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March 29, 2006

**BY EMAIL**

To: Regional Executive Directors

From: Bill Howard  
Director  
Revenue Branch

**Re: Amendment No. 3 to the *Provincial Logging  
Residue and Waste Measurement Procedures Manual***

I hereby approve Amendment No. 3 to the *Provincial Logging Residue and Waste Measurement Procedures Manual*, and attach a copy for your use.

This amendment will come into force on April 1, 2006.



**for:**

Bill Howard  
Director  
Revenue Branch

Attachment







**BRITISH  
COLUMBIA**

Ministry of  
Forests  
and Range



## MANUAL REVISION TRANSMITTAL

<p>FOR FURTHER INFORMATION OR IF YOU HAVE A CHANGE OF ADDRESS, PLEASE CONTACT:</p> <p>John Wai Residue Forester and Log Salvage Policy Forester Revenue Branch Ministry of Forests and Range 6<sup>th</sup> Floor - 727 Fisgard Street Victoria, BC V8W 1R8 Phone: 356-7671 PROFS userid: John.Wai@gov.bc.ca FAX: 387-5670</p>	<b>MANUAL TITLE</b>	
	Prov. Logging Residue & Waste Measurement Procedures Manual	
	<b>AMENDMENT</b> Amendment No. 3	<b>ISSUE DATE</b> April 1, 2006
	<b>MANUAL CO-ORDINATOR</b>	
	Judy Laton Manuals Co-ordinator	
	<b>AUTHORIZATION (Name, Title)</b>	
	W. Howard Director, Revenue Branch	

Please make the following changes to your copy of the above Ministry manual.

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**Table 1-2 Interior Timber Merchantability Specifications**

Description		All Stands	
Stumps**			
•	no higher than	30 cm	
Diameter (outside bark) at stump height			
•	Lodgepole pine: all timber that meets or exceeds	15 cm	
•	All other species: all timber that meets or exceeds	20 cm	
Top diameter (inside bark or slab thickness)			
•	For all species and ages, except Cedar older than 141 years, all timber that meets or exceeds	10 cm	
•	For Cedar older than 141 years	15 cm	
Minimum length			
•	log or slab	3 m	
**	Measured on the side of the stump adjacent to the highest ground.		

Waste volumes are measured and billed monetarily in accordance with the following Table 1-3.

**Table 1-3: The Disposition of Waste Volumes in Monetary Billing**

Table Values Effective April 1, 2006 (Valid for all Species)								
LOG  TYPE	G R A D E S		ALL STANDS					
			AVOIDABLE (from field data)			UNAVOIDABLE (from field data)		
	Coast	Interior	Class W/X	Measure YES/NO	Rate * S/\$0.25	Class W/X	Measure YES/NO	Rate * S/\$0.25
Saw Log	X or better	1 and 2	W	YES	S	W	YES	NB
Lumber Reject	Y	4	W	YES	\$0.25	W	YES	NB
Dead Dry Lumber Reject	Dry Y	Dry 4	X	NO	NB	X	NO	NB
Undersize		6	X	NO	NB	X	NO	NB
Firmwood Reject	Z	Z	X	NO	NB	X	NO	NB

**Class:** Waste, X other

**Measure/Record:** YES or NO

**Rate:** S = 12-month average Stumpage rate for all coniferous species, and the stumpage rates established in the Coast or Interior Appraisal Manual for all deciduous species, \$0.25 = fixed base rate. NB = No Billing.

All rates charged will include any bonus bids and levies where applicable.

- See Appendix 5 for waste benchmarks.

### 1.1.2 Rationale

The right to harvest Crown timber is granted in the form of agreements under the *Forest Act*.

The licensee has the discretion of whether or not to harvest the timber from the agreement area subject to the forest management standards required.

Pursuant to the *Forest Act*, an agreement holder must pay stumpage for timber that was harvested.

Under the *Forest Act* and the agreements, the licensee must pay a waste assessment for merchantable timber not harvested and for timber deemed to be wasted.

### 1.1.3 Definitions

“Waste” means timber, except timber reserved from cutting, whether standing or felled, which meets or exceeds the timber merchantability specifications described for the Coast and the Interior in this manual that was not removed from the cutting authority area.

“Unavoidable waste” means waste that:

- i. is inaccessible or physically obstructed;
- ii. could not be felled, bucked or removed due to safety or environmental reasons.

“Avoidable waste” means waste that does not fall within the definition of unavoidable waste.

"Merchantable timber" means timber that meets or exceeds the timber merchantability specifications that are described in Table 1-1 for the Coast and in Table 1-2 for the Interior in this manual. Timber that is graded dry Y (5) or Z (Coast), graded dry 4, 6 or Z (Interior) is not merchantable.

“Timber Merchantability Specifications” means stump height and diameter, log top diameter, slab thickness and log length described in this manual for the Coast and the Interior.

“Waste assessment” means an assessment conducted in accordance with the procedures set out in the *Provincial Logging Residue and Waste Measurement Procedures Manual* for determining the volumes of merchantable timber and waste left on a harvested area following completion of primary logging.

“Waste benchmark” means the volume of avoidable waste, expressed in cubic metres per hectare, that can be left on a harvested area without being subject to a monetary waste assessment.

#### **1.1.4 Monetary Billings**

Subject to the waste benchmarks described in Appendix 5, the avoidable waste volumes are billed as follows.

##### **1.1.4.1 Coast**

The avoidable grade Y waste volumes are billed at \$0.25 per m<sup>3</sup>.

Dead/dry grade Y (grade 5) timber not removed from the harvested area is not measured in waste assessments.

The avoidable grade X or better waste volumes are billed at the waste rates determined in Appendix 3 of this manual.

##### **1.1.4.2 Interior**

The avoidable waste volumes of grade 4, lumber reject; are billed at \$0.25 per m<sup>3</sup>.

The avoidable sawlog grades 1 and 2 volumes are billed at the waste rates determined in Appendix 3 of this manual.

#### **1.1.5 Deciduous**

Deciduous species are treated the same as coniferous species for waste billing purposes. Deciduous timber within the merchantability specifications that is not harvested, is measured as waste.

#### **1.1.6 Amount Payable**

For merchantable Crown timber that is not cut and removed, the amount payable is calculated by multiplying:

- a. the volumes of avoidable waste reported in a waste assessment after deducting the waste benchmark volume allowed under Appendix 5, by
- b. the applicable waste rates as follows:
  - i. Coniferous species graded:
    - (a) sawlog - the waste rate derived in a method described in Appendix 3,

# Assessment Planning

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# 2

There are two main levels of waste assessment planning:

- *Annual Planning* (for the entire year's waste assessments), and
- *Block Planning* (for each individual cutblock's waste assessment)

## **2.1 Annual Plan**

An Annual Waste Assessment Plan must be developed for all blocks including road rights-of-way to be waste assessed during the year, and submitted to the District Manager for approval.

The District Manager may exempt a licensee from the annual plan requirement if a majority of the licensee's blocks is assessed using the ocular estimate method.

The annual plan is normally based on a twelve-month calendar year period and should include:

- a list of proposed cutblocks that will be available for waste assessments indicating their licence/CP/block numbers and the chosen reporting unit option for the cutblocks,
- the assessment methods (oculars, parent block, (FSI) full sampling intensity surveys, (RSI) reduced sampling intensity surveys),
- the coefficients of variation proposed for each reporting unit subject to full sampling intensity surveys,
- if block exemption (Section 3.2) is to be used, the proposed parent block(s) (if known) and the related exempted blocks

If the sampling error objective for the previous year sampling was not met, the district manager may instruct the use of a higher coefficient of variation.

The Annual Waste Assessment Plan must be submitted 30 days before the expiry of the current annual plan, or as directed by the District Manager. The District Manager may approve or reject the plan.

The annual plan may be submitted on-line using the waste system.

4. If the approval for an RSI Survey is given, the number of dispersed plots will be determined by using the appropriate tables in this manual. The required coefficient of variation will be 100 percent. The number of dispersed plots, according to the table, will be at "one quarter" (every 4<sup>th</sup> plot) and the required plot size will be at 400 m<sup>2</sup> (11.28 m radius). For partial cutting cutblocks specified under Section 4.7, a smaller plot size may be used. The licensee will check with the district for plot number commencement (i.e., start at either plot #1, #2, #3 or #4).
5. The sampling error will be ignored for the RSI Survey; however, the minimum plot requirement and size must be adhered to.
6. Field measurements and recording requirements for an RSI Survey will be the same as for an FSI Survey as the information will be compiled and used for billing and cut control purposes.
7. If the results of the RSI Survey exceed the prescribed level of avoidable waste, the District Manager may require the licensee to do a FSI Survey at their own expense.

## **3.2 Block Exemption (Using Parent Block Information)**

The block exemption procedure can be used where it is not always practical to measure the waste from every block. This procedure is suited to rights-of-way, salvage blocks, or small individual blocks that are "clones" of other surveyed blocks. The method of accounting for accumulations within exempted blocks is at the discretion of the District Manager.

### **3.2.1 Conditions**

The following conditions must be met in order to exempt blocks from a full survey:

1. The blocks must be 20 ha or less in size.
2. The exempted blocks must have an acceptable parent block \* from which data for waste billing purpose can be extrapolated.
3. The parent block must be surveyed by the full survey procedures.

\* *Parent Block* - a surveyed block that is representative, in terms of the level of waste, to the block being proposed for survey exemption.

### **3.2.2 Procedures**

1. The proposed parent block and the exempted blocks should be identified in the Annual Waste Assessment Plan. For the licensees who chose the Aggregate Option, the proposed exempted blocks should be excluded from the plot to hectare ratio determination.
2. The licensee's application should contain all relevant information on the proposed parent block as well as the block requested for exemption.
3. Field inspections should be undertaken to verify similarity of the proposed parent block to the block requested for exemption.
4. Written approval for exempting blocks will be given by the District Manager.



5. Upon receipt of the District Manager's approval, the licensee shall submit a waste report for the exempted block within sixty (60) days. This report will be based on the survey data from the approved parent block.
6. The data reported for an exempted block will be subject to check survey and used for monetary billing and cut control purposes.
7. Blocks rejected from exemption will be subject to surveys under the RSI, FSI or the Aggregate Option.

### **3.3 Ocular Estimate**

The ocular estimate is designed to reduce surveying costs and administration time on cutblocks. Licensees will be billed for monetary charges as per volumes estimated.

For all Forest Regions, ocular estimates must be submitted and signed off by a licensed surveyor or scaler, RPF or RFT. Where there are no revenue concerns, a district manager may exempt this requirement for minor tenures and woodlot licences.

#### **3.3.1 Ocular Estimate Levels**

The maximum allowable avoidable waste levels for performing ocular estimates are the waste benchmark levels established in Appendix 5, for cutblocks in all forest regions excepting the Coast Forest Region. In the Coast Forest Region, old growth cutblocks are subject to a maximum level of 20 m<sup>3</sup>/ha and second growth cutblocks are subject to a maximum of 10 m<sup>3</sup>/ha of avoidable waste respectively.

If the waste benchmark is exceeded and there is minimal revenue risk, the District Manager may permit the use of oculars.

Where both the representatives of the licensee or the party responsible for ocular and the District Manager agree, standing timber waste volumes may be derived using the ocular estimate method. The average net piece volume contained in the Extended Type Stand and Stock Table in the cruise report may be used to derive the standing timber volume. Grades for the standing trees are assigned using the historical billing history records. In the instances that the billing history records are absent or if an RPF or RFT considers the historical records are unrepresentative of the grade profile on site, grade allocations may be derived by an RPF or RFT based on actual on site examinations.

#### **3.3.2 Conditions**

This procedure can be applied when:

1. The estimated level of avoidable waste on the cutblock meets Section 3.3.1.
2. The volume of waste can be reasonably estimated and there is minimal revenue risk.

If these two criteria cannot be met, a plot sampling survey will be required.

#### **3.3.3 Responsibility**

Similar to full surveys, major licensees and woodlot licensees are responsible for carrying out oculars on their scale based cutting authorities. The District Manager is responsible for conducting oculars on forestry licences to cut (minor and occupant). The Timber

## Waste Volumes

Forest District:				Licensee:			
Timbermark:				RU:		Return Number:	
Licence:		CP:		Block:			
Block Net Area: ① + ② + ③ ha							
Date Primary Logging Completed:		Avoidable Waste Benchmark: m³/ha		Block Leading Species:			
<b>Ocular Estimates</b>							
	DISPERSED		ACCUMULATED		STANDING TREES		TOTAL
Stratum Code *							
Area (ha)	①		②		③		
Avoidable	m³/ha	Total (m³)	m³/ha	Total (m³)	Total (m³)		Total (m³)
Sawlog waste (1)							
Sawlog waste (2)							
Grade 4 (Y)							
Total Avoidable							
Unavoidable							
Sawlog waste							
Grade 4 (Y)							
Total Unavoidable							
Grand Total							
<p>* Refer to Section 5.7.2 of the Provincial Logging Residue and Waste Measurement Procedures Manual.</p> <p>I hereby provide the above estimates in lieu of a waste survey. I agree to the use of these figures for waste monetary billing purposes.</p>							
Additional Comments:							
Surveyor/Scaler Name & No:				RPF/PFT Name and No:			
Signature (Licensee or Representative):				Forest Officer			
Date:							

2006/04

Please be advised that this information may be released under the *Freedom of Information and Protection of Privacy Act*.

**Figure 3.1 Ocular Estimate Form.**

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### 4.3 Sampling Method

There are four assessment methods as outlined in 5.7.2, they are PLOT (P), 100% Measure (S), Ocular Estimate (O), and Estimate Percent (E). Anyone or any combinations of the four assessment methods may be used in a waste assessment.

In both aggregate and cutblock options, the waste volume in the dispersed and accumulation subpopulations is calculated based on fixed-area sample plots laid out systematically. For the estimated or 100 percent piece scale subpopulations, waste volumes are either estimated or 100 percent measure for each specified stratum.

The fixed-area plots are established in a systematic, staggered grid pattern in dispersed types. In roadside accumulations the plot spacing depends on the average width of the accumulation. The grid spacing will also depend on the plot size and number of plots determined for the sub-population.

For accumulations, the licensees have the option of estimating volumes. Plots which fall on hazardous piles should be relocated; however, if unsuccessful, estimates will be allowed. Areas subject to 100 percent measurement or estimation should be typed out on the maps.

This manual prescribes either a cut-block or aggregate option using a combination of either fixed-area plots, estimations and/or 100 percent measure. Any variation from this sampling method requires written approval of the Director, Revenue Branch.

The safety of the surveyor must always take precedence when estimating or measuring plots, including the wearing of proper safety equipment and footwear.

#### 4.3.1 Number of Plots (Sample Size)

The number of plots and maximum sampling error for each sub-population are determined from plot tables. There are two sets of tables each for the Coast and Interior (dispersed and accumulation areas). These tables embody certain underlying assumptions concerning the volume, relative proportions of waste, cruise volume, and are specific to a given plot size.

To use the plot tables, you need the sub-population area and the estimated coefficient of variation (C.V.). This C.V. is specific to the individual plot volumes in that sub-population area.

If no coefficients of variation are available, use a "start up" C.V. estimate of 100 percent for the dispersed and accumulation sub-populations.

Subsequent estimates can be based on actual survey statistics. For the aggregate option, sampling proceeds as each cutblock is logged or becomes available.

#### **4.3.2 Procedure to Determine the Number of Plots**

Determine the minimum number of plots required for each sub-population as follows:

1. Determine the sub-population area (sum of stratum areas in the dispersed *or* accumulation sub-population).
2. Estimate the sub-population coefficient of variation, or use start up values.
3. From the appropriate dispersed or accumulation plot table, read the minimum number of plots required from the body of the table.
4. Read the maximum sampling error from the right-hand column of the table.
5. The minimum number of plots per stratum is 2, based on the sub-population area.
6. For the aggregate option, the number of plots for an *individual block* will be the result of the hectare to plot ratio *for all blocks in the aggregate* divided into the area of the block and rounded up to the nearest whole number, but the minimum of 2 plots per stratum still applies on *each* block.

For example:

If on the aggregate option you have a hectare to plot ratio of 6.2:1 and the area on one of the blocks is 41.5 ha, divide 41.5 by 6.2 to get 6.7; round up to 7 plots. If the number of plots before rounding is less than two, then at least two plots per stratum must be established on that block.

#### **4.3.3 Grid Spacing**

Follow Section 4.3.2 to determine the number of plots required.

For the cutblock option, the number of plots required for each block is taken directly from the appropriate plot table.

For the Aggregate option, the number of plots required for each block is calculated by dividing the gross area of the block by the hectare to plot ratio for the Aggregate, rounding to the nearest whole number.

For both the Cutblock and Aggregate options, the minimum number of plots per cutblock is 2, and the grid spacing is determined for each block.

Table 4-5: Interior - Accumulation Area

ESTIMATED MINIMUM NUMBER OF PLOTS (n)* TO MEET THE SAMPLING ERROR OBJECTIVE ARE SHOWN IN BODY OF TABLE MINIMUM PLOT REQUIREMENT PER STRATUM PER SUB-POPULATION IS TWO (2) -TABLE BASED ON TOTAL WASTE IN SUB-POPULATION = 15% OF CRUISE VOLUME.** -WASTE COMPONENT IN SUB-POPULATION = 9% OF CRUISE VOLUME IN REPORTING UNIT.										
SUB-POP. AREA IN HECTARES (A)	ESTIMATED COEFFICIENT OF VARIATION % (C.V.)									SAMPLING ERROR % S.E. @ .95
	50	60	70	80	90	100	110	120	130	
0.25	2	2	2	2	2	2	2	2	3	N/A
0.50	2	2	2	2	3	3	4	4	5	N/A
0.75	2	2	3	3	4	5	6	7	8	N/A
1	2	3	3	4	5	6	7	9	10	N/A
1.5	3	4	5	6	7	9	11	13	15	N/A
2	4	5	6	8	10	12	14	17	20	N/A
2.5	4	6	8	10	12	15	18	21	24	N/A
3	5	7	9	12	14	18	21	25	29	52
3.5	5	7	9	12	15	18	21	25	29	52
4	5	7	9	12	15	18	21	25	29	52
4.5	5	7	9	12	15	18	21	25	29	52
5	5	7	9	12	15	18	22	25	29	52
5.5	5	7	9	12	15	18	22	25	29	52
6	5	7	9	12	15	18	22	25	30	52
6.5	5	7	9	12	15	18	22	25	30	52
7	5	7	9	12	15	18	22	25	30	52
7.5	5	7	9	12	15	18	22	25	30	52
8	5	7	9	12	15	18	22	25	30	52
9	5	7	9	12	15	18	22	25	30	52
10	5	7	9	12	15	18	22	25	30	52
11	5	7	9	12	15	18	22	26	30	52
12	5	7	9	12	15	18	22	26	30	52
13	5	7	9	12	15	18	22	26	30	52
14	5	7	9	12	15	18	22	26	30	52
15	5	7	9	12	15	18	22	26	30	52
16	5	7	9	12	15	18	22	26	30	52
17	5	7	9	12	15	18	22	26	30	52
18	5	7	9	12	15	18	22	26	30	52
19	5	7	9	12	15	18	22	26	30	52
20	5	7	9	12	15	18	22	26	30	52
22	5	7	9	12	15	18	22	26	30	52
24	5	7	9	12	15	18	22	26	30	52
26	5	7	9	12	15	18	22	26	30	52
28	5	7	9	12	15	18	22	26	30	52
30	5	7	9	12	15	18	22	26	30	52
32	5	7	9	12	15	18	22	26	30	52
34	5	7	9	12	15	18	22	26	30	52
36	5	7	9	12	15	18	22	26	30	52
38	5	7	9	12	15	18	22	26	30	52
40	5	7	9	12	15	18	22	26	30	52

\* Based on 50 square metre plot size. For a different plot size calculate a new coefficient of variation from the following formula and then determine the probable minimum number of plots needed to achieve the sampling error @ .95 using the new C.V.

New C.V. =  $\sqrt{(C^2) * (Y/X)}$   
Where: C = C.V. using old plot size (%)  
Y = old plot size (m<sup>2</sup>)  
X = new plot size (m<sup>2</sup>)

\*\* Cruise volume in reporting unit = cruise volume per hectare (V) \* population area (H).

## **4.6 Road Rights-of-Way**

### **4.6.1 Reporting**

Waste assessments are required on road rights-of-way. Licensees must ensure the waste reported on the road rights-of-way is attributed to the correct timber mark or road permit mark. If a road belongs to a Master Road Permit, then the Master Road Permit mark shall be used.

### **4.6.2 Procedures**

The road right-of-way is the access road leading into the cutblock from the closest previously logged cutblock or the preceding road junction with the main road. There are two surveying options:

1. No plot sampling is required. The area of the road right-of-way area (from edge of the travelled surface to edge of the timber) is included with the dispersed sub-population area of the cutblock.
2. Sample with plots (usually 50 m<sup>2</sup>) in a separate roadside stratum. The stratum code to be used is OT0X.

The procedure for locating the plots is to start from the POC for the cutblock (where the road enters the cutblock) and put in rectangular plots covering the width of the area between the edge of the road and the edge of the timber using the right hand rule.



### 5.1.5 Grading Pieces

Log pieces must be graded according to the rules in the *Scaling Manual* except where the waste rules are different and then waste rules are used.

For example the minimum log length for waste is 3 m instead of the 2.5 m in the *Scaling Manual*.

For more information on the grading rules see the *Scaling Manual*.

### 5.1.6 Visual Estimates

If loose debris cannot be quickly moved away to facilitate measurements in dispersed plots, or if logs and/or branches in landings prevent measuring one of the ends or the length of a log, visually estimate the missing dimension. In order to correctly establish the grade, at least one end must be visible or the piece should not be recorded.

### 5.1.7 Measure Factor

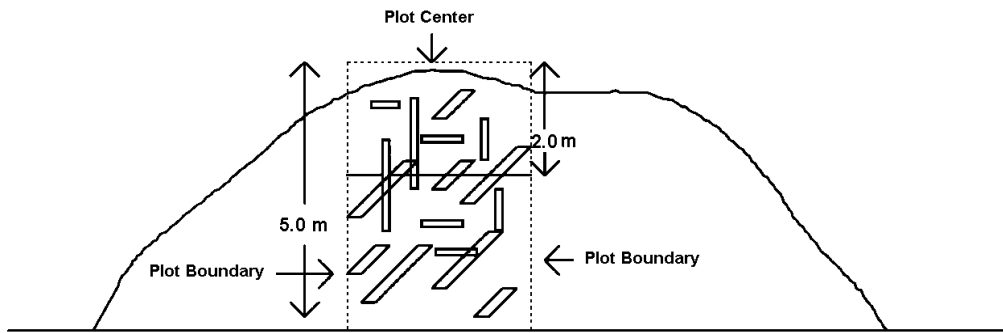
In deep accumulations, it may not be possible to measure or visually estimate each piece. In these cases, first measure and/or visually estimate the material that is accessible.

Then, project the plot boundaries down to the ground and visually estimate what portion of the volumes within the plot boundaries were measured. Record this portion on the plot tally card under "measure %."

This percent is known as the "Measure Factor", and is only applied to the plot method.

Measure as many pieces as possible, even when some dimensions of an individual piece must be estimated.

In the example below: If you were able to measure down approximately 2 m, you would record a measure factor of 40 percent providing that the volumes of waste were spread evenly through the cylinder within the plot boundaries. The measure factor is derived from  $2\text{m}/5\text{m} \times 100\% = 40\%$ .



**Figure 5.1 Measure Factor.**

### **5.1.8 Deductions for Rot**

For material containing rot, measure and record the gross dimensions of the piece (actual size) including rot. In addition, surveyor calculates the volume deduction for rot but records the deduction equivalent in rads and/or metres, along with the most appropriate "decay type".

### 5.3.2.2 Partial Cut

Surveyors should reference appropriate documents that provide the volume percent reduction by either one or more of species, timber type, risk group/tree class or treatment unit for each individual cutblock within the cutting permit or agreement.

Timber volume that is left in excess of the leave volume will be billed as waste subject to the application of the waste benchmarks.

There are at least two methods - recruise, fixed area waste plots, for determining the unharvested standing tree volume in a partial cut. Choose a method that is appropriate for the cutblock.

For a recruise, a licensee must strive to put in a sufficient number of cruise plots that will either meet or exceed the sampling error achieved in the original cruise.

If waste plots are used, the plot size should be 400 m<sup>2</sup>. A licensee must strive to put in a sufficient number of waste plots that will meet or exceed the sampling error objective approved for the reporting unit. The minimum sampling intensity required is at least two plots per stratum or if the cutblock is not stratified, two plots per cutblock.

Once the unharvested standing tree volume has been derived, the timber scale grades will be assigned using the historic billing grade profile of the timber mark for the cutting authority. Only in the absence of the billing history records or if an RPF or RFT considers the records are unrepresentative, grades may be derived by an RPF or RFT on the basis of actual grade compositions of the stand left on site.

The survey results of partial cutblocks should be sponsored by an RPF or RFT. This is to confirm that the partial cut timber harvesting requirements that were previously stated in Schedule B, or the Percent Reduction Report in the Appraisal Cruise Compilation Submission have been met and there are no waste billing concerns on the remaining standing tree volumes. If the block survey result is not sponsored by an RPF/RFT, the licensee may be directed by the District Manager to recruise or resurvey the residual standing trees if a field check reveals a probable deficiency of the timber volume harvested.

### 5.3.2.3 Unharvested Cutblocks

The District Manager may bill an unharvested cutblock in an expired, surrendered or cancelled cutting permit or authority. The billings will be made on the basis of the net cruise volume attributed to the unharvested cutblock.

Once the net cruise volume is determined, the grade allocations will be based on the historic billing grade profile of the timber mark for the cutting authority. Only in the absence of the billing history records or if an RPF or RFT considers the records are unrepresentative, grades may be derived by an RPF or RFT based on examinations of the actual grade compositions of the stand left on site.

### 5.3.3 Slabs

A slab is defined as any non-round piece with less than half (1/2) of its original circumference remaining, a minimum thickness of 10 cm and an average diameter equal to or larger than the timber merchantability specification diameter. The *only* exception is mature red cedar (on the Coast only) which must have a minimum thickness of 15 cm to be measured or recorded.

Slabs are measured, graded and recorded as a “Log” (L) if they have a minimum thickness of at least 10 cm for at least 3 m in length or as “Bucking Waste” (W) if they are bucked at the butt end or both ends and have a minimum thickness of a least 10 cm for less than 3 m but at least a tenth (0.1) of a metre.

Chapter 5 of the *Scaling Manual* should be referred to for measurement procedures for slab ends in various shapes (i.e., semi-circle, quadrant, sector, segment, etc). Alternatively, the following method is continuously accepted for computing slab diameters, for waste purposes.

Using Figure 5.3, slab diameters are computed using the following steps:

1. Measure and average 3 thickness.

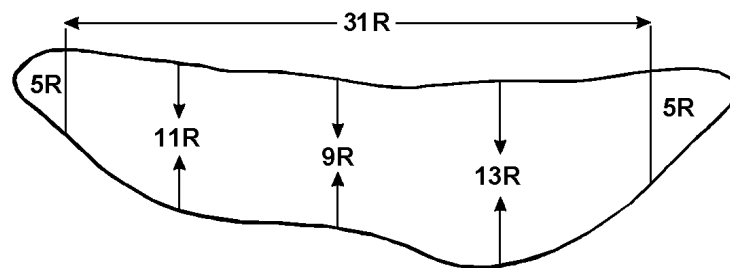
i.e.,  $11 + 9 + 13 = 33/3 = 11$  rads

2. Measure 1 width between 5 rad edges.

i.e., Width = 31 rads

3. Average the thickness and the width.

i.e.,  $11 + 31 = 42/2 = 21$  rads\*



**Figure 5.3 Measuring Slabs.**

### 5.3.4 Stumps

A stump is defined as any piece with more than half (1/2) of its original circumference remaining, less than 3.3 m in length and still attached to the roots. The length is to be

## 6.2 Check Survey Standards

Check surveys verify that the field measurements are taken and recorded correctly. The check survey will re-measure all the pieces that should have been measured in the original plot. The survey or parts of a survey of a cutblock or a reporting unit can be accepted or rejected based on the results of the check survey.

In addition to meeting the requirements in Section 6.3 (Maximum Allowable Errors), waste surveys should meet the minimum sampling intensities requirements.

Field Services staff may check more than the minimum requirement if it is necessary to ensure compliance with the manual standards (ie., previous check(s) showed borderline acceptable work).

The Ministry of Forests waste check surveys standards are:

### 6.2.1 Number of Blocks

#### 1. Cutblock Option.

To check at least 10 percent of the measured cut blocks to a minimum of at least one cut block. This applies to both major licensees and the BC Timber Sales cutblocks.

- To check all plot cards, reports, and data entry.

#### 2. Aggregate Option.

To check a minimum of 10 percent of the measured cut blocks in each reporting unit to a minimum of at least one block.

- To check 10 percent of the plot cards for every block against the plot listing report for data entry errors or incorrect methods of recording plot information.

#### 3. Ocular Estimates

- To check at least 10 percent of the available cutblocks.

### 6.2.2 Check Requirements

In check surveys, the following number of plots and items are re-measured:

#### 1. Cutblock Option.

*Dispersed Area:*

- at least 10 percent of the plots in each selected block,
- a minimum of two plots or at least 1 plot per stratum, whichever is greater,
- check and account for all standing trees not harvested,
- check plots are properly located.

*Accumulations:*

- at least 10 percent of the plots in each selected block,
- a minimum of 2 plots, or at least 1 plot per stratum, whichever is greater

2. Aggregate Option.

- at least 10 percent of the plots in the selected blocks must be checked,
- at least 2 plots per stratum, whichever is greater in each selected block,
- check plots are properly located, and
- check and account for all standing trees within the selected cutblock.

If more than one crew conduct surveys within the reporting unit, each crew should be checked on a weighted basis.

3. Ocular Estimates

- check reported estimates are representative of the waste levels on site, and
- check and account for all standing trees not harvested.

## **6.4 Acceptability of Block Results**

If the net volume of the checked plots falls within the specified variance, then the survey is deemed to be acceptable unless the procedures specified in the manual were not adhered to (i.e., incorrect area used, log decks not included in the survey). Any obvious bias in grades and/or waste class which affect monetary billing will result in rejection of the survey.

If the net volume parameter is not met then the check survey will pinpoint the areas of weakness and allow that portion or entire survey to be redone.

If more than 30 percent of the checked cutblocks within a reporting unit are rejected, the district manager may order that all the cutblocks within that reporting unit be resurveyed if the same surveyor(s) worked on all blocks.

Rejection of a survey will count against the waste surveyor for the purposes of validation of their certification. If more than one (1) waste surveyor worked on a cutblock, the rejection will count against the waste surveyor whose fieldwork caused the rejection.

## **6.5 Non-Compliance With Check Survey Standards**

If the licensee's or contractor's survey work is rejected after a check survey, the District Manager may order:

- a second survey to replace the original waste survey, or
- the licensee or contractor to re-survey those portions of the original survey that were rejected.

The licensee or contractor will be responsible for any costs they incur in the re-survey.



#### 4. Sampling Statistics:

##### a. Cut Block Option only.

- i. For blocks over 25 ha check that the sampling error requirement for the dispersed area has been met.

The sampling error requirement for blocks under 25 ha has been waived.

- ii. For blocks that have at least 3 ha of accumulation piles check that the accumulation sampling error requirement has been met.

The sampling error requirement for blocks with less than 3 ha of accumulations has been waived.

##### b. Aggregate Option only

- i. The sampling statistics and sampling summary reports don't need to be checked until the entire aggregate has been completed.
- ii. If the aggregate has been completed check that the sampling error requirements have been met.

If the sampling error requirements have not been met, check whether the licensee used a reasonable C.V. to determine the number of plots required and whether they established the required number of plots.

If the answer is yes then the aggregate is acceptable.

If the answer is no, a higher C.V. may be required from the licensee before approving the licensee's Annual Waste Assessment Plan for the following year.

#### 5. FS 702 Waste Volume Estimate

Check the following:

- a. The waste surveyor number and return number (each subsequent FS 702 is incremented by one) have been filled out and that the waste surveyor has a valid Waste Surveyor Licence or Scaling Licence Number. If not, check for sponsoring forestry professional's name and number if plot surveys are submitted.

The old FS 72 format is no longer acceptable and must be converted to the current FS 702 format as in Figure 7.1.

## **7.4 Processing Waste Volume Estimate (FS 702)**

Once checking is completed as per Section 7.3.1, the ministry will obtain and code the applicable waste rates on the FS 702.

### **7.4.1 Waste Rate**

The application of a waste rate is dependent on whether there has been timber harvesting on a cutting authority. If timber has been harvested on a cutting authority, then a waste rate is determined and applied on a cutblock basis.

#### **1. Cutblocks with Harvesting**

For cutblocks with harvesting, a waste rate is calculated for the cutblock using the weighted average stumpage rate charged for the sawlogs (graded sawlogs on the Coast, and grade code blank sawlogs and/or grade code 1 and 2 sawlogs in the Interior) from invoices issued for a twelve-month period in respect of timber harvested under the applicable timbermark. The twelve-month period ends the month after the month that primary logging was completed for the cutblock. This applies to dispersed waste, accumulations and standing timber within the cutblock. Remaining areas of standing timber within the cutblock, that are left unharvested at the expiry, surrender, termination or cancellation of the cutting authority, would be waste billed using the same method, that is, the waste rate is based on the primary logging completion date for the cutblock. Refer to Appendix 3.1 for a description of determining the waste rate for cutblocks with harvesting.

Note that cutblocks may be split for waste assessment purposes (refer to page 5-38).

#### **2. Cutblocks with No Harvesting but Harvesting has Occurred on the Cutting Authority**

If there has been no harvesting on the cutblock but there has been harvesting for the cutting authority, then the waste rate for the cutblock is derived using the average of the cutting authority's four quarterly timber appraisal stumpage rate (plus any bonus and levies where applicable) in effect during the twelve-months preceding the date of cutting authority's expiry, surrender, termination or cancellation, as the case may be. Refer to Appendix 3.2 for a description of determining the waste rate for cutblocks where no harvesting has taken place but there has been harvesting from the cutting authority.

#### **3. Cutblocks with No Harvesting and No Harvesting has Occurred on the Cutting Authority**

If there has been no harvesting on the cutblock, and there has been no harvesting on the cutting authority, then waste billings do not apply to cutblocks upon expiry, surrender, termination or cancellation of the cutting authority, as the case may be.

## 7.5 Interior Log Grade Changes

The Interior log grade changes are scheduled to take effect April 1, 2006. Areas logged prior to April 1, 2006 will be waste surveyed using the grades in effect before the grade change subject to conditions specified below.

The cut blocks that will be affected are:

1. Blocks that are harvesting complete prior to April 1, 2006, but are surveyed and/or entered into the Waste System after April 1, 2006.
2. Blocks with areas partially harvested prior to April 1, 2006.

For those affected cut blocks, licensees have until April 30, 2006 to submit to the District Manager (or for timber sale licence, the Timber Sale Manager) a listing of cut blocks where timber harvesting is completed and/or partially completed as of March 31, 2006. The listing for completed cublocks must include: Licence, CP, Block #s, Geographic Location, Block net area, and in addition for partially completed blocks, the areas harvested prior to the grade change, and maps clearly showing the harvested areas.

When the survey data for the cut blocks in the listing are entered into the Waste System, **the Survey Date on screen 102 must be artificially changed by the licensee to March 13, 2006.** This step will enable the grade listing in effect prior to April 1, 2006. When these blocks are submitted, the actual survey date must be entered on the comment box. Additionally, for administrative purposes, **the primary logging completion date must be entered with a date no later than February 28, 2006** for the purpose of the waste rate twelve-month average calculations.

**Conditions:**

The survey results for both havested and partially harvested block in the listing must be submitted within sixty days from the date of notification or snow free. Those blocks that are submitted late must use the log grades in effect April1, 2006.

Forest Districts will monitor on the basis of the survey date and the comments entered for ensuring the cut blocks submitted are indeed blocks eligible to use the grades in effect prior to April 1, 2006.

Any waste created after April 1, 2006, must be graded using the new grades in effect April 1, 2006.

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Bias		Measurement bias occurs when the mean of the measured values differs from the mean of the actual values.
		Sampling bias occurs when certain sampling units are more likely to be included than others (lack of randomness).
		Statistical bias occurs when the expected value of the statistic differs from the population parameter.
Breakage		Breakage is defined as any piece, meeting the minimum diameter of the cutting authority, which is shorter than 3 m in length and broken at the large end or at both ends. Normal breakage is not usually recorded.
Bucking Waste		Bucking waste is defined as any pieces less than 3 m in length that has been cut at the large end, or at both ends. It has been cut through improper or careless bucking practices.
Chunk		A short piece of waste that has resulted from end trimming logs, or from breaking logs during extraction operations.
Closure Error		The square root of the sum of the squared sum of latitudes plus the squared sum of departures, which may also be expressed as a ratio to or percent of the perimeter length. A closure error of 1 percent will result in an area error of approximately 2 percent.
Coast		This refers to the Coast Forest Region.
Coefficient of Variation		A relative measure of variation, equal to the sample standard deviation expressed as a percentage of the sample mean.
Confidence		An expression of accuracy of sample estimates, usually assessed by confidence intervals, a specified proportion of which, such as 95 percent confidence intervals, contain the true population parameters.

Contractual Stump Height	The allowed stump height, specified in the minimum utilization standards of the cutting authority, as measured from the ground on the high side.
Cutblock	An area within which the holder of an agreement is authorized to harvest timber, as identified in:  a) a cutting permit, or b) the agreement, if the agreement does not provide for cutting permits.
Cutblock Option	Each cutting block will be sampled as a separate population, and reported as a separate waste reporting unit.
Cut Control	The Ministry of Forests procedure for accounting the volumes of timber harvested under a licence as specified under Part 4 of the <i>Forest Act</i> .
Cutting Authority	Cutting Authority means a Timber Sale Licence, a Licence to Cut, a Road Permit, or a cutting permit issued under a Tree Farm Licence, Forest Licence, Timber Licence or a Woodlot Licence.
Dry 4 or Y	Dead and dry lumber reject that is not measured in waste.
Fixed-area Plot Sampling	A sampling method where each plot within a stratum is exactly the same size and shape.
Full Sampling Intensity (FSI)	A full sampling intensity survey on which a sampling error or hectare to plot ratio must be met as specified in Tables 4-2, 4-3, 4-4 and 4-5.
High Side (stumps)	The position where the ground meets the stump on the uphill side, ignoring any root flare, obstacles, vegetation, and loose matter that has accumulated at the base of the tree. Length measurements usually start from 30 cm above this point.
Interior	This refers to the Southern and the Northern Interior Regions.

## Appendix 3 Waste Rate Determination

The determination of the waste rate is dependent on whether there has been timber harvesting on a cutblock.

### A3.1 Cutblocks with Harvesting

For cutblocks with harvesting, the waste rate for the cutblock is derived from the weighted average stumpage rate charged for the sawlogs (graded sawlogs on the Coast, grade code blank sawlogs and/or grade code 1 and 2 sawlogs in the Interior) in invoices issued during the 12-month period ending one month after the month in which primary logging on the cutblock area was completed. The formula to be used is:

$$WR = TS/TV$$

Where:

WR	=	Waste Rate for the cutting authority.	
TS	=	Total billed sawlog stumpage (sum of Upset Stumpage*, and Bonus Bid) for the twelve-months prior to one month after the month primary logging was declared completed on the cutblock.	
		*	Include silviculture and development levies.
TV	=	Total billed volume (accumulated volume in cubic metres that derived the total billed stumpage for the sawlogs) for the twelve-months prior to one month after the month primary logging was declared completed on the cutblock.	

### A3.2 Cutblocks with No Harvesting

If there has been no harvesting on the cutblock, but there has been harvesting from the cutting authority, then the waste rate for the cutblock is derived using the average of the cutting authority's four quarterly timber appraisal stumpage rates (plus any bonus and levies where applicable) in effect during the twelve-months preceding the date of the cutting authority's expiry, surrender, termination or cancellation, as the case may be. The formula to be used is:

$$WR = ACASR$$

Where:

WR	=	Waste Rate for the cutblock.
ACASR	=	Average Cutting Authority Stumpage Rate over the four quarters preceding the expiry, surrender, termination or cancellation date.

#### Example 1

If Cutting Authority A (CP A) became effective on September 5, 2003, and expires on September 4, 2005, then the ACASR is the simple average of the four quarterly stumpage rates for CP A as at October 1, 2004, January 1, 2005, April 1, 2005 and July 1, 2005.

#### Example 2

If Cutting Authority B (CP B) became effective on April 20, 2005, and is surrendered on September 5, 2005, then the ACASR is the simple average of the April 20, 2005 and July 1, 2005 stumpage rates for CP B.

### A3.3 Deciduous Waste Rate

For deciduous species, the waste rate is either the appraised stand as a whole reserve rate, or if there is no appraised rate, use the specified fixed rate for the species in the Coast or Interior Appraisal Manuals, plus any bonus bid and levies where applicable.



## Appendix 4 Riparian Management Zone (RMZ)

### A4.1 Assessment Method

For waste assessments to be conducted within the riparian management zone, the assessment method should commensurate with the silvicultural system used, as follows:

•	single tree selection	-	100 percent piece scale, or 50 m <sup>2</sup>
•	group selection	-	100 percent piece scale or (circular or rectangular) plot of 50 to 400 m <sup>2</sup> that best fits the group selection harvested area.

Refer to Section 4.7 for assessing partial cutting (variable retention) cutblocks, and Section 5.7.2 for stratum codes.

### A4.2 Stream Clean-out

For stream clean-out conducted in accordance with the Riparian Management Area Guidebook, the waste classification procedures are as follows:

1. Where a log is left across a creek, classify the log as unavoidable for environmental reasons.
2. If a creek was machine cleaned and it was reasonable to recover the log pieces, classify the pieces as avoidable.
3. If a creek was hand cleaned and the log was bucked into small segments and thrown out of the creek channel, classify the pieces as unavoidable.

## **Appendix 5 Waste Benchmarks**

### **1. Benchmarks**

Waste benchmarks will be in effect until April 1, 2007.

On an individual cut block basis, the following waste benchmarks in cubic meters per hectare will be used for monetary billing of avoidable waste:

Coast	Immature	Mature
Normal	10 m <sup>3</sup> /ha	35 m <sup>3</sup> /ha

Interior	Dry Belt	Transition Zone	Wet Belt
Normal	4 m <sup>3</sup> /ha	10 m <sup>3</sup> /ha	20 m <sup>3</sup> /ha

The waste benchmark volume of a cutblock is derived by multiplying the value of the benchmark with the total of the dispersed, accumulation and standing trees sub population areas reported in a waste assessment of the cutblock.

### **2. Benchmark Calculations and Billings**

#### **a. Coast**

Avoidable waste volumes in sawlog grades (X or better) from the dispersed, accumulated and the standing tree subpopulations of the cutblock will be applied to the benchmarks.

Where the avoidable waste volumes in sawlog grades are below the established benchmark for the cutblock, no monetary billing of avoidable waste in sawlog grades will be made.

Where the avoidable waste volumes in sawlog grades are above the established benchmark for the cutblock, monetary billings will be made on the sawlog grade volumes exceeding the benchmark.

Avoidable waste volumes in Y grade will not be applied to the benchmark but will be billed monetarily in all cases.

#### **b. Interior (the application of waste benchmarks is dependent on the survey date)**

##### **i. Survey date before April 1, 2006.**

Avoidable waste volumes in sawlog grade and catastrophic grade 3 from the dispersed, accumulated and the standing tree subpopulations of the cutblock will be applied to the benchmark. Catastrophic grade 3 will be applied to the benchmark first followed by the sawlog grade.

Where the avoidable waste volumes in sawlog grades and catastrophic grade 3 are below the established benchmark for the cutblock, no monetary billing of avoidable waste in sawlog and catastrophic grade 3 will be made.

Where the avoidable waste volumes in sawlog grade and catastrophic grade 3 are above the established benchmark for the cutblock, monetary billings will be made on the sawlog and the catastrophic grade 3 volumes exceeding the benchmark.

Avoidable waste volumes in endemic grade 3, and grade 4 will not be applied to the benchmark but will be billed monetarily in all cases.

ii. Survey date on or after April 1, 2006

Avoidable waste volumes in sawlog grades (grade 1 and 2) from the dispersed, accumulated and standing tree subpopulations of the cutblock will be applied to the benchmarks.

Where the avoidable waste volumes in sawlog grades are below the established benchmark for the cutblock no monetary billing of avoidable waste in sawlog grades will be made.

Where the avoidable waste volumes in sawlog grades are above the established benchmark for the cutblock, monetary billings will be made on the sawlog grade volumes exceeding the benchmark.

Avoidable waste volumes in grade 4 will not be applied to the benchmark but will be billed monetarily in all cases.

3. Benchmark Eligibility

All cutblocks where primary logging had been completed after January 1, 1999 will qualify for the waste benchmarks.

The benchmarks are administered on an individual cut block basis, regardless of whether the cutblock is in the Cutblock, the Aggregate or the Ocular Reporting Unit. Therefore, each cut block must be individually assessed to determine whether the avoidable waste within the cutblock is above or below the benchmark.

No waste benchmarks will be applied to log decks that in the determination of a forest officer are subject to scaling at a scale site or being field scaled. Such log decks must be clearly marked by the licensee and not to be included in the waste assessment.

Waste benchmarks do not apply to the unharvested cutblocks.

No waste benchmark will be applied to an area of a cutblock where the wasted timber volume compromised the site-specific forest management objective(s). The area must be delineated, waste assessed and billed separately from the remaining area of the cutblock.







 <b>BRITISH COLUMBIA</b>	<b>COAST</b> <b>Worksheet for Waste Billing Against Benchmarks</b>	Ministry of Forests	
<b>To be Completed by Licensees</b>			
Licence No.	CP No.	Cut Block	
Timber Mark	Reporting Unit No.		
Primary Logging Completion Date	Cut Block Net Area <span style="float: right;">ha</span>		
Location	Stand/Site Type		
<b>Calculations</b>			
Avoidable waste (sawlog)	=		M <sup>3</sup> /ha..... (A)
Established benchmark	=		M <sup>3</sup> /ha..... (B)
(A) - (B)	=		M <sup>3</sup> /ha..... (C)
If (C) < or = 0.0000, stop			
If (C) > 0.0000, proceed as follows:			
Waste Monetary Reduction Factor (WMRF) =	(C)/(A) =		.....(D) <small>(to four decimals)</small>
<b>To be Completed by Forest Service</b>			
<b>Processing</b>			
If (C) is < or = 0.0000, on FS 702, code:			
Avoidable all species sawlogs (X or better):	\$0.00/m <sup>3</sup>		
Avoidable all species grade Y:	\$0.25/m <sup>3</sup>		
Unavoidable all species all grades:	\$0.00/m <sup>3</sup>		
If (C) is > 0.0000, request average sawlog rate from HBS			
Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	.....(E)	
Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	.....(F)	
On FS 702, code			
Avoidable coniferous species sawlogs (D x E) =	\$ _____ /m <sup>3</sup>		
Avoidable deciduous species sawlogs: (D x F) =	\$ _____ /m <sup>3</sup>		
Avoidable all species grade Y: \$0.25/m <sup>3</sup>			
Unavoidable all species all grades: \$0.00/m <sup>3</sup>			
Approved by Forest Officer (signature)		Date	



Figure A5.1 Sample of Worksheet for Waste Billing Against Benchmarks (Coast).

	<b>INTERIOR ENDEMIC</b> <b>Worksheet for Waste Billing Against Benchmarks</b>	Ministry of Forests 
<b>To be Completed by Licensees</b>		
Licence No.	CP No.	Cut Block
Timber Mark	Reporting Unit No.	
Primary Logging Completion Date	Cut Block Net Area ha	
Location	Stand/Site Type	
<b>Calculations</b>		
Avoidable Waste:		
Sawlog	=	_____ M <sup>3</sup> /ha.... ( A )
Grade 3	=	_____ 0 _____ M <sup>3</sup> /ha.... ( B )
Establish benchmark	=	_____ M <sup>3</sup> /ha.... ( C )
[ ( A ) + ( B ) ] - ( C )	=	_____ M <sup>3</sup> /ha.... ( D )
If ( D ) < or = 0.0000, stop		
If ( D ) > 0.0000, proceed as follows:		
Waste Monetary Reduction Factor		
(WMRF) =	$\frac{D}{A}$	= _____ ..... ( E ) (to four decimals)
<b>To be Completed by Forest Service</b>		
<b>Processing</b>		
If ( D ) is < or = 0.0000, on FS 702, code:		
Avoidable all species sawlogs:		\$0.00/m <sup>3</sup>
Avoidable all species grade 3:		\$0.25/m <sup>3</sup>
Avoidable all species grade 4:		\$0.25/m <sup>3</sup>
Unavoidable all species all grades:		\$0.00/m <sup>3</sup>
If ( D ) is > 0.0000, request average sawlog rate from HBS		
Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	..... ( F )
Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	..... ( G )
On FS 702, code		
Avoidable coniferous species sawlogs ( E x F ) =	\$ _____ /m <sup>3</sup>	
Avoidable deciduous species sawlogs: ( E x G ) =	\$ _____ /m <sup>3</sup>	
Avoidable all species grade 3: \$0.25/m <sup>3</sup>		
Avoidable all species grade 4: \$0.25/m <sup>3</sup>		
Unavoidable all species all grades: \$0.00/m <sup>3</sup>		
Approved by Forest Officer (signature)		Date



**Figure A5.2a Sample of Worksheet for Waste Billing Against Benchmarks (Interior Endemic) for Blocks Surveyed before April 1, 2006.**

 <b>INTERIOR CATASTROPHIC</b> <b>Worksheet for Waste Billing Against Benchmarks</b>		Ministry of Forests 																
To be Completed by by Licensees																		
Licence No.	CP No.	Cut Block																
Timber Mark	Reporting Unit No.																	
Primary Logging Completion Date	Cut Block Net Area <span style="float: right;">ha</span>																	
Location	Stand/Site Type																	
<b>Calculations</b>																		
Avoidable Waste: <table style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 40%;">Sawlog</td> <td style="width: 10%;">=</td> <td style="width: 40%;">_____ M<sup>3</sup>/ha..... ( A )</td> </tr> <tr> <td>Grade 3</td> <td>=</td> <td>_____ M<sup>3</sup>/ha..... ( B )</td> </tr> <tr> <td>Establish benchmark</td> <td>=</td> <td>_____ M<sup>3</sup>/ha..... ( C )</td> </tr> <tr> <td><math>[(A) + (B)] - (C)</math></td> <td>=</td> <td>_____ M<sup>3</sup>/ha..... ( D )</td> </tr> </table> <p style="margin-top: 10px;">If ( D ) &lt; or = 0.0000, stop</p> <p style="margin-top: 10px;">If ( D ) &gt; 0.0000, proceed as follows:</p> <p style="margin-top: 10px;">Waste Monetary Reduction Factor</p> <p style="margin-top: 10px;">(WMRF) = <math>\frac{D}{A}</math> = _____ .....( E )  <small>(to four decimals)</small></p>			Sawlog	=	_____ M <sup>3</sup> /ha..... ( A )	Grade 3	=	_____ M <sup>3</sup> /ha..... ( B )	Establish benchmark	=	_____ M <sup>3</sup> /ha..... ( C )	$[(A) + (B)] - (C)$	=	_____ M <sup>3</sup> /ha..... ( D )				
Sawlog	=	_____ M <sup>3</sup> /ha..... ( A )																
Grade 3	=	_____ M <sup>3</sup> /ha..... ( B )																
Establish benchmark	=	_____ M <sup>3</sup> /ha..... ( C )																
$[(A) + (B)] - (C)$	=	_____ M <sup>3</sup> /ha..... ( D )																
To be Completed by Forest Service																		
<b>Processing</b>																		
If ( D ) is < or = 0.0000, on FS 702, code: <table style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 60%;">Avoidable all species sawlogs:</td> <td style="width: 40%;">\$0.00/m<sup>3</sup></td> </tr> <tr> <td>Avoidable all species grade 3:</td> <td>\$0.00/m<sup>3</sup></td> </tr> <tr> <td>Avoidable all species grade 4:</td> <td>\$0.25/m<sup>3</sup></td> </tr> <tr> <td>Unavoidable all species al grades:</td> <td>\$0.00/m<sup>3</sup></td> </tr> </table>			Avoidable all species sawlogs:	\$0.00/m <sup>3</sup>	Avoidable all species grade 3:	\$0.00/m <sup>3</sup>	Avoidable all species grade 4:	\$0.25/m <sup>3</sup>	Unavoidable all species al grades:	\$0.00/m <sup>3</sup>								
Avoidable all species sawlogs:	\$0.00/m <sup>3</sup>																	
Avoidable all species grade 3:	\$0.00/m <sup>3</sup>																	
Avoidable all species grade 4:	\$0.25/m <sup>3</sup>																	
Unavoidable all species al grades:	\$0.00/m <sup>3</sup>																	
If ( D ) is > 0.0000, request average sawlog rate from HBS <table style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 50%;">Average coniferous sawlog rate (HBS) =</td> <td style="width: 20%;">\$ _____ /m<sup>3</sup></td> <td style="width: 30%;">.....( F )</td> </tr> <tr> <td>Deciduous sawlog rate =</td> <td>\$ _____ /m<sup>3</sup></td> <td>.....( G )</td> </tr> </table> <p style="margin-top: 10px;">On FS 702, code</p> <table style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 50%;">Avoidable coniferous species sawlogs ( E x F ) =</td> <td style="width: 50%;">\$ _____ /m<sup>3</sup></td> </tr> <tr> <td>Avoidable deciduous species sawlogs: ( E x G ) =</td> <td>\$ _____ /m<sup>3</sup></td> </tr> <tr> <td colspan="2">Avoidable all species grade 3: \$0.00/m</td> </tr> <tr> <td colspan="2">Avoidable all species grade 4: \$0.25/m<sup>3</sup></td> </tr> <tr> <td colspan="2">Unavoidable all species all grades: \$0.00/m<sup>3</sup></td> </tr> </table>			Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	.....( F )	Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	.....( G )	Avoidable coniferous species sawlogs ( E x F ) =	\$ _____ /m <sup>3</sup>	Avoidable deciduous species sawlogs: ( E x G ) =	\$ _____ /m <sup>3</sup>	Avoidable all species grade 3: \$0.00/m		Avoidable all species grade 4: \$0.25/m <sup>3</sup>		Unavoidable all species all grades: \$0.00/m <sup>3</sup>	
Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	.....( F )																
Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	.....( G )																
Avoidable coniferous species sawlogs ( E x F ) =	\$ _____ /m <sup>3</sup>																	
Avoidable deciduous species sawlogs: ( E x G ) =	\$ _____ /m <sup>3</sup>																	
Avoidable all species grade 3: \$0.00/m																		
Avoidable all species grade 4: \$0.25/m <sup>3</sup>																		
Unavoidable all species all grades: \$0.00/m <sup>3</sup>																		
Approved by Forest Officer (signature)	Date																	

**Figure A5.2b Sample of Worksheet for Waste Billing Against Benchmarks (Interior Catastrophic where Avoidable Grade 3 is less than Waste Benchmark) for Blocks Surveyed before April 1, 2006.**

 <b>INTERIOR CATASTROPHIC</b> <b>Worksheet for Waste Billing Against Benchmarks</b>		Ministry of Forests 	
<b>To be Completed by Licensees</b>			
Licence No.		CP No.	Cut Block
Timber Mark		Reporting Unit No.	
Primary Logging Completion Date		Cut Block Net Area ha	
Location		Stand/Site Type	
<b>Calculations</b>			
Avoidable Waste:			
Grade 3	=	_____ M <sup>3</sup> /ha.....	( A )
Establish benchmark	=	_____ M <sup>3</sup> /ha.....	( B )
( A ) - ( B )	=	_____ M <sup>3</sup> /ha.....	( C )
Waste Monetary Reduction Factor			
(WMRF) =	$\frac{C}{A}$	= _____	.....( D )
		(to four decimals)	
<b>To be Completed by Forest Service</b>			
<b>Processing</b>			
Request average sawlog rate from HBS			
Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	.....( F )	
Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	.....( G )	
On FS 702, code			
Avoidable coniferous species sawlogs ( F ) =	\$ _____ /m <sup>3</sup>		
Avoidable deciduous species sawlogs: ( G ) =	\$ _____ /m <sup>3</sup>		
Avoidable all species grade 3: \$0.25/m <sup>3</sup> x D =	\$ _____ /m <sup>3</sup>		
Avoidable all species grade 4: \$0.25/m <sup>3</sup>			
Unavoidable all species all grades: \$0.00/m <sup>3</sup>			
Approved by Forest Officer (signature)		Date	

*Figure A5.2c Sample of Worksheet for Waste Billing Against Benchmarks (Interior Catastrophic where Avoidable Grade 3 is greater than or equal to Waste Benchmark) for Blocks Surveyed before April 1, 2006.*

	<h2 style="margin: 0;">INTERIOR</h2> <h3 style="margin: 0;">Worksheet for Waste Billing Against Benchmarks</h3>	Ministry of Forests 
To be Completed by Licensees		
Licence No.	CP No.	Cut Block
Timber Mark	Reporting Unit No.	
Primary Logging Completion Date	Cut Block Net Area <span style="float: right;">ha</span>	
Location	Stand/Site Type	
<b>Calculations</b>		
Avoidable waste (sawlog) (grades 1 and 2)	= _____	M <sup>3</sup> /ha..... (A)
Established benchmark	= _____	M <sup>3</sup> /ha..... (B)
(A) - (B)	= _____	M <sup>3</sup> /ha..... (C)
If (C) < or = 0.0000, stop		
If (C) > 0.0000, proceed as follows:		
Waste Monetary Reduction Factor (WMRF) =	(C)/(A) = _____	.....(D) <small>(to four decimals)</small>
To be Completed by Forest Service		
<b>Processing</b>		
If (C) is < or = 0.0000, on FS 702, code:		
Avoidable all species sawlogs (grades 1 and 2):	\$0.00/m <sup>3</sup>	
Avoidable all species grade 4:	\$0.25/m <sup>3</sup>	
Unavoidable all species all grades:	\$0.00/m <sup>3</sup>	
If (C) is > 0.0000, request average sawlog rate from HBS		
Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	.....(E)
Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	.....(F)
On FS 702, code		
Avoidable coniferous species sawlogs (D x E) =	\$ _____ /m <sup>3</sup>	
Avoidable deciduous species sawlogs: (D x F) =	\$ _____ /m <sup>3</sup>	
Avoidable all species grade 4: \$0.25/m <sup>3</sup>		
Unavoidable all species all grades: \$0.00/m <sup>3</sup>		
Approved by Forest Officer (signature)		Date

**Figure A5.2d Sample of Worksheet for Waste Billing Against Benchmarks for Blocks  
Surveyed after April 1, 2006.**