contact with hot surfaces or leaking steam or ice buildup that could present a slip hazard.

A knowledgeable individual at the Union Gas Customer's location referenced in the projects above was contacted by the Verifier and asked specifically what portion of the work performed as outlined in the project would have been performed for safety reasons alone. Two customers reached the 20% value without prompting and the balance felt this was a reasonable estimate. The Verifier feels this value is appropriate. These interviews and assumptions were discussed with the Audit Committee during the project review conference calls and there were no objections raised by that group.

This agreement is understandable because the percentage of steam and process piping that could be touched or where a steam leak could injure a worker is roughly the same for each location. For this reason – the 20% reduction was applied to each project.

b) With respect to the rationale for why DSM incentives enabled the customer to complete this project, please see the response at Exhibit C.SEC.15 b).

The following response was prepared by Diamond Engineering Company:

Yes, the customer has a written protocol to repair steam leaks on a regular and emergency basis.

c) The following response was prepared by Diamond Engineering Company:

The representations of the Customer were reasonable and no data was supplied to the Verifier to recalculate the Customer's estimates. The leaking traps represented 3.7% of the total steam loss from the system and the energy saved from condensate repairs represented less than 0.3% of the project's estimated savings.

d) The 7-year equipment life was filed in annual input assumptions filings with the Board, most recently approved in EB-2014-0354. The use of a 7-year equipment life has been consistently applied by Union, and verified and confirmed through multiple prior annual DSM audits, including the 2014 CPSV process.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0487:

a) Please justify the use of a 20% safety factor, as opposed to some greater or lesser level.

b) Please confirm that the customer has a written protocol to repair steam leaks on a regular, year-round basis. Please provide the rationale for assuming that money or other assistance from Union Gas was a necessary cause of these steam leak repairs.

Response:

a) Please see the response prepared by Diamond Engineering Company at Exhibit C.SEC.16 a).

b) With respect to the rationale for why DSM incentives enabled the customer to complete this project, please see the response at Exhibit C.SEC.15 b).

The following response was prepared by Diamond Engineering Company:

Yes, the customer has a written protocol to repair steam leaks on a regular and emergency basis.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For projects 0664, 0356, 0522 and 0543,

a) Please confirm that assuming a 7 year life implies that, in the baseline, the steam traps would have been left unrepaired and unreplaced for the next 7 years. Please justify that assumption.

b) Please provide any analysis done to assess whether these projects, or any of them, should be treated as advancements.

Response:

a) Confirmed. The lifetime savings claimed for the steam trap project referenced assumes a 7-year equipment useful life, and also implies that the unrepaired condition will persist for the equivalent lifetime. The condition and performance of a steam trap is not readily identifiable and requires diagnostic equipment and steam trap surveying to assess the condition of the steam traps in place. Completion of steam trap surveys and repairs for identified underperforming traps competes with many other priorities. The equivalent lifetime of a steam trap is not simply a measure of the trap underperforming at the condition it was identified at the time of repair for the next 7 years. The equivalent lifetime considers that the condition of underperforming traps will worsen over time, increasing energy loss. The use of a 7-year measure life has been consistently applied by Union, and verified and confirmed through multiple prior audits, including the 2014 CPSV process.

b) Please see the response at Exhibit C.SEC.14 b).

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0664:

a) Please justify the use of a 20% safety factor, as opposed to some greater or lesser level.

b) Please explain why a project with a two-month simple payback and a cost of $8,000 required Union Gas incentives or assistance.

c) Please confirm that the customer has a written protocol to repair steam traps on a regular, year-round basis. Please provide the rationale for assuming that money or other assistance from Union Gas was a necessary cause of these steam trap repairs or replacements.

Response:

a) The following response was prepared by Diamond Engineering Company:

No 20% factor was applied. In nearly all cases, steam trap systems, by design, discharge to a safe location.

b) Please see the response at Exhibit C.SEC.15 b).

c) With respect to the rationale for why DSM incentives enabled the customer to complete this project, please see the response at Exhibit C.SEC.15 b).

The following response was prepared by Diamond Engineering Company:

Yes, the customer has a written protocol to repair or replace steam traps on a regular basis year around.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0356:

a) Please justify the use of a 20% safety factor, as opposed to some greater or lesser level.

b) Please explain why a project with a three-month simple payback and a cost of $25,000 required Union Gas incentives or assistance.

c) Please confirm that the customer has a written protocol to repair steam traps on a regular, year-round basis. Please provide the rationale for assuming that money or other assistance from Union Gas was a necessary cause of these steam trap repairs or replacements.

d) Please explain the low per-trap replacement cost in this project as compared to the other projects in which steam traps were replaced.

Response:

a) Please see the response prepared by Diamond Engineering Company at Exhibit C.SEC.19 a).

b) Please see the response at Exhibit C.SEC.15 b).

c) With respect to the rationale for why DSM incentives enabled the customer to complete this project, please see the response at Exhibit C.SEC.15 b).

The following response was prepared by Diamond Engineering Company:

Yes, the customer has a written protocol to repair or replace steam traps on a regular basis year around.

d) Union has no specific information on why the per trap cost is low compared to the other steam trap projects reviewed through the 2014 CPSV process. Steam traps are available in different sizes and performance ratings, and may simply have mechanical components repaired as opposed to outright replacement of the trap itself. Another factor affecting cost is the labour needed to access and repair a trap. The more cumbersome the effort, the more expensive the labour cost.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0522:

a) Please justify the use of a 20% safety factor, as opposed to some greater or lesser level.

b) Please confirm that the customer has a written protocol to repair steam traps on a regular, year-round basis. Please provide the rationale for assuming that money or other assistance from Union Gas was a necessary cause of these steam trap repairs or replacements.

c) Please provide the calculation of the 9 month simple payback for this project in C.SEC.1.

d) Please expand on the implications of ignoring the "excessive" number of blowing traps as described on page 54.

Response:

a) Please see the response prepared by Diamond Engineering Company at Exhibit C.SEC.19 a).

b) With respect to the rationale for why DSM incentives enabled the customer to complete this project, please see the response at Exhibit C.SEC.15 b).

The following response was prepared by Diamond Engineering Company:

Yes, the customer has a written protocol to repair or replace steam traps on a regular basis year around.

c) The simple payback is 0.8 years or 9 months. Please see Attachment 1 for the calculation.

d) The implication of ignoring the "excessive" number of blowing traps is inefficient use of energy within the steam system (i.e. more steam must be produced to compensate for the energy loss of blowing steam traps).

Simple pay back calculation for project 2014-IND-0522

Project ID	Gross Audited Annual Gas Savings (m^3/Yr) a.	Gross Audited Annual Electrical Savings (kWh/Yr) b.	Gross Audited Annual Water Savings (Liters/Yr) c.	2014 Avg Gas Unit Price[1] ($/$m^3$) d.	2014 Electricity Unit Price[2] ($/kWh) e.	2014 Water Unit Price[2] ($/L) f.	Total Annual Cost Savings[1] g. (a*d)+(b*e) +(c*f)	Gross Audited Incremental Cost ($) h.	Simple Payback i. (h/g)
2014-IND-0522	1,676,500	-	34,490,000	$0.16	$0.10	$0.00	$276,714	$218,337	0.8 years

Notes

1- Average Gas Unit Prices are the average 2014 unit rate per m^3 by rate class delivered to customers on system supply exclusive of fixed customer charges (non-fixed charges include delivery, demand, transportation, storage and gas commodity).

2- Electricity and Water Unit Prices are the 2014 values from the OPA Conservation and Demand Management Cost Effectiveness Guide, October 15, 2010, Appendix A, Ratepayer Assumptions.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0675,

a) Please confirm that assuming a 20 year life implies that, in the baseline, the steam injector would have been left unrepaired for the next 20 years. Please justify that assumption.

b) Please explain why a project with a two-month simple payback and a cost of $16,000 required Union Gas incentives or assistance.

Response:

a) Confirmed. The lifetime savings claimed for the process improvement assumes a 20-year equipment useful life, and also implies that the unrepaired injector will persist for the equivalent lifetime. The process improvement in question would have had no impact on the customer's process output hence, it is reasonable that the repairs would not be addressed.

b) Please see the response at Exhibit C.SEC.15 b).

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0612:

a) Please explain why a project with a two-month simple payback required Union Gas incentives or assistance.

b) Please confirm that the inclusion in the Applicant's results of the audited ccm for this project increases the claimed shareholders' incentive by more than $150,000.

c) Please confirm that assuming a 20 year life implies that, in the baseline, the re-routing of the condensate would not have been implemented any time in the next 20 years. Please justify that assumption. Please provide more details of the phrase, on page 79, "The useful life of the project was discussed".

Response:

a) Please see the response at Exhibit C.SEC.15 b).

b) Not confirmed. Union did not claim any shareholder incentive related to its 2014 Large Volume program.

c) Confirmed. The lifetime savings claimed for the capital equipment project assumes a 20-year equipment useful life, and also implies that the baseline condition would have continued for the equivalent lifetime. This improvement was non-critical to the customer's process, and the baseline performance condition can continue indefinitely. The useful life of the project was discussed amongst the Audit Committee with the Verifier. The Verifier confirmed a reasonable lifetime expectation for the project was the equipment life of the repair.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0622:

a) Please explain why a project with a one-month simple payback required Union Gas incentives or assistance.

b) Please explain why a project in which "The customer replaced the failed components" would have a ten year life. Please confirm that assuming a 10 year life implies that, in the baseline, the failed components would not have been replaced any time in the next 10 years. Please justify that assumption.

Response:

a) Please see the response at Exhibit C.SEC.15 b).

b) Confirmed, the lifetime savings claimed for the project considers the equipment life of the repaired component and the continued operation of the less efficient baseline condition for the equivalent lifetime. The repair was non-critical to the customer's process and the baseline performance condition can continue indefinitely.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0287:

a) Please explain the reference to an Economizer on page 108.

b) Please confirm that assuming a 20 year life implies that, in the baseline, the kiln insulation, which the CPSV firm says was "seriously damaged", would not have been replaced any time in the next 20 years. Please justify that assumption.

c) Please explain the 20% safety factor on page 109. Please describe the steps taken by the CPSV firm to verify this estimate.

Response:

a) The following response was prepared by Diamond Engineering Company:

"Economizer" should read "Kiln".

b) Confirmed. The lifetime savings claimed for the kiln insulation considers the useful life of the new insulation and the continued operation of the underperforming insulation for the equivalent lifetime. The repair was non-critical to the customer's process and the baseline performance condition can continue indefinitely.

c) The following response was prepared by Diamond Engineering Company:

We assume the word "Safety" above applies to work that was performed to protect personnel from burns from contact with the hot surface of the furnace or kiln.

A knowledgeable individual at the Union Gas Customer's location referenced in the project above was contacted by the Verifier and asked specifically what portion of the work performed as outlined in the project would have been performed for safety reasons alone. After discussion, the Verifier and Customer agreed that 20% was an appropriate factor.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For Project 0543:

a) Please explain why no safety factor was applied.

b) Please explain why a project with a six-month simple payback required Union Gas incentives or assistance.

c) Please confirm that the customer has a written protocol to repair steam traps on a regular, year-round basis. Please provide the rationale for assuming that money or other assistance from Union Gas was a necessary cause of these steam trap repairs or replacements.

d) Please provide further detail on the change in fuel mix referred to on page 114 that resulting in the increase in estimated savings.

Response:

a) The following response was prepared by Diamond Engineering Company:

The subject of the project was steam trap replacement / repair. In nearly all cases, steam trap systems, by design, discharge to a safe location.

b) Please see the response at Exhibit C.SEC.15 b).

c) With respect to the rationale for why DSM incentives enabled the customer to complete this project, please see the response at Exhibit C.SEC.15 b).

The following response was prepared by Diamond Engineering Company:

Yes, the customer has a written protocol to repair or replace steam traps on a regular basis year around.

d) The following response was prepared by Diamond Engineering Company:

When a customer uses multiple fuels to generate steam and has the ability to replace one fuel with another, the rational Customer will always reduce the use of the most expensive fuel first.

The deviation between the Verifier estimate and the Union Gas Project Manager Estimate is a result of fuel mix calculations with the Union Gas Project Manager assuming the proportional reduction in all fuels used to generate steam. This, however, was not the case. The Customer always reduced the highest cost fuel first. For this project, natural gas was the highest cost fuel.

UNION GAS LIMITED

Answer to Interrogatory from
School Energy Coalition ("SEC")

Reference: Exhibit B, Tab 1, Appendix N

For projects 0630, 0632, and 0667,

a) Please confirm that assuming a 20 year life implies that, in the baseline, the pipe insulation would have been left unrepaired and unreplaced for the next 20 years. Please justify that assumption.

b) Please provide any analysis done to assess whether these projects, or any of them, should be treated as advancements.

c) Please explain why projects with a low cost, and a five month simple payback, required Union Gas incentives or assistance.

d) Please confirm that the inclusion in the Applicant's results of the audited ccm for these three projects increases the claimed shareholders' incentive by more than $200,000.

e) Please justify the use of a 20% safety factor, as opposed to some greater or lesser level.

f) Please explain why the loss of efficiency assumed for the insulation in all three cases was 15%. Please confirm that the CPSV firm took no steps to verify this assumption.

Response:

a) Confirmed. The lifetime savings claimed for the pipe insulation considers the useful life of the new insulation and the continued operation of the underperforming insulation for the equivalent lifetime. The repair was non-critical to the customer's process and the baseline performance condition can continue indefinitely.

b) Please see the response at Exhibit C.SEC.14 b).

c) Please see the response at Exhibit C.SEC.15 b).

d) Not confirmed. Union did not claim any shareholder incentive related to its 2014 Large Volume program.

e) Please see the response prepared by Diamond Engineering Company at Exhibit C.SEC.16 a).

f) The following response was prepared by Diamond Engineering Company.

The repairs had already been completed prior to the Verifier's site visit, therefore physical measurements were not possible. The 15% assumption is an assumption arrived at by a consensus between the Verifier, Customer and Union Gas Project Manager.