STATE OF ALASKA

THE REGULATORY COMMISSION OF ALASKA

Before Commissioners:	Stephen McAlpine, Chairman Rebecca L. Pauli Robert M. Pickett Norman Rokeberg Janis W. Wilson
In the Matter of the Request Filed by the MUNICIPALITY OF ANCHORAGE d/b/a MUNICIPAL LIGHT & POWER DEPARTMENT for Approval to Establish Depreciation Rates	U-16-094
In the Matter of the Tariff Revisions, Designated as TA357-121, filed by the MUNICIPALITY OF ANCHORAGE d/b/a MUNICIPAL LIGHT & POWER DEPARTMENT	U-17-008

MUNICIPAL LIGHT AND POWER'S FIRST SUPPLEMENTAL RESPONSE TO PROVIDENCE HEALTH & SERVICES' FOURTEENTH REQUEST FOR DISCOVERY ON REPLY TESTIMONY (PHS-MLP-14)

The Municipality of Anchorage d/b/a Municipal Light and Power ("ML&P"), hereby provides its first supplemental response to Providence Health & Services' ("PHS'") fourteenth request for discovery on reply testimony. All responses to discovery are prepared by ML&P in consultation with counsel. Witnesses at hearing will be available for cross-examination on their testimony. Documents produced in response to these requests will also be stored in an electronic document management sharefile site accessible with login credentials that have been or will be provided as requested to the counsel, analysts, and consultants for PHS, AG, ANTHC, ENSTAR, FEA, and JLP.

PRELIMINARY STATEMENT

Discovery in this docket is not complete. As discovery proceeds, facts,

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REDACTED

Interrogatory (No. PHS-MLP-14-48): In reference to the electronic workpapers file provided with respect to Mr. Reed's Exhibit JJR-37, Plant 2A Benefits estimate (MLP30829),

(a) Explain whether the analysis supporting the average thermal heat rates before and after adding Plant 2A (tab "Page 2 Heat Rates" in MLP30829) reflects energy supplied from ML&P's hydro generation resources.

(b) If you answer subpart (a) in the negative, explain why it is appropriate to apply the forecasted heat rate improvement factor to total retail sales when a portion of sales are served from hydro generation whose efficiency is not affected by Plant 2A.

(c) State the MWh of hydropower included within the 1,018,677 MWh of 2015 ML&P retail sales used in Mr. Reed's benefits calculation.

(d) State ML&P's actual average thermal heat rate (comparable to the actual 2015 monthly heat rates and estimated post-Plant 2A heat rates in tab "Page 2 Heat Rates" of MLP30829) for each month since Plant 2A came online.

Response: (a) The thermal heat rate analysis does not include energy supplied from ML&P's hydro generation resources.

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(b) As an initial matter, when ML&P is providing both retail sales and wholesale sales, it is not possible within ML&P's system to determine how much of each "are served from hydro generation" as opposed to from thermal generation. However, for purposes of estimating the approximate size of benefits attributable to Plant 2A, various simplifying assumptions can be made. The analysis presented in Exhibit JJR-37 assumes that ML&P's customers will benefit in an amount equal to the reduction in per unit gas costs for the thermal fleet multiplied by ML&P's retail sales. Another simplifying assumption is that there will be no improvement in ML&P's margins on off-system sales after Plant 2A compared to before Plant 2A, even though actual margins on off-system sales are likely to improve with the addition of Plant 2A, perhaps significantly, particularly to the extent off-system sales are served from hydro generation. The benefit of improved margins on off-system sales is not included in Mr. Reed's calculations.

Alternatively, one could assume that all or some given portion of retail sales "are served from hydro generation" (although, as stated before, the source of particular sales cannot actually be determined), but the results of Mr. Reed's analysis would not change significantly. For example, the figure below shows the results of workpapers produced with this response as MLP35461 and MLP35462, in which Mr. Reed re-calculated the estimated approximate efficiency benefits attributable to Plant 2A under two alternative scenarios. In Scenario A, he assumes that 79.8% of hydro generation will be used to serve retail customers, reflecting the proportion of ML&P's total sales that are retail sales (see the tab entitled "2015 Gen Uses" in the Scenario A workpaper). In Scenario B, he assumes that 100% of hydro generation will be used

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to serve retail customers. These differing assumptions would also affect the level of margins on off-system sales, but like the analysis in Exhibit JJR-37, those impacts are not included in the alternative benefit estimates.

Figure 1. Sensitivity Scenarios for Benefits Calculation (NPV, $MM)

	Original	Scenario A	Scenario B
Efficiency Benefit	$216.3	$184.9	$176.9
Sales Benefit	$39.0	$39.0	$39.0
Total	$255.3	$223.9	$215.9
Change in Total	*0*	*-12%*	*-15%*

At most, recalculation of the estimated benefits under alternative simplifying assumptions of the end use of hydro generation reduces the estimated total benefit attributable to Plant 2A by 15%. However, again, doing so ignores the affect of increase in margins on off-system sales; therefore, the actual change vs. the estimate described in Mr. Reed's testimony is necessarily smaller for each of Scenario A and B than indicated above.

(c) See response to PHS-MLP-14-48(b).

(d) ML&P's actual average thermal heat rates by month through June 2017 are reported in ML&P's quarterly COPA filings (Attachment 2, Total Cost of Power), which have been previously produced or are publicly available on the Commission's website. The heat rates for July through September 2017 are, respectively 7.679, 7.878, and 9.890.

Person(s) Supplying Information: John Reed, Anna Henderson.

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Printout of MLP35461 excel file workpapers

1	**NET IMPACT ON RETAIL RATES REVENUE NET OF Plant 2A FUEL COST REDUCTIONS**		**Exhibit 17**		
2					
3	2015 Fuel Costs for Retail Electric Sales in COPA	5470		$ 47,154,016	RRS, Sch. 13, Adj 9
4	2015 Fixed and Diesel Costs in COPA:				
5	CINGSA (Reservation, Capacity & RCC)			$ 1,573,567	COPA Filings, Att. 2*
6	Diesel			$ 108,029	COPA Filings, Att. 2*
7	2015 Fixed and Diesel Costs in COPA			$ 1,681,596	F5+F6
8	2015 Variable Natural Gas Costs for Retail Electric Sales in COPA			$ 45,472,420	F3-F7
9					
10	2015 Actual Avg. Thermal Heat Rate (MCF/MWh)			9.423	Page 2
11	Projected Avg. Thermal Heat Rate—Full Year of Plant 2A (MCF/MWh)			7.674	Page 2
12	Heat Rate % Reduction Due to Plant 2A			18.56%	-(F11-F10)/F10
13					
14	Reduction in COPA Fuel Costs Due Primarily to Plant 2A			$ 8,439,823	F8xF12
15					
16	2015 COPA Expense			$ 52,928,089	
17	2015 Econ Energy Margins			$ (5,310,160)	
18	Estimate Plant 2A Fuel Cost Reduction			$ (8,439,823)	
19				$ 39,178,106	15.95%
20					
21	2015 Retails Sales (KWH)			1,018,677,163	
22	2015 Adjusted 2015 TY COPA rate			$ 0.0385	
23	2015 Average Actual COPA rate			$ 0.0467	17.72%
24					
25		Requested	Requested	Requested	
26		Increase	Increase	Increase	
27		Rate Stabilization	Traditional	Traditional	
28		Interim & Permaner	Interim	Permanent	
29	Pro Forma Retail Rates Revenue (Incl COPA & Customer Charges)	$ 142,246,019	$ 142,246,019	$ 142,246,019	RRS, Sch. 7
30	Required Increase in Retail Rates Revenue	$ 26,607,547	$ 39,238,707	$ 39,483,505	RRS, Sch. 1
31	Reduction in COPA Fuel Costs Due Primarily to Plant 2A	$ (8,439,823)	$ (8,439,823)	$ (8,439,823)	F14
32	Required Increase in Retail Rates Revenue Net of Plant 2A Fuel Cost Reduction	$ 18,167,724	$ 30,798,884	$ 31,043,682	F21-F22
33	Required % Increase to Retail Rates Revenue Net of Plant 2A Fuel Cost Reduction	**12.77%**	**21.65%**	**21.82%**	F23/F20

* TA321-121, TA324-121, TA325-121, & TA327-121

Municipal Light & Power
Average Thermal Heat Rates Before and After SPP

	2015	Post Plant 2A
January	9.130	7.420
February	9.980	7.420
March	8.980	7.420
April	9.840	8.500
May	8.860	7.452
June	9.890	8.000
July	9.490	7.420
August	8.970	7.420
September	9.240	8.500
October	10.210	7.420
November	9.020	7.700
December	9.470	7.420
Average	9.423	7.674

Attachment #2

	Diesel	CINGSA Reservation	Capacity	RCC	
3Q 2015	62,687	237,015	153,900	2,209	$ 393,124
4Q 2015	23,950	237,015	153,900	2,371	$ 393,286
1Q 2016	11,946	237,015	153,900	2,674	$ 393,589
2Q 2016	9,446	237,015	153,900	2,653	$ 393,568
	108,029	948,060	615,600	9,907	$1,573,567

Increased Sales Benefit Calculation

Line	[A]	[B] 2016Q2 [a]	[C] 2016Q3	[D] 2016Q4	[E] 2017Q1	[F] 2017Q2
1	GVEA Economy Sales					
2	GVEA kWh Sold	49,811,000	73,435,000	7,571,000	53,025,000	82,889,000
3	GVEA Total Sales	$ 3,922,383	$ 4,949,429	$ 491,261	$ 4,025,631	$ 6,063,701
4	GVEA Margins on Sales For Resale	$ 667,719	$ 1,165,087	$ 53,956	$ 1,292,501	$ 1,936,073
5	GVEA Margins, $/MWh	$ 13.41	$ 15.87	$ 7.13	$ 24.38	$ 23.36
6	CEA Economy Sales					
7	CEA kWh Sold	6,586,000	0	3,868,000	1,795,000	869,000
8	CEA Total Sales	$ 141,662	$ -	$ 280,582	$ 153,945	$ 17,064
9	CEA Margins on Sales For Resale	$ 126,778	$ -	$ 34,065	$ 15,414	$ 15,100
10	CEA Margins, $/MWh	$ 19.25	$ -	n/a	n/a	n/a
11	HEA Economy Sales					
12	HEA kWh Sold	593,000	573,000	0	0	1,053,000
13	HEA Total Sales	$ 49,573	$ 42,116	$ -	$ -	$ 73,297
14	HEA Margins on Sales For Resale	$ 9,532	$ 8,192	$ -	$ -	$ 70,917
15	HEA Margins, $/MWh	$ 16.07	n/a	$ -	$ -	$ -
16	MEA Economy Sales					
17	MEA kWh Sold	0	10,151,000	2,880,000	0	500,000
18	MEA Total Sales	$ -	$ 457,505	$ 129,600	$ -	$ 5,644
19	MEA Margins on Sales For Resale	$ -	$ 431,430	$ 123,091	$ -	$ 4,514
20	MEA Margins, $/MWh	$ -	n/a	$ -	$ -	$ -
21						
22	Total Margins on Sales for Resale	$ 805,278.00	$ 1,607,289.00	$ 223,563.00	$ 1,308,079	2,026,134
23						
24	Total kWh	56,990,000	84,159,000	14,319,000	54,820,000	85,311,000
25	Total MWh	56,990	84,159	14,319	54,820	85,311
26	Margins, $/MWh	$ 48.73	$ 15.87	$ 7.13	$ 24.38	$ 23.36
27						

Line						
28	**Average of 2016Q2 to 2017Q1, Total MWh Economy Sales**	**2017Q2 Total MWh Economy Sales**	Increase in Sales	Annual MWh Benefit	**Average of 2016Q2 to 2017Q1, Margins, $/MWh**	**Profits from Economy Sales**
29	52,572	85,311	32,739	130,956	$ 24.03	$ 3,146,508.31
30	**MWh**	**MWh**	**MWh**	**MWh**		
31	Average of Line 25, Columns [B], [C], [D], [E]	Line 25, Column [F]	Line 29, [B]-[A]	Line 29, [C] * 4	Average of Line 26, Columns [B], [C], [D], [E]	Line 29, [D] * [E]

Sources: MUNICIPAL LIGHT AND POWER TA 352-121, ATTACHMENT NO. 3, 4th Quarter 2016 COPA, SALES FOR RESALE For the Quarter ending June 30, 2016
MUNICIPAL LIGHT AND POWER TA 355-121, ATTACHMENT NO.3, 1st Quarter 2017 COPA. SALES FOR RESALE For the Quarter ending September 30, 2016
MUNICIPAL LIGHT AND POWER TA 359-121, ATTACHMENT NO. 3, 2nd Quarter 2017 COPA. SALES FOR RESALE For the Quarter ending December 31, 2016
MUNICIPAL LIGHT AND POWER TA 360-121, ATTACHMENT NO. 3, 3rd Quarter 2017 COPA. SALES FOR RESALE For the Quarter ending March 31, 2017
MUNICIPAL LIGHT AND POWER TA 361-121, ATTACHMENT NO. 3, 4th Quarter2017 COPA. SALES FOR RESALE For the Quarter ending June 30, 2017

2.00% Inflation
7.15% Discount

39,049,978 NPV

1	2018	$	3,209,438.48
2	2019	$	3,273,627.25
3	2020	$	3,339,099.79
4	2021	$	3,405,881.79
5	2022	$	3,473,999.42
6	2023	$	3,543,479.41
7	2024	$	3,614,349.00
8	2025	$	3,686,635.98
9	2026	$	3,760,368.70
10	2027	$	3,835,576.07
11	2028	$	3,912,287.59
12	2029	$	3,990,533.35
13	2030	$	4,070,344.01
14	2031	$	4,151,750.89
15	2032	$	4,234,785.91
16	2033	$	4,319,481.63
17	2034	$	4,405,871.26
18	2035	$	4,493,988.69
19	2036	$	4,583,868.46
20	2037	$	4,675,545.83

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Inputs

Inflation	2.00%	117,013	Bradley 2015 output (MWh)
Discount rate	7.15%	68,553	Eklutna 2015 output (MWh)
Hilcorp cap growth rate	4.00%	185,566	Total 2015 hydro
Hilcorp 2017 cap price ($/Mcf)	7.72	79.8%	2015 hydro attributable to retail
Load growth assumption	0.00%	148,078	2015 hydro attributable to retail (MWh)
Gas transportation (2017 $/Mcf)	0.2381		

Transfer Price ($/Mcf)

Jul 2017-Jun 2018	2.53
Jul 2018-Jun 2019	2.58
Jul 2019-Dec 2019	2.63
Cal 2018	2.55
Cal 2019	2.60

Case 1: Savings based on 2012 Gen Study forecast - 250 ASAP, Low LNG (with two years of extrapolation)

		1	2	3	4	5	6	7	8	9	10
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gas price	$/Mcf	2.55	2.60	14.85	14.97	15.10	15.22	15.35	15.48	15.61	15.22
Plus transportation	$/Mcf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29
Delivered gas price	$/Mcf	2.79	2.85	15.10	15.23	15.36	15.49	15.62	15.76	15.89	15.51
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.88	4.99	26.41	26.63	26.86	27.09	27.32	27.56	27.80	27.13
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	4,255,256	4,340,361	22,996,863	23,188,037	23,385,834	23,586,126	23,788,943	23,994,301	24,202,226	23,621,565

		11	12	13	14	15	16	17	18	19	20
		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Gas price	$/Mcf	15.37	15.52	15.67	15.82	15.97	16.12	16.28	16.43	16.59	16.75
Plus transportation	$/Mcf	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/Mcf	15.67	15.82	15.97	16.13	16.29	16.45	16.61	16.77	16.94	17.11
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	27.40	27.67	27.94	28.21	28.49	28.77	29.05	29.34	29.63	29.92
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	23,852,945	24,086,773	24,323,075	24,561,878	24,803,208	25,047,093	25,293,558	25,542,632	25,794,060	26,048,057

Benefit NPV $ 215,707,901

Case 2: Savings based on 2012 Gen Study forecast - No ASAP, Low LNG (with two years of extrapolation)

		1	2	3	4	5	6	7	8	9	10
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gas price	$/Mcf	2.55	2.60	13.62	14.16	14.73	15.23	15.79	16.29	16.85	17.41
Plus transportation	$/Mcf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29
Delivered gas price	$/Mcf	2.79	2.85	13.87	14.42	14.99	15.49	16.06	16.57	17.13	17.70
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	24.26	25.22	26.23	27.10	28.09	28.98	29.96	30.97
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	4,255,256	4,340,361	21,117,168	21,958,147	22,832,250	23,593,459	24,453,807	25,229,529	26,084,042	26,958,903

		11	12	13	14	15	16	17	18	19	20
		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Gas price	$/Mcf	18.07	18.64	19.29	19.98	20.69	21.43	22.20	23.00	23.83	24.69
Plus transportation	$/Mcf	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/Mcf	18.31	18.94	19.60	20.29	21.01	21.76	22.53	23.34	24.18	25.04
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	32.03	33.13	34.28	35.49	36.75	38.05	39.41	40.82	42.28	43.79
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	27,882,993	28,844,119	29,842,375	30,895,697	31,990,823	33,124,627	34,310,709	35,542,050	36,811,587	38,126,600

Benefit NPV $ 242,690,338

Case 3: Savings based on Hilcorp cap extrapolation

		1	2	3	4	5	6	7	8	9	10
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gas price	$/Mcf	2.55	2.60	8.68	9.03	9.39	9.77	10.16	10.57	10.99	11.43
Plus transportation	$/Mcf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29
Delivered gas price	$/Mcf	2.79	2.85	8.94	9.29	9.66	10.04	10.43	10.84	11.27	11.72
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	15.63	16.25	16.89	17.55	18.25	18.97	19.72	20.49
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	4,255,256	4,340,361	13,607,601	14,144,210	14,702,130	15,282,210	15,885,332	16,512,418	17,164,417	17,842,528

		11	12	13	14	15	16	17	18	19	20
		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Gas price	$/Mcf	11.88	12.36	12.85	13.37	13.90	14.46	15.04	15.64	16.26	16.92
Plus transportation	$/Mcf	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/Mcf	12.18	12.66	13.16	13.68	14.22	14.79	15.37	15.98	16.61	17.27
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	21.30	22.15	23.02	23.93	24.88	25.86	26.88	27.95	29.05	30.20
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	18,547,183	19,280,054	20,042,060	20,834,365	21,658,170	22,514,738	23,405,373	24,331,435	25,294,336	26,295,546

Benefit NPV $ 163,514,273

Case 4: Savings based on forecast approved in the BRU acquisition proceeding - NERA report, Appendix 1 (market purchase price with four years of extrapolation)

		1	2	3	4	5	6	7	8	9	10
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Gas price	$/Mcf	2.55	2.60	7.61	7.76	7.92	7.36	7.31	7.45	7.6	7.75
Plus transportation	$/Mcf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29
Delivered gas price	$/Mcf	2.79	2.85	7.86	8.02	8.18	7.63	7.58	7.73	7.88	8.04
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	13.75	14.02	14.31	13.34	13.26	13.52	13.79	14.06
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	4,255,256	4,340,361	11,972,321	12,208,417	12,459,895	11,615,201	11,547,232	11,768,736	12,005,634	12,242,701

		11	12	13	14	15	16	17	18	19	20
		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Gas price	$/Mcf	7.91	8.07	8.23	8.39	8.56	8.73	8.90	9.08	9.26	9.44
Plus transportation	$/Mcf	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/Mcf	8.21	8.37	8.54	8.70	8.88	9.06	9.24	9.42	9.61	9.80
Heat rate benefit	Mcf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	14.35	14.64	14.93	15.22	15.53	15.84	16.16	16.48	16.80	17.14
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078	148,078
ML&P retail sales net of hydro	MWh	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599	870,599
Annual heat rate benefit	$	12,495,169	12,747,813	13,000,637	13,255,546	13,522,069	13,790,685	14,064,560	14,343,877	14,628,741	14,919,263

Benefit NPV $ 117,011,015

	Efficiency Benefit	Sales Benefit	Total
250 ASAP, Low LNG	216.2	39.0	255.3
No ASAP, Low LNG	242.7	39.0	281.7
BRU Acquisition Forecast	117.0	39.0	156.1
Hilcorp Cap Extrapolation	163.5	39.0	202.6
Average	184.9	39.0	223.9
Results in Exhibit JJR-37	*216.3*	*39.0*	*255.3*
Change vs. Exhibit JJR-37	*-15%*	*0%*	*-12%*

	Jan-15	Feb-15	Mar-15	Apr-15
GVEA	8,556,000	7,652,000	4,501,000	37,192,000
CEA	0	0	0	0
HEA	0	0	4,788,000	0
MEA	0	0	0	0
Total	8,556,000	7,652,000	9,289,000	37,192,000

	MWh	**% total**
2015 economy sales	257,893	20.2%
2015 retail sales	1,018,677	79.8%

May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15
26,168,000	29,580,000	25,830,000	23,846,000	13,530,000	11,388,000	26,508,000
0	0	0	369,000	2,472,000	0	0
0	2,060,000	0	0	2,050,000	3,678,000	0
0	0	0	419,000	0	0	0
26,168,000	31,640,000	25,830,000	24,634,000	18,052,000	15,066,000	26,508,000

Dec-15
27,306,000
0
0
0
27,306,000

Printout of MLP35462 excel file workpapers

1	**NET IMPACT ON RETAIL RATES REVENUE NET OF Plant 2A FUEL COST REDUCTIONS**		Exhibit 17		
2					
3	2015 Fuel Costs for Retail Electric Sales in COPA	5470		$ 47,154,016	RRS, Sch 13, Adj. 9
4	2015 Fixed and Diesel Costs in COPA:				
5	CINGSA (Reservation, Capacity & RCC)			$ 1,573,567	COPA Filings, Att. 2*
6	Diesel			$ 108,029	COPA Filings, Att. 2*
7	2015 Fixed and Diesel Costs In COPA			$ 1,681,596	F5+F6
8	2015 Variable Natural Gas Costs for Retail Electric Sales In COPA			$ 45,472,420	F3-F7
9					
10	2015 Actual Avg. Thermal Heat Rate (MCF/MWh)			9.423	Page 2
11	Projected Avg. Thermal Heat Rate—Full Year of Plant 2A (MCF/MWh)			7.674	Page 2
12	Heat Rate % Reduction Due to Plant 2A			18.56%	-(F11-F10)/F10
13					
14	Reduction in COPA Fuel Costs Due Primarily to Plant 2A			$ 8,439,823	F8xF12
15					
16	2015 COPA Expense			$ 52,928,089	
17	2015 Econ Energy Margins			$ (5,310,160)	
18	Estimate Plant 2A Fuel Cost Reduction			$ (8,439,823)	
19				$ 39,178,106	15.95%
20					
21	2015 Retails Sales (KWH)			1,018,677,163	
22	2015 Adjusted 2015 TY COPA rate			$ 0.0385	
23	2015 Average Actual COPA rate			$ 0.0467	17.72%
24					
25		Requested	Requested	Requested	
26		Increase	Increase	Increase	
27		Rate Stabilization	Traditional	Traditional	
28		Interim & Permaner	Interim	Permanent	
29	Pro Forma Retail Rates Revenue (Incl COPA & Customer Charges)	$ 142,246,019	$ 142,246,019	$ 142,246,019	RRS, Sch. 7
30	Required Increase in Retail Rates Revenue	$ 26,607,547	$ 39,238,707	$ 39,483,505	RRS, Sch 1
31	Reduction in COPA Fuel Costs Due Primarily to Plant 2A	$ (8,439,823)	$ (8,439,823)	$ (8,439,823)	F14
32	Required Increase in Retail Rates Revenue Net of Plant 2A Fuel Cost Reduction	$ 18,167,724	$ 30,798,884	$ 31,043,682	F21-F22
33	Required % Increase to Retail Rates Revenue Net of Plant 2A Fuel Cost Reduction	**12.77%**	**21.65%**	**21.82%**	F23/F20

* TA321-121, TA324-121, TA325-121, & TA327-121

Municipal Light & Power
Average Thermal Heat Rates Before and After SPP

	2015	Post Plant 2A
January	9.130	7.420
February	9.980	7.420
March	8.980	7.420
April	9.840	8.500
May	8.860	7.452
June	9.890	8.000
July	9.490	7.420
August	8.970	7.420
September	9.240	8.500
October	10.210	7.420
November	9.020	7.700
December	9.470	7.420
Average	9.423	7.674

Attachment #2

	Diesel	CINGSA Reservation	Capacity	RCC	
3Q 2015	62,687	237,015	153,900	2,209	$ 393,124
4Q 2015	23,950	237,015	153,900	2,371	$ 393,286
1Q 2016	11,946	237,015	153,900	2,674	$ 393,589
2Q 2016	9,446	237,015	153,900	2,653	$ 393,568
	108,029	948,060	615,600	9,907	$1,573,567

Increased Sales Benefit Calculation

Line	[A]	[B] 2016Q2 [a]	[C] 2016Q3	[D] 2016Q4	[E] 2017Q1	[F] 2017Q2
1	GVEA Economy Sales					
2	GVEA kWh Sold	49,811,000	73,435,000	7,571,000	53,025,000	82,889,000
3	GVEA Total Sales	$ 3,922,383	$ 4,949,429	$ 491,261	$ 4,025,631	$ 6,063,701
4	GVEA Margins on Sales For Resale	$ 667,719	$ 1,165,087	$ 53,956	$ 1,292,501	$ 1,936,073
5	GVEA Margins, $/MWh	$ 13.41	$ 15.87	$ 7.13	$ 24.38	$ 23.36
6	CEA Economy Sales					
7	CEA kWh Sold	6,586,000	0	3,868,000	1,795,000	869,000
8	CEA Total Sales	$ 141,662	$ -	$ 280,582	$ 153,945	$ 17,064
9	CEA Margins on Sales For Resale	$ 126,778	$ -	$ 34,065	$ 15,414	$ 15,100
10	CEA Margins, $/MWh	$ 19.25	$ -	n/a	n/a	n/a
11	HEA Economy Sales					
12	HEA kWh Sold	593,000	573,000	0	0	1,053,000
13	HEA Total Sales	$ 49,573	$ 42,116	$ -	$ -	$ 73,297
14	HEA Margins on Sales For Resale	$ 9,532	$ 8,192	$ -	$ -	$ 70,917
15	HEA Margins, $/MWh	$ 16.07	n/a	$ -	$ -	$ -
16	MEA Economy Sales					
17	MEA kWh Sold	0	10,151,000	2,880,000	0	500,000
18	MEA Total Sales	$ -	$ 457,505	$ 129,600	$ -	$ 5,644
19	MEA Margins on Sales For Resale	$ -	$ 431,430	$ 123,091	$ -	$ 4,514
20	MEA Margins, $/MWh	$ -	n/a	$ -	$ -	$ -
21						
22	Total Margins on Sales for Resale	$ 805,278.00	$ 1,607,289.00	$ 223,563.00	$ 1,308,079	2,026,134
23						
24	Total kWh	56,990,000	84,159,000	14,319,000	54,820,000	85,311,000
25	Total MWh	56,990	84,159	14,319	54,820	85,311
26	Margins, $/MWh	$ 48.73	$ 15.87	$ 7.13	$ 24.38	$ 23.36
27						
28	**Average of 2016Q2 to 2017Q1, Total MWh Economy Sales**	**2017Q2 Total MWh Economy Sales**	**Increase in Sales**	**Annual MWh Benefit**	**Average of 2016Q2 to 2017Q1, Margins, $/MWh**	**Profits from Economy Sales**
29	52,572	85,311	32,739	130,956	$ 24.03	$ 3,146,508.31
30	MWh	MWh	MWh	MWh		
31	Average of Line 25, Columns [B], [C], [D], [E]	Line 25, Column [F]	Line 29, [B]-[A]	Line 29, [C] * 4	Average of Line 26, Columns [B], [C], [D], [E]	Line 29, [D] * [E]

Sources: MUNICIPAL LIGHT AND POWER TA 352-121, ATTACHMENT NO. 3, 4th Quarter 2016 COPA, SALES FOR RESALE For the Quarter ending June 30,2016
MUNICIPAL LIGHT AND POWER TA 355-121 , ATTACHMENT NO.3, 1st Quarter 2017 COPA. SALES FOR RESALE For the Quarter ending September 30, 2016
MUNICIPAL LIGHT AND POWER TA 359-121, ATTACHMENT NO. 3, 2nd Quarter 2017 COPA. SALES FOR RESALE For the Quarter ending December 31, 2016
MUNICIPAL LIGHT AND POWER TA 360-121, ATTACHMENT NO. 3, 3rd Quarter 2017 COPA. SALES FOR RESALE For the Quarter ending March 31, 2017
MUNICIPAL LIGHT AND POWER TA 361-121, ATTACHMENT NO. 3, 4th Quarter2017 COPA. SALES FOR RESALE For the Quarter ending June 30, 2017

2.00% Inflation
7.15% Discount

39,049,978 NPV

1	2018	$	3,209,438.48
2	2019	$	3,273,627.25
3	2020	$	3,339,099.79
4	2021	$	3,405,881.79
5	2022	$	3,473,999.42
6	2023	$	3,543,479.41
7	2024	$	3,614,349.00
8	2025	$	3,686,635.98
9	2026	$	3,760,368.70
10	2027	$	3,835,576.07
11	2028	$	3,912,287.59
12	2029	$	3,990,533.35
13	2030	$	4,070,344.01
14	2031	$	4,151,750.89
15	2032	$	4,234,785.91
16	2033	$	4,319,481.63
17	2034	$	4,405,871.26
18	2035	$	4,493,988.69
19	2036	$	4,583,868.46
20	2037	$	4,675,545.83

DRAFT - PRIVILEGED AND CONFIDENTIAL

Inputs

Inflation	2.00%	117,013	Bradley 2015 output (MWh)
Discount rate	7.15%	68,553	Eklutna 2015 output (MWh)
Hilcorp cap growth rate	4.00%	185,566	Total 2015 hydro
Hilcorp 2017 cap price ($/Mcf)	7.72	100.0%	2015 hydro attributable to retail
Load growth assumption	0.00%	185,566	2015 hydro attributable to retail (MWh)
Gas transportation (2017 $/Mcf)	0.2581		

Transfer Price ($/MCf)

Jul 2017-Jun 2018	2.53
Jul 2018-Jun 2019	2.56
Jul 2019-Dec 2019	2.53
Cal 2018	2.55
Cal 2019	2.60

Case 1: Savings based on 2012 Gen Study forecast - 250 ASAP, Low LNG (with two years of extrapolation)

		1 2018	2 2019	3 2020	4 2021	5 2022	6 2023	7 2024	8 2025	9 2026	10 2027	11 2028	12 2029	13 2030	14 2031	15 2032	16 2033	17 2034	18 2035	19 2036	20 2037
Gas price	$/Mcf	2.55	2.60	14.85	14.97	15.10	15.22	15.35	15.48	15.61	15.22	15.37	15.52	15.67	15.82	15.97	16.12	16.28	16.43	16.59	16.75
Plus transportation	$/MCf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/MCf	2.79	2.85	15.10	15.23	15.36	15.49	15.62	15.76	15.89	15.51	15.67	15.82	15.97	16.13	16.29	16.45	16.61	16.77	16.94	17.11
Heat rate benefit	MCf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	26.41	26.63	26.86	27.09	27.32	27.56	27.80	27.13	27.40	27.67	27.94	28.21	28.49	28.77	29.05	29.34	29.63	29.92
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566
ML&P retail sales net of hydro	MWh	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111
Annual heat rate benefit	$	4,072,024	4,155,465	22,006,615	22,189,558	22,378,838	22,570,508	22,764,589	22,961,104	23,160,076	22,604,418	22,825,835	23,045,594	23,275,721	23,504,241	23,735,180	23,968,362	24,204,415	24,442,764	24,683,384	24,926,425

Benefit NPV	$	206,893,184

Case 2: Savings based on 2012 Gen Study forecast - No ASAP, Low LNG (with two years of extrapolation)

		1 2018	2 2019	3 2020	4 2021	5 2022	6 2023	7 2024	8 2025	9 2026	10 2027	11 2028	12 2029	13 2030	14 2031	15 2032	16 2033	17 2034	18 2035	19 2036	20 2037
Gas price	$/Mcf	2.55	2.60	13.62	14.16	14.73	15.23	15.79	16.29	16.85	17.41	18.02	18.64	19.29	19.98	20.69	21.43	22.20	23.00	23.83	24.69
Plus transportation	$/MCf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/MCf	2.79	2.85	13.87	14.42	14.99	15.49	16.06	16.57	17.13	17.70	18.31	18.94	19.60	20.29	21.01	21.76	22.53	23.34	24.18	25.04
Heat rate benefit	MCf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	24.26	25.22	26.23	27.10	28.09	28.98	29.96	30.97	32.03	33.13	34.28	35.49	36.75	38.05	39.41	40.82	42.28	43.79
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566
ML&P retail sales net of hydro	MWh	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111
Annual heat rate benefit	$	4,072,024	4,153,465	20,207,861	21,012,627	21,849,072	22,577,523	23,400,824	24,143,143	24,960,861	25,798,050	26,682,948	27,602,088	28,557,360	29,565,325	30,613,295	31,700,191	32,833,286	34,011,606	35,226,476	36,484,865

Benefit NPV	$	232,230,300

Case 3: Savings based on Hilcorp cap extrapolation

		1 2018	2 2019	3 2020	4 2021	5 2022	6 2023	7 2024	8 2025	9 2026	10 2027	11 2028	12 2029	13 2030	14 2031	15 2032	16 2033	17 2034	18 2035	19 2036	20 2037
Gas price	$/Mcf	2.55	2.60	8.68	9.03	9.39	9.77	10.16	10.57	10.99	11.43	11.86	12.36	12.85	13.37	13.90	14.46	15.04	15.64	16.26	16.92
Plus transportation	$/MCf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/MCf	2.79	2.85	8.94	9.29	9.66	10.04	10.43	10.84	11.27	11.72	12.18	12.66	13.16	13.68	14.22	14.79	15.37	15.98	16.61	17.27
Heat rate benefit	MCf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	15.63	16.25	16.89	17.55	18.25	18.97	19.72	20.49	21.30	22.15	23.02	23.93	24.88	25.86	26.88	27.95	29.05	30.20
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566
ML&P retail sales net of hydro	MWh	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111
Annual heat rate benefit	$	4,072,024	4,153,465	13,021,656	13,535,159	14,069,055	14,624,156	15,201,308	15,801,390	16,425,316	17,074,056	17,748,559	18,449,853	19,179,047	19,937,231	20,725,567	21,545,251	22,397,586	23,283,721	24,205,160	25,163,258

Benefit NPV	$	156,473,333

Case 4: Savings based on forecast approved in the BRU acquisition proceeding - NERA report, Appendix 1 (market purchase price with four years of extrapolation)

		1 2018	2 2019	3 2020	4 2021	5 2022	6 2023	7 2024	8 2025	9 2026	10 2027	11 2028	12 2029	13 2030	14 2031	15 2032	16 2033	17 2034	18 2035	19 2036	20 2037
Gas price	$/Mcf	2.55	2.60	7.61	7.76	7.92	7.36	7.31	7.45	7.6	7.75	7.91	8.07	8.23	8.39	8.56	8.73	8.90	9.08	9.26	9.44
Plus transportation	$/MCf	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.30	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.35	0.35
Delivered gas price	$/MCf	2.79	2.85	7.86	8.02	8.18	7.63	7.58	7.73	7.88	8.04	8.21	8.37	8.54	8.70	8.88	9.06	9.24	9.42	9.61	9.80
Heat rate benefit	MCf/MWh	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749	1.749
Heat rate benefit	$/MWh	4.89	4.99	13.75	14.02	14.31	13.34	13.26	13.52	13.79	14.06	14.35	14.64	14.93	15.22	15.53	15.84	16.16	16.48	16.80	17.14
ML&P retail sales	MWh	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677	1,018,677
Hydro generation	MWh	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566	185,566
ML&P retail sales net of hydro	MWh	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111	833,111
Annual heat rate benefit	$	4,072,024	4,153,465	11,456,792	11,682,722	11,923,870	11,115,049	11,050,007	11,261,974	11,488,670	11,715,539	11,957,125	12,198,591	12,440,829	12,682,947	12,939,807	13,196,855	13,458,939	13,726,229	13,998,826	14,276,838

Benefit NPV	$	111,972,507

	Efficiency Benefit	Sales Benefit	Total
250 ASAP, Low LNG	206.9	39.0	245.9
No ASAP, Low LNG	232.2	39.0	271.3
BRU Acquisition Forecast	112.0	39.0	151.0
Hilcorp Cap Extrapolation	156.5	39.0	195.5
Average	176.9	39.0	215.9
Results in Exhibit JJR-37	*216.3*	*39.0*	*255.3*
Change vs. Exhibit JJR-37	*-18%*	*0%*	*-15%*