



**BRITISH
COLUMBIA**

Ministry of Forests
and Range

**SPECIFICATIONS:
Calculation of Interior
Stumpage Rates**



July 1, 2006



Revenue
Branch

Table of Contents

1.	Calculating Conventions	1
2.	Calculating Stand Value Index (SVI) for Interior Appraisals	3
3.	Calculating Mean Value Index (MVI) for Interior Appraisals	9
4.	Calculating Base Rate for Interior Appraisals	12
5.	Calculating Final Stumpage Rate for Interior Appraisals	15

1. CALCULATING CONVENTIONS

Calculating conventions used throughout this document are as follows below.

Use only single operation calculations, except in compound additions and subtractions where all operands have the same number of decimal places.

Multiplication

Compute each product to a number of decimal places equal to the sum of the number of decimal places specified for the 2 operands, then round to the number of decimal places specified for the product. For example, the calculation to compute the product, to 2 decimal places, of 2 numbers (1 with no decimal places and the other with 3 decimal places) would be done as follows:

$$\begin{aligned} \text{i.e., } 262 * .234 &= 61.308 \\ &= 61.31 \text{ rounded to 2 decimal places} \end{aligned}$$

Division

Compute each quotient to a number of decimal places equal to the number of decimal places specified for the quotient plus 1, then round to the number of decimal places specified for the quotient. For example, the calculation to compute the quotient, to 2 decimal places, of 2 numbers (each with 0 decimal places), would be done as follows:

$$\begin{aligned} \text{i.e., } 234209 / 4671518 &= 62.616 \\ &= 62.62 \text{ rounded to 2 decimal places} \end{aligned}$$

Addition

Compute each sum to a number of decimal places equal to the larger of the number of decimal places specified for the 2 operands, then round to the number of decimal places specified for the sum. For example, the calculation to compute the sum, to 2 decimal places, of 2 numbers (each with 4 decimal places), would be done as follows:

$$\begin{aligned} \text{i.e., } 13.5837 + 11.6489 &= 25.2326 \\ &= 25.23 \text{ rounded to 2 decimal places} \end{aligned}$$

Subtraction

Compute each difference to a number of decimal places equal to the larger of the number of decimal places specified for the 2 operands, then round to the number of decimal places specified for the difference. For example, the calculation to compute the difference to 2 decimal places of 2 numbers (1 with 5 decimal places and the other with 3 decimal places), would be as follows:

$$\begin{aligned} \text{i.e., } 12.69999 - 9.375 &= 3.32499 \\ &= 3.32 \text{ rounded to 2 decimal places} \end{aligned}$$

Rounding

Determine the right most digit to be retained (i.e., 12.3449).

Determine the left most digit to be dropped (i.e., 12.3449).

If the left most digit to be dropped is less than 5, then the right most digit retained is unchanged (i.e., 12.3449 rounded to 2 decimal places is 12.34).

If the left most digit to be dropped is 5 or greater, then the right most digit retained is incremented by 1 (i.e., 12.3450 rounded to 2 decimal places is 12.35).

Table naming conventions used throughout this document are as follows:

T Trend	=	Cost trend factors.
T Lumber	=	12 month average lumber market values by species.
T Chip	=	12 month average chip values and shipping differentials by point of appraisal.
T Quarter	=	Quarterly parameters.
T LRF	=	Lumber recovery update factors by species (Chapter 3 of current <i>Interior Appraisal Manual</i>).
T Mill	=	Manufacturing (milling) costs by species.
T HH	=	Harvest history of billed volume.

2. CALCULATING SVI FOR INTERIOR APPRAISALS

Legend

In “Source” column: “Tnn” refers to GAS table identity (see full descriptions on Page 2).
 “Snn” refers to the step number within this example.
 “Mark” refers to values on the corporate data base for each mark.

Calculation of stud log portion of selling price is valid for spruce, lodgepole, balsam, fir and larch species only. A 0 stud log portion for other species is accomplished by a 0 percent stud for the other species.

		Units	Decimal	Maximum Value	Source	Rounded
Compute Lumber AMV						
2.1	Stud AMV	\$/Mbm	0	999		Yes
	= Stud AMV	\$/Mbm	2	999.99	T Lumber	
2.2	Random length AMV	\$/Mbm	0	999		Yes
	= Random length AMV	\$/Mbm	2	999.99	T Lumber	
Adjust Lumber Recovery Factor						
2.3	Adjusted species LRF	fbm/m ³	0	999		
	= Species LRF	fbm/m ³	0	999	Mark	
	+ Average LRF adjustment	fbm/m ³	0	999	T LRF	
Compute Stud Log Fraction						
2.4	Stud log fraction	N/A	2	1.00		
	= Stud log percent / 100	N/A	0	100	Mark	

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Stud Log Portion of AMV						
2.5	Stud AMV (fbm)	\$/fbm	3	.999		
	= Stud AMV	\$/Mbm	0	999	S 2.1	
	(Mbm)/1000					
2.6	Effective stud percent	N/A	0	100		
	= Effective stud percent	N/A	0	100	Mark	
	- Stud percent intercept	N/A	0	100	Policy	
2.7	Stud AMV percent	N/A	0	225		
	= Effective stud percent	N/A	0	55	S 2.6	
	* Stud percent slope	N/A	0	100	Policy	
2.8	If stud AMV percent < 0, stud AMV percent = 0	N/A	0	100	S 2.7	
	If stud AMV percent > 100, stud AMV percent = 100					
2.9	Stud AMV fraction	N/A	2	1.00		
	= Stud AMV percent/100	N/A	0	100	S 2.7	
2.10	AMV stud log portion	\$/fbm	5	.99999		
	= Stud AMV (fbm)	\$/fbm	3	.999	S 2.5	
	* Stud AMV fraction	N/A	2	1.00	S 2.9	

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Random Length Portion of AMV						
2.11	Random length AMV (fbm)	\$/fbm	3	.999		
	= Random length AMV (Mbm)	\$/Mbm	0	999	S 2.2	
2.12	Random length AMV percent	N/A	0	100		
	= 100	N/A	0			
	- Stud AMV percent	N/A	0	100	S 2.8	
2.13	Random length AMV fraction	N/A	2	1.00		
	= Random length AMV percent/100	N/A	0	100	S 2.12	
2.14	AMV random length portion	N/A	5	.99999		
	= Random length AMV (fbm)	\$/fbm	3	.999	S 2.11	
	* Random length AMV fraction	N/A	2	1.00	S 2.13	

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Lumber Selling Price						
2.15	Lumber AMV	\$/fbm	3	.999		Yes
	= AMV random length portion	\$/fbm	5	.99999	S 2.14	
	+ AMV stud log portion	\$/fbm	5	.99999	S 2.10	
2.16	Lumber selling price	\$/m ³	2	999.99		Yes
	= Adjusted species LRF	fbm/m ³	0	999	S 2.3	
	* Lumber AMV	\$/fbm	3	.999	S 2.15	
Compute Chip Selling Price						
2.17	Chip recovery	fbm/m ³	0	999		
	= Combined product recovery factor	fbm/m ³	0	999	T LRF	
	- Adjusted species LRF	fbm/m ³	0	999	S 2.3	
2.18	Scaled chip yield factor	BDU/fbm	5	.99999		
	= Chip yield factor/10000	BDU	0	999	TLRF	
2.19	Chip yield (BDU)	BDU/m ³	5	.99999		
	= Chip recovery	fbm/m ³	0	999	S 2.17	
	* Scaled chip yield factor	BDU/fbm	5	.99999	S 2.18	
2.20	Total chip selling price	\$/m ³	2	999.99		Yes
	= Chip yield (BDU)	BDU/m ³	5	.99999	S 2.18	
	* Chip AMV	\$/BDU	2	999.99	T Chip	
2.21	Adjusted chip selling price	\$/m ³	2	999.99		Yes
	= Total chip selling price	\$/m ³	2	999.99	S 2.20	
	* (100-BURN %)/100	N/A	2	1.00	Mark	

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Selling Price						
2.22	Selling price	\$/m ³	2	999.99		
	= Lumber selling price	\$/m ³	2	99.99	S 2.16	
	+ Adjusted chip selling price	\$/m ³	2	99.99	S 2.21	
	- Shipping differential	\$/m ³	2	9.99	T Chip	
Compute Operating Cost						
2.23	Trended logging costs	\$/m ³	2	999.99		Yes
	= Untrended logging cost	\$/m ³	2	999.99	Mark	
	* Logging trend factor	N/A	3	9.999	T Trend	
2.24	Trended silviculture cost	\$/m ³	2	99.99		Yes
	= Untrended silviculture cost	\$/m ³	2	99.99	Mark	
	Silviculture cost trend factor	N/A	3	9.999	T Trend	
2.25	Trended species milling costs	\$/m ³	2	999.99		
	= Untrended species milling cost	\$/m ³	2	9.99	T Mill	Yes
	* Milling cost trend factor	N/A	3	9.999	T Trend	
2.26	Species operating cost	\$/m ³	2	999.99		
	= Trended logging cost	\$/m ³	2	999.99	S 2.23	
	+ Trended silviculture cost	\$/m ³	2	99.99	S 2.24	
	+ Trended species milling cost	\$/m ³	2	999.99	S 2.25	

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Stand Species Total						
2.27	Species total value	\$	0	99999999		Yes
	= Species selling price	\$/m ³	2	999.99	S 2.22	
	* Species cruise volume	m ³	0	99999999	Mark	
2.28	Species total cost	\$	0	99999999		Yes
	= Species operating cost	\$/m ³	2	999.99	S 2.26	
	* Species cruise volume	m ³	0	99999999	Mark	
2.29	Stand value	\$	0	99999999		
	= Sum of total values (all species)	\$	0	99999999	S 2.27	
2.30	Stand cost	\$	0	99999999		
	= Sum of total costs (all species)	\$	0	99999999	S 2.28	
2.31	Stand volume	m ³	0	99999999		
	= Sum of cruise volumes (all species)	m ³	0	99999999	Mark	
Compute SVI						
2.32	Weighted selling price	\$/m ³	2	999.99		Yes
	= Stand value	\$	0	99999999	S 2.29	
	/ Stand volume	m ³	0	99999999	S 2.31	
2.33	Weighted operating cost	\$/m ³	2	999.99		Yes
	= Stand cost	\$	0	99999999	S 2.30	
	/ Stand volume	m ³	0	99999999	S 2.31	
2.34	SVI	\$/m ³	2	999.99		
	= Weighted selling price	\$/m ³	2	999.99	S 2.32	
	- Weighted operating cost	\$/m ³	2	999.99	S 2.33	

3. CALCULATING MVI FOR INTERIOR APPRAISALS

Overview

1. Select Marks

Marks are selected from a copy of the corporate data base using criteria which will be detailed in Section 1.

2. Calculate MVI (Interior Appraisals)

The selected marks are then passed to a series of calculation programs which calculate value indexes and averages on a species, district and company basis.

1. Select Marks

The selection of Interior marks is done from the snapshot of the SQLP1 DATABASE. Then, the species records for the mark are extracted to ensure only appraised species are used. Volumes billed for all coniferous species over the period (14 months prior to stumpage adjustment date to 2 months before the stumpage adjustment date) are then totalled into 2 groups: logs which receive the stand rate and low grade logs that are billed at the statutory minimum rate. In subsequent base rate calculations, any low grade logs will be made revenue neutral.

Select marks which meet all of 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 issued under 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 valid appraisal data permitting the calculation of a value index.

Specifications: Calculation of Interior Stumpage Rates

6. Mark has a total cruise volume of 100 cubic metres or more.
7. Mark has a confirmed worksheet with an appraisal effective data more recent than 48 months ago (from the stumpage adjustment date), that has not expired as of the stumpage adjustment date.
8. Mark has information for at least 1 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 volumes and values are based on the species and grades shown in the species low grade saw log factors table for the applicable date.

High grade volumes are based on all volumes 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.

2. Calculate MVI

Legend

In “Source” column: “SVI-Snn” refers to the step number from the STAND-VALUE INDEX specification earlier in the document.

“Snn” refers to the step number within this specification.

“HH” refers to the sum of volumes from the specific 12 months of harvest history.

In “Max. Value” column: 9(8) means 99999999.

Calculate SVI for Interior appraisals.

See earlier section and the associated effective date.

Compute MVI – Interior appraisals.

		Units	Decimal	Maximum Value	Source	Rounded
3.1	Stand value cross product = SVI	\$	0	9(9)		Yes
	* Stand billed volume	\$/m ³	2	999.99	S 2.34	
		m ³	0	9(8)	HH	
3.2	Cross product total value	\$	0	9(12)		
	= Sum of stand value cross products (all marks)	\$	0	9(11)	S1	
3.3	Total Interior billed volume	m ³	0	9(11)		
	= Sum of stand billed volumes (all marks)	m ³	0	9(10)	HH	
3.4	Interior MVI	\$/m ³	2	999.99		
	= Cross product total value	\$	0	9(12)	S3.2	
	/ Total Interior billed volume	m ³	0	9(11)	S3.3	

4. CALCULATING BASE RATE FOR INTERIOR APPRAISALS

Legend

In “Source” column: “Tnn” refers to the GAS table identity – full descriptions are shown on Page 2.
“Snn” refers to the step number within this example.
“MVI” refers to value from mark VI data file produced in the MVI calculation.

Initialize trial base rate.

1. Initial trial base rate = average market price (AMP).

Compute trial average rate.

2. Compute trial average rate (Steps 4.1 to 4.11 shown on the following pages).
3. Compute new trial base rate = trial base rate + AMP – trial average rate.

Repeat Steps 2 and 3 until trial average rate = AMP or until number of iterations exceed maximum permitted.

Base rate static.

4. Final base rate = new trial base rate.

To find other base rates that yield the same trial average rate.

5. Initial value for trial base rate + or - \$0.01 depending on whether the base rate exceeds or is less than the AMP.
6. Compute trial average rate (Steps 4.1 to 4.11).
7. Compute new trial base rate = trial base rate – 0.01.

Repeat Steps 6 and 7 until trial average rate is 1 cent less than or greater than target, or until number of iterations exceeds maximum.

Maximum iterations reached.

Specifications: Calculation of Interior Stumpage Rates

8. If number of iterations exceeds maximum iterations then print an appropriate message.

Compute trial average rate.

		Units	Decimal	Maximum Value	Source	Rounded
Compute Trial Stand Value for Each Mark						
4.1	Relative value index	\$/m ³	2	999.99		
	= SVI	\$/m ³	2	999.99	MVI	
	- MVI	\$/m ³	2	999.99	T Quarterly	
4.2	Trial indicated rate	\$/m ³	2	999.99		
	= Trial base rate	\$/m ³	2	999.99		
	+ Adjusted relative value index	\$/m ³	2	999.99	S 4.1	
4.3	Trial reserve rate = maximum	\$/m ³	2	999.99		
	of trial indicated rate	\$/m ³	2	999.99	S 4.2	
	or minimum rate	\$/m ³	2	999.99	T Quarterly	
4.4	Trial high grade rate	\$/m ³	2	999.99		
	= Trial reserve rate	\$/m ³	2	999.99	S 4.3	
	- Rate reduction trigger	\$/m ³	2	999.99	T Quarterly	
4.5	Stand high grade billed volume	m ³	0	9(8)		
	= Stand billed volume	m ³	0	9(8)	MVI	
	- Stand low grade billed volume	m ³	0	9(8)	MVI	
4.6	Stand high grade value	\$	0	9(10)		
	= Stand high grade billed volume	m ³	0	9(8)	S 4.5	
	* Trial high grade rate	\$/m ³	2	999.99	S 4.4	
4.7	Stand low grade value	\$	0	9(10)		
	= Stand low grade billed volume	m ³	0	9(8)	MVI	
	* Trial low grade rate (i.e., \$0.25)	\$/m ³	2	999.99	T Default	

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Trial Stand Value for Each Mark						
(continued)						
4.8	Trial stand value	\$	0	9(10)		
	= Stand high grade value	\$	0	9(10)	S 4.6	
	+ Stand low grade value	\$	0	9(10)	S 4.7	
Compute Stand Totals						
4.9	Total trial value	\$	0	9(12)		
	= Sum of trial stand values (all marks)	\$	0	9(12)	S 4.8	
4.10	Total billed volume	m ³	0	9(10)		
	= Sum of stand billed volumes (all marks)	m ³	0	9(8)	MVI	
Compute trial average rate.						
4.11	Trial average rate	\$/m ³	4	999.9999		
	= Total trial value	\$	0	9(12)	S 4.9	
	/ Total billed volume	m ³	0	9(10)	S 4.10	

5. CALCULATING FINAL STUMPAGE RATE FOR INTERIOR APPRAISALS

Legend

In “Source” column: “Mark” refers to the values on the corporate data base for each mark.

“Tnn” refers to GAS table identity – full descriptions are shown on Page 2.

“SVI-Snn” refers to the step number from the STAND VALUE INDEX specifications earlier in this document.

“Snn” refers to the step number within this example.

In “Max. Value” column: 9(8) means 99999999.

Calculating SVI for Interior appraisals.

See earlier section and the associated effective date.

Specifications: Calculation of Interior Stumpage Rates

		Units	Decimal	Maximum Value	Source	Rounded
Compute Final Rate						
5.1	Relative value index	\$/m ³	2	999.99		
	= SVI	\$/m ³	2	999.99	S 2.34	
	- MVI	\$/m ³	2	999.99	T Quarterly	
5.2	Indicated rate	\$/m ³	2	999.99		
	= Base rate	\$/m ³	2	999.99	T Quarterly	
	+ Relative value index	\$/m ³	2	999.99	S5.1	
5.3	Reserve rate = maximum	\$/m ³	2	999.99		
	of indicated rate	\$/m ³	2	999.99	S5.2	
	or minimum rate	\$/m ³	2	999.99	T Quarterly	
5.4	Upset rate	\$/m ³	3	999.99		
	= Reserve rate	\$/m ³	2	999.99	S5.3	
	+ Silviculture levy	\$/m ³	2	999.99	Mark	
	+ Development levy	\$/m ³	2	999.99	Mark	
5.5	Total rate	\$/m ³	2	999.99		
	= Upset rate	\$/m ³	2	999.99	S5.4	
	+ Bonus bid	\$/m ³	2	999.99	Mark	