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Findings and Conclusions



Royalty and Related Information Review Task Force Recommendations

January 26, 1998



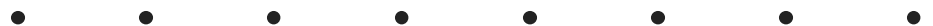
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Forty two alternative solutions have been identified, documented and screened to park those considered the least viable...

1. Postage Stamp rates for capital
2. Use joint venture information to calculate royalty
3. Jumping Pound 90/95 for each facility
4. Operator deemed to be responsible for all Crown royalty
5. Crown buys equity position in facilities
6. Crown takes raw gas volumes in-kind
7. Eliminate vintage
8. Royalty on Pool basis vs. well event level
9. Royalty as flat percentage of sales
10. Ring fence Alberta - Crown royalty as net profit interest
11. Potter Liddle regional rates
12. Crown sells royalty interest
13. Write off remaining capital
14. S-1 royalty trigger calculation
15. Align eligible and non-eligible costs
16. Determine stream components at well head and assess Crown charges on component rates
17. Flat royalty rate on production
18. Price and production sensitive royalty rate on raw gas, residue gas and products
19. Reduce assessed Crown royalty by a percentage to compensate for eliminating allowable costs deductions
20. Set separate royalty rates for different products allowing for costs
21. Introduce third tier of gas with only implicit cost recognition
22. Pay royalty on residual gas and NGL mix via the S-1
23. Remove holiday and special cases and adjust royalty rate
24. Special treatment for mature properties

The solution descriptions and ultimate disposition are found in Appendix C to this report



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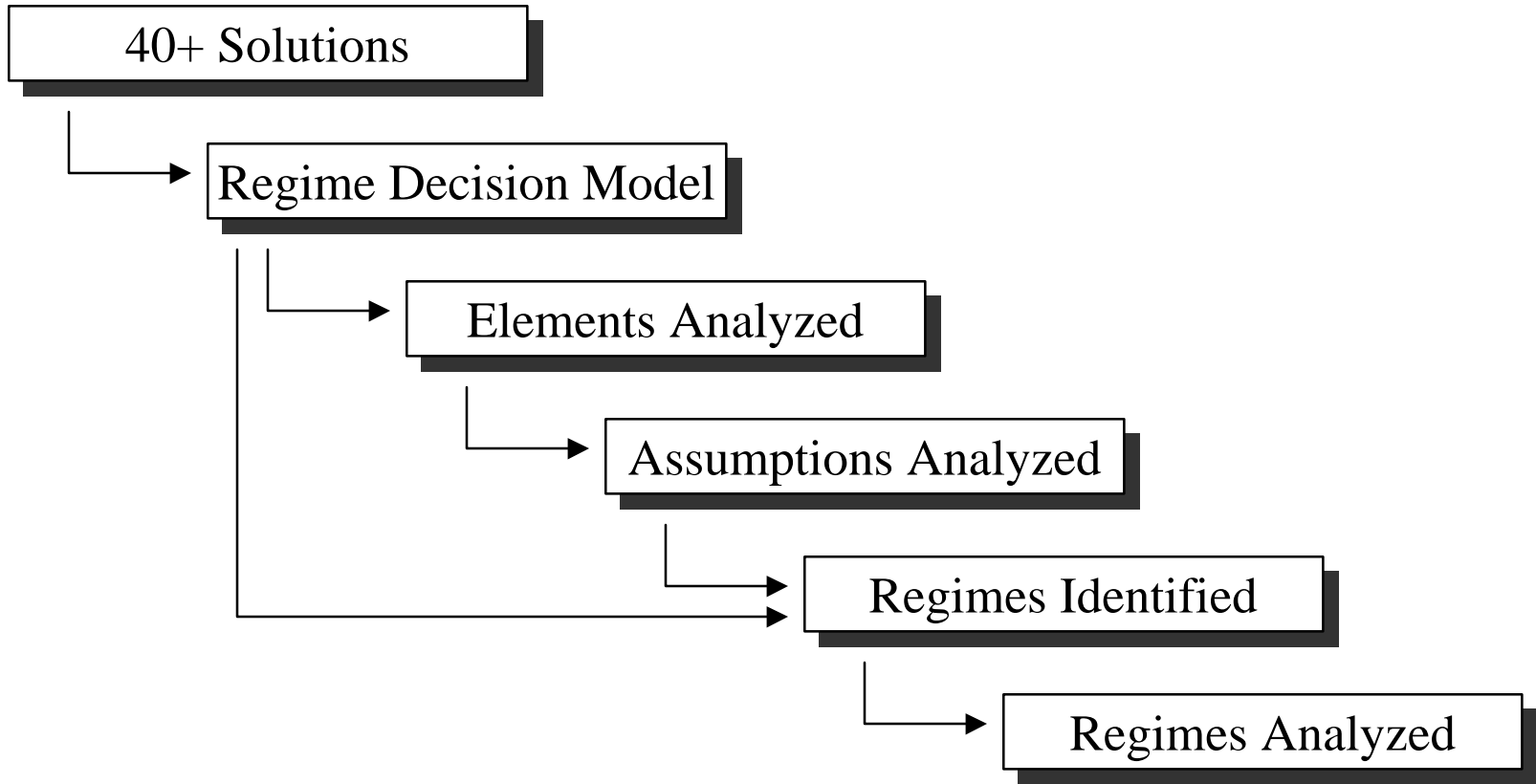
... with the rationale for interim and ultimate disposition included in the description

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| 25. Merge freehold mineral tax with royalty process | 34A. Gross wellhead royalty based on GJ's and reference price and reduced Gas Cost Allowance |
| 26. Shared information registries in electronic media at well, owner and transaction level | 34B. Net wellhead royalty based on GJ's and reference price and no GCA |
| 27. Operator pays royalty when operator is agent for the working interest owner | 35. Crown lifts some or all segregated products in-kind |
| 28. Crown waives nuisance royalty assessment by well event | 36. Flat royalty rate up to 80% production of the pool |
| 28aa. Crown waives nuisance royalty assessment below monthly/annual dollar hurdles | 37. Pool gas analysis (heat content determination) |
| 29. Remove differences between field pentanes/plant pentanes | 38. Retain existing business rules/processes; replace OAS |
| 30. Royalty calculated on average well production in a pool. | 39. Retain existing business rules/processes; modify custom processing |
| 31. Paydown to average if average capital used (transition for #1) | 40. Retain existing business rules/processes; modify S reporting |
| 32. Saskatchewan royalty model | 41. Plant inlet option |
| 33. BC royalty model | 42. Actual costs incurred |



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The 40+ solutions were mapped to a regime decision model, where elements and assumptions were assessed, and regimes were identified and analyzed



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The design of a royalty regime is based on a series of decisions which will define the differences between alternate royalty regimes



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A Generic Decision Tree shows all possible choices for each decision element. Every potential regime can be mapped on this diagram

Trigger		1 - Well Event			1A - Plant Outlet			
Volume		2 - Raw Gas		3 - Allocate Gas & Product		3.1 - Measure Gas & Product		
Content	4 - No Conversion (Raw Gas)	5 - Heat on allocated plant products	6 - Heat measured directly	7 - Heat on Raw Gas Analysis	8 - Heat on allocated inlet analysis	9 - Heat on Pool Gas Analysis	10 - Heat on Standard Conversion Algorithm	11 - No Conversion (res. Gas & NGL's)
Royalty Interest		12 - Royalty interest on well event			13 - Royalty interest on pool event			
	14 - Raw Gas Volumes	15 - Single Product (Heat)		16 - Residue Gas Volumes / Heat		17 - Segregated Condensates Vol C5+	18 - NGL Mix (C3/C4/C5) Vol	
Vintage		19 - Vintage			20 - No Vintage			
Gross Royalty Rate		21 - Flat %	22 - Price and /or productivity sensitive	23 - Age &/or resevoir sensitive	24 - Price &/or productivity by zone	25 - Heat sensitive %	25.1 - Price &/or productivity by plant type	
Adjust for Cost		26 - adjust % for cost NO			27 - adjust % for cost YES		27.4 - adjust % for flare	
		27.3 -All Products			27.1- Residue Gas	27.2- NGL's		
Take in Kind		28 - Takes in Kind NO			29 - Takes in Kind YES			
Value	30 - Flat Rate Province Wide	32 - Flat Rate Pool Wide	34 - Prov. Ref. Price (\$/GJ)	36 - Zone ref price (res gas) (\$/GJ)	38 - Pool wide ref price (res gas) (\$/GJ)	40 - Plant wide ref price (res gas) (\$/GJ)	42 - Ref price by product (CURRENT)	44 - Corp specific price NoT. avg / specific
(Price)	31 -Flat Rate by Zone	33 - Flat Rate Plant Wide	35 - Prov. Composite Ref. Price (\$/GJ)	37 - Zone composite ref price (\$/GJ)	39 - Pool wide composite price (\$?GJ)	41 - Plant wide composite price (\$/GJ)	43 - Public index ref NoT. avg / specific	45 - Corp plant specific NoT. avg / specific
				41.1 Plant type ref price (\$/GJ)	41.2 Plant type composite price (\$/GJ)	41.3 Corp avg price (updateable)		
Adjust for Cost		46 - Price NOT adjusted		47 -Price adjusted province wide	47.1 - Price adjusted by zone	47.2 - Price adjusted by plant type		
Establish	48 -Jumping Pound 90/95	50 - Act.ual Capital Post. Stamp Proc	52 - Post Stamp Cap & Oper. Plant Type	54 - Capital Only (No operating cost)	55.1 - Post Stamp 'Paper' plant / type		55.2 - Actual Cap all P. Stamp for 5 type	
Cost	49 -Actual Jumping Pound/ Custom Proc.	51- Post Stamp Cap & Oper Prov. wide	53 - Post Stamp Cap & Oper. by Region	55 - Oper.Only (No Capital)	60 - EGEV (adjusted gas equiv)		62 - volume allocated	64 - GJ allocation
	56 -2 types sweet & sour	57 - 43 - 5 generic 38 large	58 - 5 generic	59 - 1400 plant rates (all plants)		61 - Dollars of royalty allocated	63 -ownership of plant allocation	51

Findings and Conclusions



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Using the model the simplest royalty regime (least administration) was identified. Analysis showed it would redistribute \$113 million

Simplest Royalty Regime

Trigger Point = Wellhead

Volumes Measured = Raw Gas

Identify Quantity of Content = Not Converted

Define Royalty Interest = Well Event

Adjust for Vintage = No

Gross Royalty Rate = Price and Production Sensitive

Adjust Royalty Curve for Allowable Cost = Yes

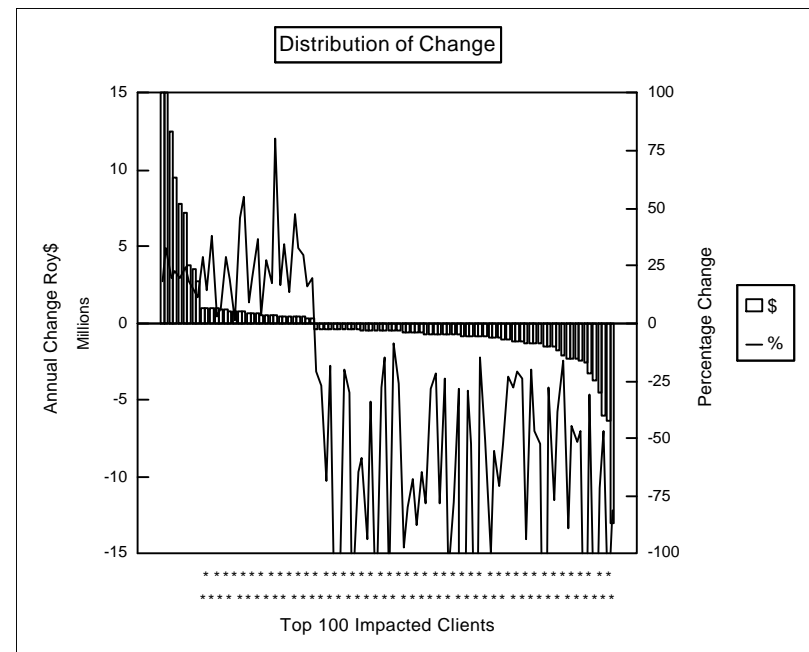
Take Royalty in Kind = No

Establish Value (Price) = Flat Province Wide

Establish Liability = On Allocated Production

Distribution Impact

- the amount of Crown Royalty dollar which moves for 'losing' companies to 'winning' companies in Model #1A



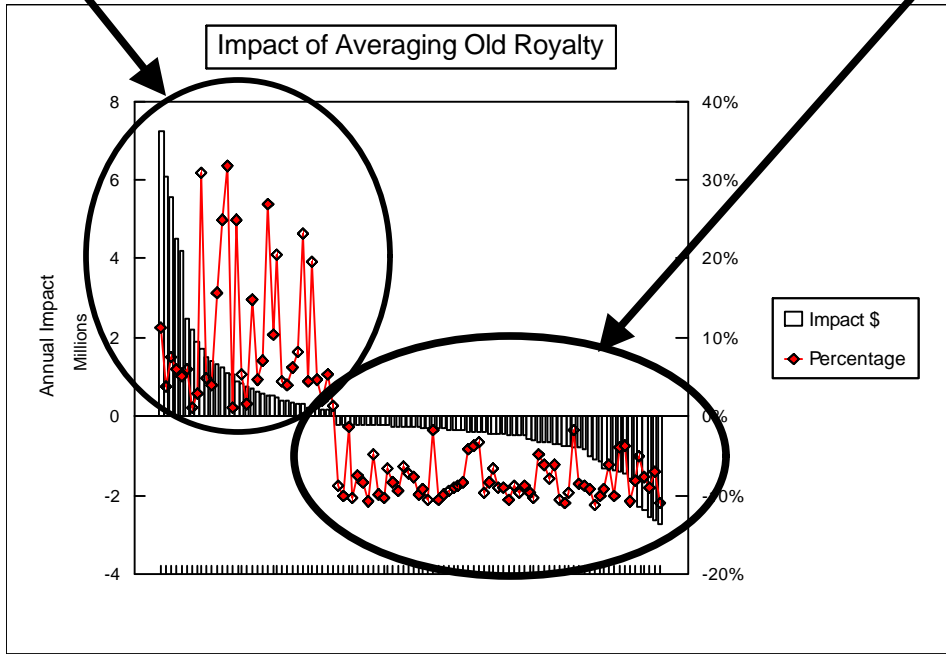
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Individual elements were also analyzed. Example, eliminating Vintage by averaging old and new royalty rates would redistribute over \$50 million

Winning Companies
Amount & Percentage of
Crown Royalty Reduction

Losing Companies
Amount & Percentage of
Crown Royalty Increase



Top 100 Impacted Clients, based on 1996 actual volumes and costs

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Assumptions which underlie the elements related to regimes using wellhead as the trigger point were found to have serious shortcoming

Valid Assumptions

- A strong motivation to implement a well head royalty exists
 - less government intervention
 - less administration effort and cost
- Methodology to effect Crown take-in-kind would be found
- Gas analysis at a well level may be inaccurate/cost prohibitive
- Accurate Pool level gas analysis can be attained on a timely basis

Invalid Assumptions

- Heat does not vary substantially within a Pool from well to well
- Heat does not vary substantially within a Pool over time
- Heat can be determined on a consistent, cost effective way for Solution gas producing Pools
- Sulphur energy value can be proxied to reflect value/costs
- Well head flow meters are sufficiently accurate to facilitate final determination of Crown royalty volumes: sweet/dry, wet/sour

The analysis of the decision elements and the underlying assumptions is in Appendix D to this report

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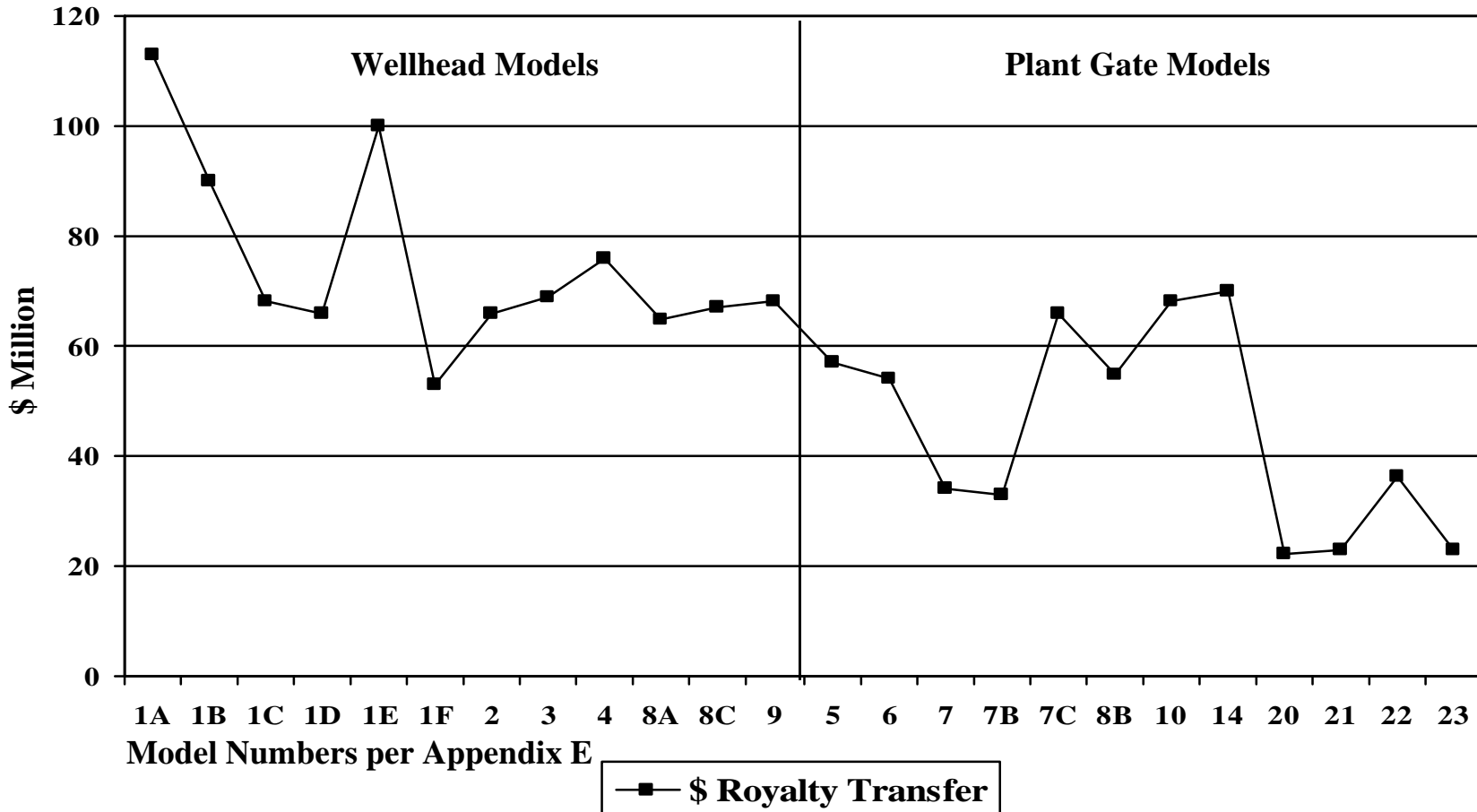
Assumptions underlying the elements for regimes using plant gate as the trigger point are valid

Valid Assumptions

- Less desirable, less potential savings
 - Prolonged government involvement in business
 - More ‘accuracy’, more G&A costs
- Lesser distributional implications will result
- Data gathering/management offers substantial rewards
- Opportunities exist to overhaul current rules/processes
 - Corporate Effective Royalty Rate
 - Custom Processing/ Custom Processing Adjustment Factors
 - Unit Operating Cost Rate determination/delivery
- Custody transfer meters are most accurate measurements in system
- Discrete royalty rates by segregated product will exist
- Reference Price mechanisms will exist
- Allowable Costs should not be delivered via royalty curves

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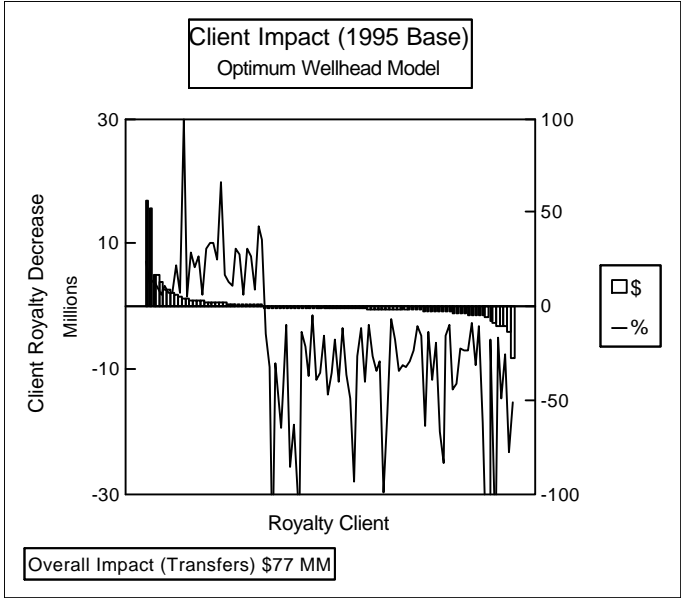
The distribution analysis of over 20 candidate regimes shows a significant potential for distribution impact regardless of the regime chosen



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The “best” wellhead regime would redistribute \$77 Million with a maximum win of \$16+Million and maximum loss of \$8 Million (*)

Trigger Point	Wellhead
Volumes Measured	Measure raw gas
Identify Quantity of Content	Heat on Pool Gas Analysis
Define Royalty Interest	At well event
Adjust for Vintage	Royalty rate varies by vintage
Gross Royalty Rate	Gross royalty % price/production sensitive
Adjust for Costs	Royalty % not adjusted for Allowable Costs
Take in Kind	Crown does not take in kind
Establish Value (Price)	Single Provincial Reference Price
Establish Allowable Costs	Price adjusted by \$/GJ by 43 plant types
Establish Liability	Pay royalty based on allocation



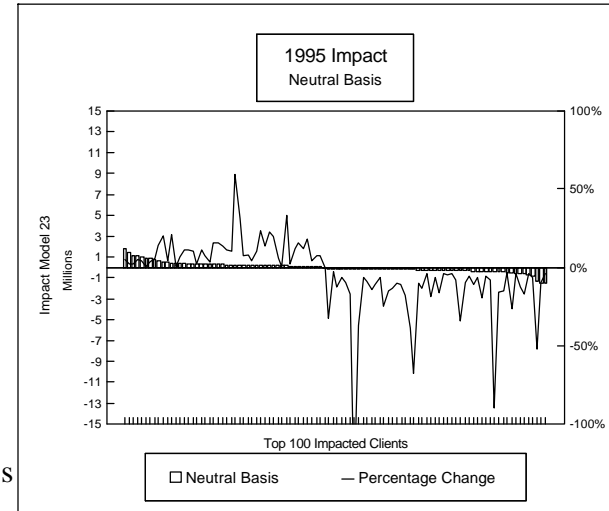
* The selection of “best” alternative included an assessment of distributional impact, administrative feasibility and future update ability

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The best plant gate regime would redistribute \$23 Million with a maximum win of <\$2 Million and maximum loss of ~\$1.3 Million (*)



Neutral basis included an increase in gross royalties of 0.8%

Trigger Point	Plant Gate
Volumes Measured	Measure residue gas and NGL's
Identify Quantity of Content	No conversion
Define Royalty Interest	At well event
Adjust for Vintage	Royalty rate varies by vintage
Gross Royalty Rate	Gross royalty % price/production sensitive
Adjust for Costs	Royalty % not adjusted for Allowable Costs
Take in Kind	Crown does not take in kind
Establish Value (Price)	Reference price by product
Establish Allowable Costs	UOCR and EUB Facility Effective Rate
Establish Liability	Pay royalty based on allocation

* The selection of “best” alternative included an assessment of distributional impact, administrative feasibility and future update ability

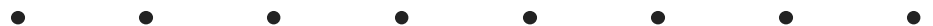
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There are also opportunities to streamline royalty administration and information collection which are independent of any particular regime

- Refine OAS and/or S-reports
 - modify OAS to reflect only Crown reporting requirements
 - consolidate S-reports where feasible
 - promote electronic filing
 - take steps to ensure accurate and timely filing, including providing training, documentation and compliance mechanisms
 - merge the streamlined OAS and S8, S20 and S21 reports
- Increase effectiveness around plant to plant transfers
- Examine Deep Gas Royalty Holiday Program - benefit realization
- Suspend minimum royalty charge



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Findings show the opportunity for benefit from reduced administration is limited to a portion of the total cost of royalty admin & S reporting

Compliance Costs

Department of Energy	
Operations, Audit, Rulings & Appeals, & Systems	\$9.6M
Alberta Energy & Utilities Board	
“S” Report Collection & Data Management	\$2.0M
Industry Compliance Costs by Size of Royalty payer	
Over \$15M in Crown Royalty paid	\$10.4M
Less than \$15M, greater than \$.5M Crown royalty paid	\$13.8M
Less than \$.5M Crown Royalty paid	<u>\$ 1.8M</u>
Ministry and Industry Total Cost of Compliance	\$37.6M
	or 3% of 1996 net royalty paid

Allowable Cost administration for industry and Crown represents \$10.2M of the \$37.6M

- **These numbers are significantly lower than was generally believed to be the case at the beginning of this project**



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In Summary the findings show measurement is inconsistent at the wellhead, impact is high and potential administrative savings are limited

- Accuracy of the volumetric measurements at the wellhead
 - consistently high for sweet/dry gas
 - very inconsistent for wet/sour gas
 - accuracy is driven by stream content and not necessarily the technology used
 - not acceptable for valuation or royalty calculation without support of plant outlet data
- The lowest potential distribution impact of the regimes investigated;
 - at wellhead is \$53 million (\$77 million for the “best” wellhead regime)
 - at plant gate is \$23 million (\$23 million for the “best” plant gate regime)
- Total administration cost of Crown royalty and S-reporting is < \$40M.
 - potential savings represents a portion of this amount



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Therefore the key recommendations are: repair current regime problems; streamline volumetric data capture; build a shared information registry

- Improve current regime by:
 - Reducing the volatility of unit operating cost rates (UOCR)
 - Linking capital cost allowance more directly to individual EUB facilities
 - Implementing Custom Processing Allowances based on gas type
 - Updating and aligning Allowable Costs definitions with industry standards and practices
- Rationalize data requirements across “S” Reports & Owner Activity Statements (OAS) by:
 - Reducing monthly information capture on OAS through use of a registry of working interest owners
 - Combining certain ‘S’ reports with the streamlined ‘OAS’ report
- Build a shared information registry by:
 - Combining the basic data gathered and maintained by the AEUB and the Department (Ministry)
 - Providing industry and the Ministry online access to the registry

