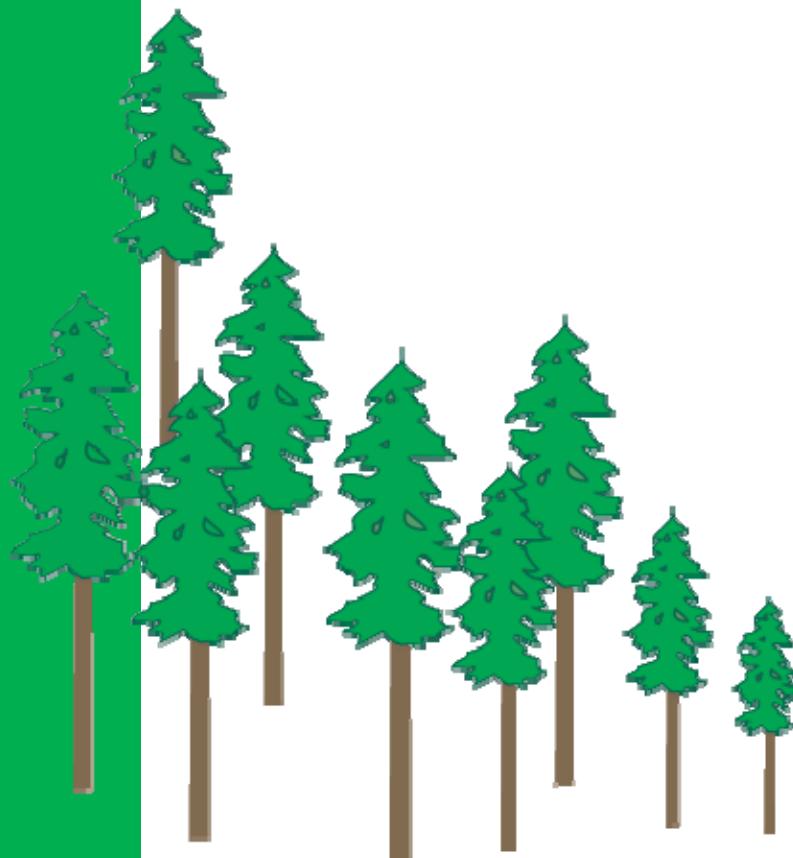# SPECIFICATIONS:

The Interior Market Pricing System

November 1, 2010

Timber
Pricing
Branch

Specifications: The Interior Market Pricing System

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Disclaimer:

This document is intended to complement the IAM by providing additional technical details such as rounding conventions. If there are any inconsistencies found between this document and the IAM then the IAM shall prevail.

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1. SOURCE DATA

Naming conventions for source data used throughout this document are as follows.

PAR	=	3 month average market values and other parameters published quarterly.
IAM	=	*Interior Appraisal Manual*.
Mark	=	refers to values on the corporate data base for each mark.
Mark/IAM		refers to site data for the mark and cost estimates from current *Interior Appraisal Manual*.
APP X	=	refers to an appendix of this document.
S X.X.X	=	refers to steps described in this document.

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2. Calculating the MPS Stumpage Rate

		Units	Decimal Places	Source/ Value	Rounding
2.1	selling price index	$/m^3	2		yes
=	stand value			S 2.1.2	
/	CONVOL			S 2.1.1	
2.1.1	CONVOL	m^3	0		
=	sum of coniferous species cruise volumes	m^3		Mark	
2.1.2	stand value	$	2		
=	sum of species values	$		S 2.1.3	
2.1.3	species value	$	2		
=	species selling price	$/m^3		S 2.1.4	
*	species cruise volume	m^3	0	Mark	
2.1.4	species selling price	$/m^3	2		
=	species appraisal LRF	fbm/m^3		S 2.1.5	
*	species lumber AMV	$/fbm		S 2.1.6	
2.1.5	species appraisal LRF	fbm/m³	0		
=	species cruise LRF[1]	fbm/m³	0	Mark	
+	species LRF add-on	fbm/m³	0	IAM	
2.1.6	species lumber AMV (fbm)	$/fbm	3		
=	species lumber AMV (Mbm)	$/Mbm	0	PAR	
/	1000				
2.3	LOGCVPH		4		yes
=	natural logarithm of CVPH			S 2.3.1	
2.3.1	CVPH	m3/ha			no
=	CONVOL			S 2.1.1	
/	net merchantable area	ha	1	Mark	
2.4	hembal fraction	fraction	4		yes
=	hembal volume	m³	0	S 2.4.1	
/	CONVOL			S 2.1.1	

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[1] If cruise LRF for lodgepole pine has been reduced for Mountain Pine Beetle volume, the reduction must be added back in as follows (rounded to zero decimal places): final Cruise LRF = Cruise LRF + (green attack volume*3+red attack volume*33+grey attack volume*83)/lodgepole pine net volume

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		Units	Decimal Places	Source/ Value	Rounding
2.4.1	hembal volume	m³	0		
=	hemlock cruise volume	m³	0	Mark	
+	balsam cruise volume	m³	0	Mark	
2.5	cedar fraction	fraction	4		yes
=	cedar cruise volume	m³	0	Mark	
/	CONVOL			S 2.1.1	
2.7	LOGVOL		4		yes
=	natural logarithm (EFFVOL/1000)			S 2.7.1	
2.7.1	EFFVOL		0		yes
=	CONVOL if TOA does not apply			S 2.1.1	
or	Zonal Volume if TOA does apply			IAM S 3.3	
2.8	LOGVPT		4		yes
=	natural logarithm (VPT)		2	Mark	
2.10	decay fraction	fraction	4		yes
=	sum of species decay percent prorates	%		S 2.10.1	
/	100				
2.10.1	species decay percent prorate	%			
=	species decay percent	%	0	Mark	
*	species cruise volume		0	Mark	
/	CONVOL			S 2.1.1	
2.12	partial cut fraction	fraction			
=	1		4		yes
-	(CAPCUT% (no 80% limit)/100)		4	Mark/IAM	
2.13	cable yarding fraction	fraction	4		yes
=	(hi lead and grapple volume	m³	0	Mark	
+	skyline volume)	m³	0	Mark	
/	HARVOL			S 2.13.1	
2.13.1	HARVOL	m3	0		yes
=	sum of all harvest method volumes		0	Mark	
2.14	heli fraction	fraction	4		yes
=	helicopter yarding volume	m³	0	Mark	
/	HARVOL			S 2.13.1	
2.16	fire damage fraction	fraction	4		yes
=	sum of fire damage fraction prorates	%		S 2.16.1	

		Units	Decimal Places	Source/ Value	Rounding
2.16.1	species fire damage fraction prorate	%			
=	species fire damage percent	%	0	Mark	
*	species cruise volume	m³	0	Mark	
/	CONVOL			S 2.1.1	
/	100				
2.17	total cycle time	hours			
=	primary cycle time	hours	1	Mark	yes
+	secondary cycle time	hours	1	Mark	yes
2.18	competitive deciduous				
=	1 if sold under IAM section 5.1.1(5)			Mark	
	0 otherwise				
2.19	decked fraction		4		yes
=	decked volume (BCTS only)	m3	0	Mark	
/	CONVOL			S 2.1.1	
2.20	Fort Nelson Peace				
=	1 if Zone 9, 0 otherwise		0	Mark	
2.21	2009 Auctions				
=	1 for all marks			1	
2.22	DANB		1		
=	DANB looked up by district			APP 1	
2.23	CPIF	ratio	4		yes
=	current CPI		1	PAR	
/	base CPI			109.3	
2.24	highway transportation				
=	1 if highway transportation		0	Mark	
	0 if off-highway transportation				
2.25	total attack fraction	fraction	4		yes
=	total attack volume	m³	0	S 2.25.1	
/	CONVOL			S 2.1.1	
2.25.1	total attack volume	m³	0		
=	MPB green attack volume	m³	0	Mark	
+	MPB red attack volume	m³	0	Mark	
+	MPB grey attack volume	m³	0	Mark	
+	other pest volume	m³	0	Mark	
2.26	cruise based indicator				
=	1 if cruise based, 0 otherwise		0	Mark	

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		Units	Decimal Places	Source/ Value	Rounding
3.1	selling price contribution	$/m³	2		yes
=	selling price index	$/m³		S 2.1	
*	selling price coefficient			0.152	
/	CPIF	$/m³		S 2.23	
3.2	exchange rate contribution	$/m³	2		yes
=	exchange rate			PAR	
*	exchange rate coefficient			-11.86	
3.3	LOGCVPH contribution	$/m³	2		yes
=	LOGCVPH			S 2.3	
*	LOGCVPH coefficient			1.50	
3.4	hembal contribution	$/m³	2		yes
=	hembal fraction			S 2.4	
*	hembal fraction coefficient			-18.91	
3.5	cedar contribution	$/m³	2		yes
=	cedar fraction			S 2.5	
*	cedar fraction coefficient			37.08	
3.7	LOGVOL contribution	$/m³	2		yes
=	LOGVOL			S 2.7	
*	LOGVOL coefficient			1.71	
3.8	LOGVPT contribution	$/m³	2		yes
=	LOGVPT			S 2.8	
*	LOGVPT coefficient			8.70	
3.10	decay contribution	$/m³	2		yes
=	decay fraction			S 2.10	
*	decay fraction coefficient			-19.10	
3.11	slope contribution	$/m³	2		yes
=	slope	%	0	Mark	
*	slope coefficient			-0.0209	
3.12	partial cut contribution	$/m³	2		yes
=	partial cut fraction			S 2.12	
*	partial cut coefficient			-2.86	

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		Units	Decimal Places	Source/ Value	Rounding
3.13	cable yarding contribution	$/m³	2		yes
=	cable yarding fraction			S 2.13	
*	cable yarding fraction coefficient			-9.48	
3.14	heli contribution	$/m³	2		yes
=	heli fraction			S 2.14	
*	heli fraction coefficient			-64.08	
3.16	fire damage contribution	$/m³	2		yes
=	fire damage fraction			S 2.16	
*	fire damage fraction coefficient			-11.48	
3.17	cycle time contribution	$/m³	2		yes
=	total cycle time			S 2.17	
*	cycle time coefficient			-1.01	
3.18	competitive deciduous contribution	$/m³	2		yes
=	competitive deciduous			S 2.18	
*	competitive deciduous coefficient			-8.26	
3.19	decked volume contribution	$/m³	2		yes
=	decked volume			S 2.19	
*	decked volume coefficient			41.11	
3.20	Fort Nelson Peace contribution	$/m³	2		yes
=	Fort Nelson Peace			S 2.20	
*	Fort Nelson Peace coefficient			-6.55	
3.21	2009 auctions contribution	$/m³	2		yes
=	2009 auctions			S 2.21	
*	2009 auctions coefficient			-13.73	
3.22	DANB contribution	$/m³	2		yes
=	DANB			S 2.22	
*	DANB coefficient			0.871	
3.24	highway transportation contribution	$/m³	2		yes
=	highway transportation	$/m³		S 2.24	
*	highway transportation coefficient			0.709	
3.25	total attack contribution	$/m³	2		yes
=	total attack fraction			S 2.25	
*	(1 - cruise based indicator)			S 2.26	
*	total attack coefficient			-5.56	
3.26	cruise based contribution	$/m³	2		yes
=	cruise based indicator			S 2.26	
*	cruise based coefficient			-8.01	

Specifications: The Interior Market Pricing System

			Units	Decimal Places	Source/ Value	Rounding
4.1		real estimated winning bid PLG	$/m³	2		yes
	=	constant			32.85	
	+	selling price contribution			S 3.1	
	+	exchange rate contribution			S3.2	
	+	LOGCVPH			S 3.3	
	+	hembal contribution			S 3.4	
	+	cedar contribution			S 3.5	
	+	LOGVOL contribution			S 3.7	
	+	LOGVPT variable contribution			S 3.8	
	+	decay contribution			S 3.10	
	+	slope contribution			S 3.11	
	+	partial cut contribution			S 3.12	
	+	cable yarding contribution			S 3.13	
	+	heli contribution			S 3.14	
	+	fire damage contribution			S 3.16	
	+	cycle time contribution			S 3.17	
	+	competitive deciduous contribution			S 3.18	
	+	decked volume contribution			S 3.19	
	+	Fort Nelson Peace contribution			S 3.20	
	+	2009 auctions contribution			S 3.21	
	+	DANB contribution			S 3.22	
	+	highway transportation contribution			S 3.24	
	+	total attack contribution			S 3.25	
	+	cruise based contribution			S 3.26	
4.2		estimated winning bid	$/m³	2		yes
	=	maximum of: 0.25 or				
		real estimated winning bid	$/m³		S 4.1	
	*	CPIF			S 2.23	
4.3		final specified operations		2		yes
	=	specified operations			S 4.3.1	
	*	CBCPIF			S 5.2	
4.3.1		specified operations	$/m³	2		yes
	=	water transportation	$/m³	2	Mark/IAM	
	+	special transportation systems	$/m³	2	Mark/IAM	
	+	camp costs	$/m³	2	Mark/IAM	
	+	skyline	$/m³	2	Mark/IAM	
	+	horse logging	$/m³	2	Mark IAM	
	+	high development cost (BCTS only)	$/m³	2	Mark IAM	
4.4		final estimated winning bid				
	=	maximum of: 0.25 or				
		(estimated winning bid			S 4.2	
	-	final specified operations)			S 4.3	

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		Units	Decimal Places	Source/ Value	Rounding
5.1	final TOA	$/m³			
=	TOA subtotal 2			S 5.1.1	
+	return to forest management			S 5.1.5	
-	MLRC			S 5.1.7	
5.1.1	TOA subtotal 2	$/m³	2		yes
=	total TOA	$/m³		S 5.1.2	
/	high grade fraction			S 5.1.4	
5.1.2	total TOA	$/m³	2		yes
=	TOA subtotal 1	$/m³		S 5.1.3	
*	CBCPIF			S 5.2	
5.1.3	TOA subtotal 1				yes
=	total administration costs	$/m³	2	Mark/IAM	
+	total development cost	$/m³	2	APP3.1	
+	total road management	$/m³	2	Mark/IAM	
+	total silviculture	$/m³	2	Mark/IAM	
5.1.4	high grade fraction	fraction	4		yes
=	(1				
-	LG)	$/m³	4	Mark/IAM	yes
5.1.5	return to forest management	$/m³	2		yes
=	TOA subtotal 2			S 5.1.1	
*	0.044		3	IAM	
5.1.6	MLRC	$/m³	2		yes
=	MLRC subtotal 1			S 5.1.7	
/	high grade fraction			S 5.1.4	
5.1.7	MLRC subtotal 1	$/m³	2		yes
=	MLRC	$/m³	2	1.01	
*	CBCPIF			S 5.2	
5.2	CBCPIF		4		yes
=	current CPI		1	PAR	
/	cost base average CPI			131.0	
6.1	Reserve Stumpage Rate	$/m³	2		yes
=	maximum of: 0.25 or				
	final estimated winning bid			S 4.4	
-	final TOA			S 5.1	

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2. THE AVERAGE MARKET PRICE

An Average Market Price will be required for the duration of the 2 year transition period (beginning July 1, 2010) to ensure that the transition mechanism is neutral with respect to the average level of stumpage without transition.

3.A Selecting Marks to be Included in the Average Market Price Calculation

The selection of Interior marks is done from a snapshot of the DBP01 database. The species records for the mark are extracted to ensure only appraised species are used. Volumes billed for all coniferous species over the period (12 month period beginning 14 months prior to the stumpage adjustment date) are then totaled into 2 groups: low grade which receive the statutory minimum rate (grade 4 and 6 for scale based permits) and stand rate volume that will be priced at the calculated stumpage rate for the cutting permit (non low grade volume, including volume on cruise based permits).

Select marks which meet the following criteria.

1. Mark is a stumpage mark.

2. Mark is appraised by the Interior method.

3. Mark is not part of BC Timber Sales.

4. Mark is from one of the following tenures:

> Forest licence
> Tree farm licence
> Timber sale licence with allowable annual cut exceeding 10,000 cubic metres
> Timber licence

5. Mark has complete appraisal data and is quarterly adjustable.

6. Mark has a total cruise volume of 100 cubic metres or more.

7. Mark has a confirmed worksheet with an appraisal effective date not before 48 months prior to the stumpage adjustment date, and where the cutting permit has not expired as of the stumpage adjustment date.

8. Mark has information for at least one of the following species: balsam, cedar, fir, hemlock, larch, lodgepole pine, spruce, white pine or yellow pine.

> Calculate the low grade and high grade volume billed for all coniferous saw log species.

9. Include volume billed for the above species and the following species: white bark pine and cypress. Do not include the volumes of special forest products. Only volumes from normal and cruise based billings are included.

Low grade volume is based on all coniferous grades 4 and 6 for scale based cutting permits.

Stand rate volume is all coniferous volume except Grade Z and low grade volumes.

Calculate the total volume billed for each mark by adding the individual species low grade and high grade volumes.

Exclude any mark where the total volume billed is less than 1,000 cubic metres.

3.B   Calculating the Average Market Price

7.1	average market price	$/m³			no
=	total AMP value			S 7.2.1	
/	total AMP volume			S 7.2.5	
7.2.1	total AMP value	$	2		yes
=	sum of mark AMP value			S 7.2.2	
7.2.2	mark AMP value	$	2		yes
=	mark stand rate value			Mark	
*	mark low grade value			Mark	
7.2.3	mark stand rate value	$	2		yes
=	mark stand rate volume			Mark	
*	reserve stumpage rate			S 6.1	
7.2.4	mark low grade value	$	2		yes
=	mark low grade volume			Mark	
*	minimum stumpage rate			0.25	
7.2.5	total AMP volume	m³	0		yes
=	sum of mark stand rate volume			Mark	
+	sum of mark low grade volume			Mark	

3. The Final Neutrality Adjustment

During the 2 year transition period beginning July 1, 2010, the average level of stumpage rates determined under Appendix VI of the IAM will be kept neutral to the pre-Appendix VI average using a Final Neutrality Adjustment (FNA).

The FNA will perform a similar function to the combined role of the mean value index (MVI) and the base rate (BR) from July 1, 2006 to June 30, 2010, which kept rates determined under the IAM neutral to the Market Pricing System.

The FNA will apply equally to the indicated stumpage rates of all appraised marks. It will be iterated so that the average rate for all grades using Appendix VI is equal to the AMP, for the same list of marks and using the same weighting volumes.

The FNA will be part of the parameters published quarterly by the director of Pricing Branch.

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APPENDIX 1: District Average Number of Bidders (DANB)

Forest District	DANB
100 Mile House	4.6
Arrow Boundary	2.6
Cascades	3.5
Central Cariboo	5.2
Chilcotin	1.0
Columbia	3.1
Fort Nelson	2.4
Fort St. James	2.3
Headwaters	3.2
Kalum	2.2
Kamloops	4.5
Kootenay Lake	2.8
Mackenzie	2.2
Nadina	4.1
Okanagan Shuswap	3.3
Peace	2.4
Prince George	3.6
Quesnel	4.7
Rocky Mountain	2.6
Skeena Stikine	2.8
Vanderhoof	2.1

APPENDIX 2:
Explanation of Variables Used in the Auction Dataset but not in Implementation

Grade 3 Fraction --- fraction of coniferous volume harvest on the auction sale that was scaled as grade 3 --- This variable does not apply because there has been no grade 3 volume scaled since the April 1, 2006 change to Interior log grades.   MPS is constructed so that policy in the final year of auctions sales (2008) is consistent with application. Since there was no grade 3 during 2009, the variable is always zero in application.

Insect Attack Code Indicator --- 1 if insect attack volumes are unavailable, zero otherwise --- This variable does not apply because insect attack volumes are determined for current cutting permits, therefore the value is always zero.

Salvage --- 1 if total insect attack is greater than 1/3 of coniferous volume, zero otherwise --- This variable does not apply because in the structure of the estimated winning bid regression the salvage is multiplied by the insect attack code indicator. Since the insect attack code indicator is always zero, this product is also always zero.

2006, 2007 and 2008 Annual Dummy Variables --- 1 if the sale was sold during these years, zero otherwise --- These variables do not apply in implementation because MPS applies the dummy variable from the latest year (2009) to all permits.

First and Second Quarter Auctions --- 1 if auction sold during the first or second quarter, zero otherwise --- This variable does apply but the average value of the variable from the auction dataset is applied in all cases and this constant value is added into the constant from the regressions, and therefore no longer appears explicitly in the equation.

APPENDIX 3:
Applicable Volume and the Calculation of Development Cost Estimates

The calculation of development cost estimates involves a proration with applicable volume as follows:

		Units	Decimal Places	Source/ Value	Rounding
APP3.1	total development cost	$/m^3	2		yes
=	total applicable cost	$		APP3.2	
/	CONVOL	m^3		S 2.1.1	
APP3.2	total applicable cost	$	2		yes
=	sum of applicable project costs	$		APP3.3	
APP3.3	applicable project cost	$	2		
=	project cost	$	2	Mark/IAM	yes
*	CONVOL	m^3	0	S 2.1.1	
/	project applicable volume	m^3	0	Mark	yes