

To: Senate Finance Committee

Attn: Senator Bert Stedman, Co-Chairman

From: David Wood

Date: 2 March, 2010

**Re: Answer to Question & Request Raised by Senator Thomas during My
Testimony (25 February 2010) – Fiscal Years 2008 and 2009**

The very pertinent and perceptive question asked earlier today by Senator Thomas sought information with respect to how might the gas dilution / cross subsidy effect identified in Alaska's current production tax rules have impacted the production taxes actually paid in recent periods had a gas line been in operation at the time?

In order to provide an indicative answer to this question I have taken the data for price, volume and costs (excluding Cook Inlet Gas) for fiscal years 2008 and 2009 (i.e. July 2007 to June 2008 and July 2008 to June 2009), which are available from the Alaska Department of Revenue (DOR), Fall 2008 and 2009 Revenues Sources Books (RSB), (Dec 2008and Dec 2009). These two periods encompass the wide range of oil prices that prevailed since the ACES rules were in place. The six tables attached (three for each fiscal period) to this document provide the necessary data and calculations to establish the impact of the cross subsidy effect.

Note that in this calculation the annual figures for production volumes and costs are distributed pro rata according to days / month across each month of the year. This assumption was necessary as DOR do not publish a monthly breakdown of the production tax calculation. This approximation is responsible for the small difference between the actual production tax paid and that calculated in the tables that follow. For fiscal year 2008 the calculated production tax shown in Table 1 is 2.7% higher than the actual production tax paid (\$6867.3 million). For fiscal year 2009 the calculated production tax shown in Table 1 is 4.5% higher than the actual production tax paid (\$3112.0 million). These slight differences are not considered significant in the context of the purpose of this analysis.

Fiscal Year 2008

Table 1 calculates the production tax for oil based on actual data showing the components of that calculation. As no gas is exported the calculations are based upon oil barrels only. This results in total production tax of **\$ 7.462 billion** which is reduced by investment credits of \$411.5 million to \$ 7.050 billion. The calculation shown essentially reproduces the figures from the RSB (2.7% difference attributed to monthly pro rata production and cost allocations).

Table 2 assumes a 4.5 bcf/day gas line and calculates production tax for this hypothetical gas stream on a stand-alone basis (i.e. not combined with oil). The calculation uses the U.S. wellhead natural gas prices from the EIA's records for the months in question. There would be some small differentials between these prices and AECO prices in Alberta, but I believe they are close enough for the purpose. I have also assumed gas transportation costs of \$4.5/mcf (\$27/boe) and field costs (capital costs plus operating costs) of \$400 million (\$1.46/ boe) which are those used by Commissioner Galvin in the examples he provided from the DOR in his testimony of 24 February 2010. This data computes a total production tax of **\$ 1.140 billion** to which no investment credits are applied.

By adding the computed production taxes in tables 1 and 2 the stand-alone oil and gas production tax for this FY 2008 (assuming 4.5 bcf /day) would be **\$8.599 billion** (reduced to \$8.187 billion by the deduction of \$411.5 million investment credits).

Table 3 calculates the production tax by combining the revenue cost and volume streams from tables 1 and 2 to provide a combined oil and gas production tax calculation of **\$6.776 billion** (reduced to \$6.365 billion by the deduction of \$411.5 million investment credits).

For this period the loss to the State in production tax revenue caused by the cross subsidy effect of combining oil and gas in the production tax calculation would have amounted to:

$$\textbf{\$6.776 billion less \$8.599 billion = -\$1.822 billion.}$$

This calculation is in line with the figures of potential loss in fiscal revenue discussed during the testimonies.

Fiscal Year 2009

Table 4 calculates the production tax for oil based on actual data showing the components of that calculation. As no gas is exported the calculations are based upon oil barrels only. This results in total production tax of **\$ 3.601 billion** which is reduced by investment credits of \$350 million to \$ 3.251 billion. The calculation shown essentially reproduces the figures from the RSB (4.5% difference attributed to monthly pro rata production and cost allocations).

Table 5 assumes a 4.5 bcf/day gas line and calculates production tax for this hypothetical gas stream on a stand-alone basis (i.e. not combined with oil). The calculation uses the U.S. wellhead natural gas prices from the EIA's records for the months in question. There would be some small differentials between these prices and AECO prices in Alberta, but I believe they are close enough for the purpose. I have also assumed gas transportation costs of \$4.5/mcf (\$27/boe) and field costs (capital costs plus operating costs) of \$400 million (\$1.46/ boe) which are those used by Commissioner Galvin in the examples he provided from the DOR in his testimony of 24 February 2010. This data computes a total production tax of **\$ 0.583 billion** to which no investment credits are applied.

By adding the computed production taxes in tables 1 and 2 the stand-alone oil and gas production tax for this FY 2009 (assuming 4.5 bcf /day) would be **\$4.185 billion** (reduced to \$3.835 billion by the deduction of \$350 million investment credits).

Table 6 calculates the production tax by combining the revenue cost and volume streams from tables 4 and 5 to provide a combined oil and gas production tax calculation of **\$3.381 billion** (reduced to \$3.031 billion by the deduction of \$350 million investment credits).

For this period the loss to the State in production tax revenue caused by the cross subsidy effect of combining oil and gas in the production tax calculation would have amounted to:

$$\textbf{\$3.381 billion less \$4.185 billion = -\$0.804 billion.}$$

This calculation indicates a lower potential loss in fiscal revenue for fiscal year 2009 compared to fiscal year 2008. This is due to the lower prices and value of oil and gas revenue streams in fiscal year 2009. However, \$0.8 billion remains a substantial potential loss in a relative low price / value environment.

Sincerely,

David Wood

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Table 1. Oil Stand-alone Production Tax Calculation (July 2007 to June 2008)

FY 2008 Production Tax Revenues: Actual Versus Potential Under Alternative Mechanisms (Analysis Based on Actual US West Coast Prices and Cost Data)												
Month	\$/barrel	\$/barrel	PTV \$/barrel	\$/barrel	\$/barrel	F=	G	H=	I=	J=	K=	Base
												US West Coast Oil Price
A	B	C	D=	E	F=	(D + E)=0	(B + C)	(F * G)	(D * H * I)	(D * I * K)	(J * L)	(M * P)
Monthly Analysis, \$90 PTV \$/barrel threshold and 0.004% progressivity parameter under Current Law as enacted in 2007												
Jul	75.93	-22.88	53.05	-30	23.05	0.40%	9.22%	19.4	95.0	25.00%	257.5	352.5
Aug	73.83	-22.88	50.95	-30	20.95	0.40%	8.38%	19.4	82.9	25.00%	247.4	330.3
Sep	79.92	-22.88	57.04	-30	27.04	0.40%	10.81%	r	18.8	115.9	25.00%	268.0
Oct	84.37	-22.88	61.89	-30	31.89	0.40%	12.75%	19.4	153.3	25.00%	300.5	453.8
Nov	92.98	-22.88	70.10	-30	40.10	0.40%	16.04%	r	18.8	211.3	25.00%	329.3
Dec	88.64	-22.88	65.76	-30	35.76	0.40%	14.30%	19.4	182.7	25.00%	319.3	501.9
Jan	91.16	-22.88	68.28	-30	38.28	0.40%	15.31%	r	19.4	203.0	25.00%	331.5
Feb	94.42	-22.88	71.54	-30	41.54	0.40%	16.61%	r	18.8	215.9	25.00%	324.9
Mar	105.06	-22.88	82.18	-30	52.18	0.40%	20.87%	19.4	333.1	25.00%	399.0	732.1
Apr	112.37	-22.88	89.49	-30	59.49	0.40%	23.79%	r	18.8	400.2	25.00%	420.4
May	125.41	-22.88	102.53	-30	72.53	0.40%	29.01%	r	19.4	577.6	25.00%	497.8
Jun	133.78	-22.88	110.90	-30	80.90	0.40%	32.36%	18.8	674.4	25.00%	521.0	1195.5
									Total:	229.3	3245.3	25.00%
										4216.6	7461.9	7050.4
Data Source: Alaska Department of Revenue (DOR), Fall 2008 Revenues Sources Book (RSB), (Dec 2008)												
FY2008 Taxable North Slope barrels /day: 626,456 229.3 millions barrels in FY2008 Lease Expenditures (\$/bbl): 16.78 TT&T (\$/bbl): 6.10 Capex Credits (\$ millions): 411.5												

Table 2. Gas Stand-alone Production Tax Calculation (July 2007 to June 2008) [Assuming Gas Line Operational]

FY 2008 Production Tax Revenues: 4.5 bcf /day Hypothetical Gas Sales (Standalone Production Tax Calculation) (US Gas Price Data from EIA)											
Month	EIA U.S. Wellhead Price \$/mcf	Per BOE Total Costs for Gas \$/boe	Per Barrel Production Tax Value PTV \$/boe	Progressivity Threshold Tax (BPT) \$/boe	PTV less Progressivity Threshold Rate	PTV Rate per Dollar of Adjusted PTV %	Incremental Progressivity Rate	Volume (millions boe)	Total		
									Base Production Tax (BPT) \$ millions	Production Tax (BPT) Value \$ millions	Total Production Tax (BPT + Progressivity) Value \$ millions
2007/2008											
Monthly Analysis: \$30 PTV \$/boe threshold and 0.004% progressivity parameter under Current Law as enacted in 2007											
Jul	6.32	-28.46	9.46	-30	0.00	0.40%	0.00%	23.3	0.0	25.00%	55.0
Aug	5.87	-28.46	6.76	-30	0.00	0.40%	0.00%	23.3	0.0	25.00%	39.3
Sep	5.42	-28.46	4.06	-30	0.00	0.40%	0.00%	22.5	0.0	25.00%	22.9
Oct	5.90	-28.46	6.94	-30	0.00	0.40%	0.00%	23.3	0.0	25.00%	40.4
Nov	6.58	-28.46	11.02	-30	0.00	0.40%	0.00%	22.5	0.0	25.00%	62.0
Dec	6.97	-28.46	13.36	-30	0.00	0.40%	0.00%	23.3	0.0	25.00%	77.7
Jan	6.99	-28.46	13.48	-30	0.00	0.40%	0.00%	23.3	0.0	25.00%	78.4
Feb	7.55	-28.46	16.84	-30	0.00	0.40%	0.00%	21.8	0.0	25.00%	91.6
Mar	8.29	-28.46	21.28	-30	0.00	0.40%	0.00%	23.3	0.0	25.00%	123.7
Apr	8.94	-28.46	25.18	-30	0.00	0.40%	0.00%	22.5	0.0	25.00%	141.7
May	9.81	-28.46	30.40	-30	0.40	0.40%	0.16%	23.3	1.1	25.00%	177.9
Jun	10.82	-28.46	36.46	-30	6.46	0.40%	2.59%	22.5	21.2	25.00%	226.3
Totals:		4.5	274.5	274.5	22.3	25.00%	1114.3	1136.7			
Data Sources: EIA for gas price Hypothetical gas production (bcf/day)											
									TT&T (\$/mcf): Lease Expenditures (\$/boe):	4.5 1.46	
									TT&T (\$/boe): Combined Production Tax Calculated on an oil + gas stand-alone calculation:	27.00	Capex Credits (\$ millions): 8598.5
										8187.0	

Table 3. Oil & Gas Combined Production Tax Calculation (July 2007 to June 2008)

FY 2008 Production Tax Revenues: Oil plus Gas Combined											
(Analysis Assumes Actual Oil Plus Hypothetical Gas)											
Month	A \$/boe	B \$/boe	C \$/boe	D= $(B + C)$	E $\$/\text{base}$	F= $(D + E) > 0$	G $\$/\text{base}$	H= $(F = G)$	I %	J= $(D * H * I)$	K \$ millions
Monthly Analysis, \$30 PTV \$/boe threshold and 0.004% progressivity parameter under Current Law as enacted in 2007											
Jul	55.22	-25.92	29.30	-30	0.00	0.40%	0.00%	42.7	0.0	25.00%	312.5
Aug	52.79	-25.92	26.87	-30	0.00	0.40%	0.00%	42.7	0.0	25.00%	286.7
Sep	54.09	-25.92	28.17	-30	0.00	0.40%	0.00%	41.3	0.0	25.00%	290.8
Oct	57.87	-25.92	31.95	-30	1.95	0.40%	0.78%	42.7	10.6	25.00%	340.8
Nov	63.83	-25.92	37.91	-30	7.91	0.40%	3.16%	41.3	49.5	25.00%	391.3
Dec	63.13	-25.92	37.21	-30	7.21	0.40%	2.88%	42.7	45.8	25.00%	396.9
Jan	64.34	-25.92	38.42	-30	8.42	0.40%	3.37%	42.7	55.2	25.00%	442.7
Feb	67.66	-25.92	41.74	-30	11.74	0.40%	4.69%	39.9	78.2	25.00%	409.9
Mar	74.92	-25.92	49.00	-30	19.00	0.40%	7.60%	42.7	158.9	25.00%	416.5
Apr	80.37	-25.92	54.45	-30	24.45	0.40%	9.78%	41.3	219.9	25.00%	522.7
May	89.15	-25.92	63.23	-30	33.23	0.40%	13.29%	42.7	358.6	25.00%	562.1
Jun	96.26	-25.92	70.34	-30	40.34	0.40%	16.14%	41.3	468.7	25.00%	674.5
											1033.1
											1194.8
											776.1
											1194.8
											6364.8
											6776.3
											5330.9
											-3822.3
											P
											4111.5
Difference Between Production Tax Calculated on a combined Oil & Gas Basis Minus Standalone Oil and Gas Basis:											

Table 4. Oil Stand-alone Production Tax Calculation (July 2008 to June 2009)

Month	\$/barrel	\$/barrel	PTV \$/barrel	PTV \$/barrel	\$/barrel	%	%	%	millions	\$ millions	%	\$ millions	%	\$ millions	N=
Monthly Analysis, \$30 PTV \$/barrel threshold and 0.004% progressivity parameter under Current Law as enacted in 2007															
Jul	132.87	-26.15	106.72	-30	76.72	0.40%	30.69%	18.6	607.6	25.00%	495.0	1102.5			
Aug	115.98	-26.15	89.83	-30	59.83	0.40%	23.93%	18.6	398.8	25.00%	416.6	815.5			
Sep	101.86	-26.15	75.71	-30	45.71	0.40%	18.28%	r	248.5	25.00%	339.8	588.3			
Oct	73.65	-26.15	47.50	-30	17.50	0.40%	7.00%	r	61.7	25.00%	220.3	282.0			
Nov	53.94	-26.15	27.79	-30	-2.21	0.40%	-0.88%	18.0	-4.4	25.00%	124.7	120.3			
Dec	37.70	-26.15	11.55	-30	-18.45	0.40%	-7.38%	18.6	-15.8	25.00%	53.6	37.8			
Jan	39.01	-26.15	12.86	-30	-17.14	0.40%	-6.86%	18.6	-16.4	25.00%	59.6	43.3			
Feb	42.78	-26.15	16.63	-30	-13.37	0.40%	-5.35%	r	16.8	-14.9	25.00%	69.7	54.8		
Mar	47.75	-26.15	21.60	-30	-8.40	0.40%	-3.36%	18.6	-13.5	25.00%	100.2	86.7			
Apr	46.56	-26.15	20.41	-30	-9.59	0.40%	-3.84%	r	18.0	-14.1	25.00%	91.6	77.5		
May	58.23	-26.15	32.08	-30	2.08	0.40%	0.83%	18.6	4.9	25.00%	148.8	153.7			
Jun	69.80	-26.15	43.65	-30	13.65	0.40%	5.46%	18.0	42.8	25.00%	195.9	238.7			
								Totals:	218.4	25.00%	1285.3	25.00%	2315.8	3601.1	3251.1
Data Source: Alaska Department of Revenue (DOR), Fall 2009 Revenues Sources Book (RSB), (Dec 2009)															
FY2009 Taxable North Slope barrels/day: 598,463 218.4 millions barrels in FY2009															
Lease Expenditures (\$/bbl): 19.67 TT&T (\$/bbl): 6.48 Capex Credits (\$ millions): 350.0															

Table 5. Gas Stand-alone Production Tax Calculation (July 2008 to June 2009) [Assuming Gas Line Operational]

FY 2009 Production Tax Revenues: 4.5 bcf/day Hypothetical Gas Sales (Standalone Production Tax Calculation)									
(US Gas Price Data from EIA)									
EIA U.S. Wellhead Price \$/mcf	Per BOE Total Costs for Gas	Per Barrel Production	Progressivity Threshold	PTV less Progressivity Threshold	PTV Rate per Dollar of Adjusted PTV	Incremental Progressivity Rate	Volume (Millions boe)	Total	
								Base Production Tax (BPT)	Production Tax (BPT + Progressivity)
Month	\$/mcf	\$/boe	PRV \$/boe	\$/boe	%	%	millions boe	\$ millions	\$ millions
A	B	C	D=	E	F=	G	H=	I=	J=
2007/2008			(B + C)	(D + E)>=0	(F * G)	(F * G)		(D * H * I)	(D * I * K)
Monthly Analysis, \$30 PRV \$/boe threshold and 0.004% progressivity parameter under Current Law as enacted in 2007									
Jul	10.62	-28.46	35.26	-30	5.26	0.40%	2.10%	23.3	17.2
Aug	8.32	-28.46	21.46	-30	0.00	0.40%	0.00%	23.3	0.0
Sep	7.27	-28.46	15.16	-30	0.00	0.40%	0.00%	22.5	0.0
Oct	6.36	-28.46	9.70	-30	0.00	0.40%	0.00%	23.3	0.0
Nov	5.97	-28.46	7.36	-30	0.00	0.40%	0.00%	22.5	0.0
Dec	5.87	-28.46	6.76	-30	0.00	0.40%	0.00%	23.3	0.0
Jan	5.15	-28.46	2.44	-30	0.00	0.40%	0.00%	23.3	0.0
Feb	4.19	-28.46	-3.32	-30	0.00	0.40%	0.00%	21.0	0.0
Mar	3.72	-28.46	-6.14	-30	0.00	0.40%	0.00%	23.3	0.0
Apr	3.43	-28.46	-7.88	-30	0.00	0.40%	0.00%	22.5	0.0
May	3.45	-28.46	-7.76	-30	0.00	0.40%	0.00%	23.3	0.0
Jun	3.45	-28.46	-7.76	-30	0.00	0.40%	0.00%	22.5	0.0
								Total:	273.8
									17.2
									25.00%
									566.2
									583.4
								TT&T (\$/mcf):	4.5
								TT&T (\$/boe):	27.00
								Capex Credits (\$ millions):	0.0
								Combined Production Tax Calculated on an oil + gas stand alone calculation:	4184.5
									3834.5

Data Sources: EIA for gas price
Hypothetical gas production (bcf/day): 4.5

Lease Expenditures (\$/boe): 1.46
Combined Production Tax Calculated on an oil + gas stand alone calculation: 4184.5

Table 6. Oil & Gas Combined Production Tax Calculation (July 2008 to June 2009)

Month	\$/boe	B	C	D= $(B + C)$	E	F= $(D + E) > 0$	G	H= $F = G$	I	J= $(D * H * I)$	K	L= $(D * I * K)$	M= $(J + L)$	N= $(M - P)$	Base										
															Oil + Gas Effective Per BOE Total Costs	Per Barrel Production	Progressivity Threshold	PTV less	PTV Rate per Incremental Progressivity Rate	Dollar of Adjusted PTV	Oil + Gas Volume (millions bbls)	Combined Progressivity Tax (CPT)	Production Tax (BPT) Rate	Production Tax (BPT) Value	CPT + BPT Value
Monthly Analysis, \$30 PTV \$/boe threshold and 0.004% progressivity parameter under Current Law as enacted in 2007																									
Jul	94.41	-27.44	66.97	-30	36.97	0.40%	14.72%	41.8		414.1		25.00%	659.9		1114.0										
Aug	79.24	-27.44	51.80	-30	21.80	0.40%	8.72%	41.8		188.8		25.00%	541.4		730.2										
Sep	69.47	-27.44	42.03	-30	12.03	0.40%	4.81%	40.5		81.8		25.00%	425.1		506.9										
Oct	53.91	-27.44	26.47	-30	0.00	0.40%	0.00%	41.8		0.0		25.00%	276.7		276.7										
Nov	43.86	-27.44	16.43	-30	0.00	0.40%	0.00%	40.5		0.0		25.00%	166.1		166.1										
Dec	36.32	-27.44	8.88	-30	0.00	0.40%	0.00%	41.8		0.0		25.00%	92.8		92.8										
Jan	34.50	-27.44	7.06	-30	0.00	0.40%	0.00%	41.8		0.0		25.00%	73.8		73.8										
Feb	32.97	-27.44	5.53	-30	0.00	0.40%	0.00%	37.8		0.0		25.00%	52.2		52.2										
Mar	33.61	-27.44	6.17	-30	0.00	0.40%	0.00%	41.8		0.0		25.00%	64.5		64.5										
Apr	32.11	-27.44	4.67	-30	0.00	0.40%	0.00%	40.5		0.0		25.00%	47.3		47.3										
May	37.36	-27.44	9.92	-30	0.00	0.40%	0.00%	41.8		0.0		25.00%	103.7		103.7										
Jun	42.49	-27.44	15.06	-30	0.00	0.40%	0.00%	40.5		0.0		25.00%	152.3		152.3										
Total:																492.2	684.7	25.00%	2695.7	3380.5	3030.5				
Difference Between Production Tax Calculated on a combined Oil & Gas Basis Minus Standalone Oil and Gas Basis:																-804.1	-804.1	P							
Capex Credits (\$ millions):																350.0									