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In the LCIA

No. 111790

THE UNITED STATES OF AMERICA,

Claimant,

v.

CANADA,

Respondent.

UNITED STATES POST HEARING BRIEF

NON-CONFIDENTIAL VERSION

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INTRODUCTION

1. The evidence adduced at the hearing of this dispute confirmed that prior to 2006, British Columbia charged a flat, low rate for most if not all mountain pine beetle (MPB) timber; then in 2006, British Columbia (BC) instituted reforms to change fundamentally the pricing of this timber—reforms that were specifically intended to sell most MPB timber at more market-sensitive prices.¹ Despite these reforms, BC has resumed pricing most MPB timber at the flat, low rate. This change is neither a move toward a more market-based system, nor one that maintains the extent to which the pricing reflects market conditions. It is, in fact, a return to the old system—a system that Canada acknowledged, as part of a warranty in the 2006 Softwood Lumber Agreement (SLA), was not as sensitive to market conditions.² It is this return that circumvents Canada's commitments under the SLA.

2. During the hearing, Canada never acknowledged BC's reversion to the pre-2006 world. It merely repeated its untenable claim that an increase in longer-dead timber explains the rise in Grade 4, and that longer-dead timber can be made into large quantities of lumber while at the same time failing the 50/50 test in record numbers.³ But the rise in longer-dead timber cannot explain the dramatic increase in Grade 4 timber. Rather, as the hearing testimony confirmed, the changing profile of the MPB harvest was expected and accounted for in the 2006 reforms. Even more important, all of the contemporaneous scientific studies performed during and after the 2006 reforms confirm

¹ C-20, CAN-000442; C-22.

² SLA, art. XVII 4(b).

³ Tr. 136:5-137:2; 1645:16-17.

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that most MPB timber is suitable to be made into lumber and should be Grades 1 or 2 until it is at least seven to eight years dead—even Canada’s witnesses confirmed this.

3. But Canada generally ignored all of this evidence, and when forced to confront it on cross-examination, Canada’s witnesses disavowed their own documents, including government documents. The sole piece of evidence Canada offered in support of its theory did not come in the form of contemporaneous evidence—scientific or otherwise. Instead, it came from Canada’s long-time economist, Professor Joseph Kalt, who determined—using a facially flawed regression analysis—that all of the BC provincial documents, and all of the scientific evidence confirming the intent and expectations of those documents, amounted to nothing at all.

4. By relying on only Professor Kalt’s analysis, to the exclusion of the documentary and witness testimony, Canada never acknowledged what was really going on in BC before, during, and after 2006, presumably because the evidence confirms that most of the Grade 4 timber should have been graded and sold as Grades 1 or 2.

5. First, both Canada’s and the United States’ scientific experts agree that most checking occurs by year two since death, after which time new checking does not occur until about year seven since death. This means that until about year seven, MPB timber generally should not be appreciably failing the 50/50 test because it simply has not deteriorated enough. And BC adopted this conclusion. In fact, in 2010, BC announced that MPB timber sawlog availability lasted from ten to 20 years after death.⁴ This means

⁴ C-108 at 2.

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that, through 2010 at least, 80 percent or more of all the pine taken to the mill would have been suitable for lumber and should have been Grades 1 or 2.⁵

6. And yet between 2007 and the present, the amount of Grade 4 more than tripled, []⁶ The evidence at the hearing confirmed why this occurred: the North American lumber industry was undergoing the most significant market downturn in decades. Facing a collapsing US housing market, []⁷ And by providing immediate relief to BC producers' bottom line, the BC provincial government conferred a benefit that enabled BC producers to endure a bad market, facing only the risk of having to pay increased export charges in a better market, as part of a remedy under the SLA. No remedy under the SLA can completely remove the benefits that BC lumber producers received from the provincial government during the serious economic downturn.

7. The Ministry of Forests and Range was at a crossroads: it could change the pricing system to provide relief, but such changes would likely require regulatory approval and would implicate the SLA because they would constitute a *de jure* change to the grandfathered 2006 reforms. Or, the Ministry could make changes to the grading system and call them mere "clarifications." BC chose the second option—the more "immediate solution." But the evidence demonstrates the changes were not mere clarifications—they were sudden and significant changes that increased the amount of Grade 4 timber.

⁵ C-193 at 3.

⁶ Tr. 926:23-927:1.

⁷ C-52, CAN-010637-44, at CAN-010640.

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8. All of these changes taken together establish that BC's underpricing of timber changed the grading and Market Pricing System (MPS) such that up to 70 percent of MPB timber was being, and continues to be, sold for a flat, low stumpage fee. In other words, before 2006, BC was selling approximately 70 percent of its timber for a flat, low stumpage fee, and after 2007, it resumed doing so. This is not a move toward market pricing, nor does it maintain the extent to which pricing reflects market conditions. It therefore constitutes a circumvention of Canada's commitments under the SLA.

9. Consequently, the United States respectfully requests compensatory adjustments to the export measures in an amount that remedies the breach. Canada breached the Agreement to benefit its industry during an economic downturn, and, if found to be a breach, will result in an application of additional export charges during what will likely be improved market conditions. The remedy in this case must equal the full benefit provided to BC producers. That is the only way to come close to leveling the playing field and to ensure that Canadian provinces are not incentivized to breach the SLA when the market is depressed. The breach is the underpricing of timber, which is continuing. That underpricing has been quantified by Dr. Jonathan Neuberger, who has presented a preferred remedy that best captures the benefit provided to BC producers. Canada belatedly proffered, in its final brief submitted just weeks before the hearing, an alternative model for remedy, whose use in this case would be inconsistent with the terms of the SLA.

I. The Evidence Demonstrates Underpricing

10. The Anti-circumvention provision of the SLA states in relevant part that:

1. Neither Party, including any authority of a Party, shall take action to circumvent or offset the

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commitments under the SLA 2006, including any action having the effect of reducing or offsetting the Export Measures or undermining the commitments set forth in Article V.

2. Grants or other benefits that a Party, including any public authority of a Party, provides shall be considered to reduce or offset the Export Measures if they are provided on a *de jure* or a *de facto* basis to producers or exporters of Canadian Softwood Lumber Products.⁸

11. To establish a circumvention under the ordinary meaning of Article XVII, the United States bears the burden to demonstrate that Canada, through BC, provided a benefit to softwood lumber producers by selling timber at prices lower than dictated by the timber pricing system grandfathered by the SLA. The United States has met its burden to establish a circumvention of Canada's commitments under the SLA. The evidence demonstrates that the amount of Grade 4 should have remained below 20 percent between 2006 and the present. BC reformed its grading and pricing system specifically to ensure that most MPB timber would be graded Grades 1 or 2.⁹ The data show that the amount of lumber output remained essentially constant (with only a slight decline) during the period in question, meaning that BC lumber producers were getting the same amount of lumber from MPB timber as they were getting when they were implementing the reforms correctly.¹⁰ This data has been confirmed by the technical and scientific information on which BC has relied for nearly a decade—all of which reveals that MPB timber largely retains its value for making lumber until it is at least seven years

⁸ SLA, art. XVII ¶¶ 1-2.

⁹ US Stmt. of Case ¶¶ 28-52, US Reply ¶¶ 44, 72.

¹⁰ US Stmt. of Case ¶¶ 63-70.

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dead.¹¹ From 2006 until 2010, less than 20 percent of the pine harvest was in this category of older timber.¹² Accordingly, the remaining 80 percent (and often more) should have been graded and sold as Grade 1 and 2 timber. All of this data is Canada's own data.

12. Canada ignores this data and offers a lone explanation for the increase in Grade 4. Canada maintains that an unexpected decline in lumber quality caused the rise in Grade 4. Canada relies on two pieces of evidence: first, aerial photos of the spread of the attack; and second, the very same harvest profile data that demonstrate the low percentage of longer dead, gray stage timber discussed above.

13. Canada further maintains that the only actions that could possibly circumvent the SLA were the actions BC took in 2007 to change the scaling regulations, to allow kiln warming, and to change bucking practices—and Canada disputes that most of those were changes to the existing system in any event. In fact, Canada has repeatedly misconstrued the U.S. claim in this arbitration. The United States alleges that Canada, specifically BC, underpriced timber that had passed the 50/50 test and should have received a sawlog grade and sold it as Grade 4 timber. By selling underpriced timber to its industry, BC conferred a benefit under Article XVII of the SLA.¹³ The evidence further demonstrates that BC took incremental and continual steps after the SLA entered into force to ensure that its industry would pay as much flat, low stumpage as possible. The increase in Grade 4, combined with the evidence and BC's own admissions of how

¹¹ US Reply ¶¶ 52-70.

¹² US Opening Demonstratives 1-2.

¹³ SLA, art. XVII 1-2.

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valuable and lumber-suitable MPB timber remained well past five years, all confirm that the Grade 4 increase did not occur because of any change in the harvest but occurred because of changes in grading.

14. But the “action” in this arbitration is not limited to BC’s incremental steps. The steps are merely a means by which BC effected its goal of increasing the amount of Grade 4 in response to the crash of the U.S. housing market. Indeed, Deputy Minister Hayden confirmed that the Crown is responsible for charging the appropriate stumpage that reflects the value of timber.¹⁴ In other words, BC is responsible for the consequences of selling underpriced timber, regardless of whether it was the entity to have misgraded the timber in the first instance.

15. Canada contends further still that the changes it made in 2007 to its scaling conventions to account for MPB were necessary to clarify existing conventions or make grading more “accurate.” This defense ultimately is irreconcilable with another key aspect of Canada’s defense. Relying on Professor Athey’s testimony, Canada submits that the so-called “bid effect” absolves all BC of all misgrading because purchasers will always base bids on the true value of the timber in a stand. Professor Athey went so far as to opine that misgrading would have no effect on stumpage fees at all, as bidders would instantaneously and perfectly factor the occurrence of misgrading into their bids. Of course, if this were true, there would have been no need for industry to be concerned about misgrading in the *other* direction (that is, Grade 4 logs being assigned to Grade 2 due to supposedly “inaccurate” scaling practices), or for the Ministry to seek to clarify its grades or make them more “accurate” with regard to log quality.

¹⁴ Tr. 837:14-19.

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16. In reality, as demonstrated below, the “bid effect” does not operate as perfectly as Professor Athey insists, and, in any event, the BC provincial government changed grading conventions to downgrade MPB logs to Grade 4 because that was a faster and more reliable way to provide timber to producers at low prices than to rely on the MPS to construct more market-sensitive prices.

17. At the close of the hearing, Canada insisted, again, that the United States has failed to meet its burden to prove circumvention.¹⁵ Canada maintains that the United States has been unable to explain the sudden and significant rise in Grade 4 starting in 2007 and that “inability to explain is not proof.”¹⁶ But the United States has explained the rise in Grade 4 using Canada’s own evidence. In rebuttal, Canada has only one response—a regression analysis developed by its long-time economist that does not show any causation between actual events and the rise in Grade 4. Not only is this regression analysis flawed on its face, Canada has ignored entirely what BC has publicly stated for the last six years regarding the purpose of the reforms and the lumber-suitability of MPB timber, and Canada has ignored entirely all the scientific evidence demonstrating that MPB timber tends to develop checks at two years since death and then generally not again until seven years since death, leaving at least seven years during which MPB timber is largely suitable for the production of lumber and so should be priced accordingly.

18. Canada also ignored that all of the scientific evidence and BC provincial statements are consistent with the actual pine harvest profile between 2007 and 2010. In

¹⁵ Tr. 112:14-18.

¹⁶ Tr. 112:18.

that time period, 80 to 95 percent of the pine harvest was five years or less dead, meaning that generally 80 to 95 percent of that harvest was largely suitable for lumber production and should have been graded Grade 1 or 2, as predicted by BC when it enacted the 2006 reforms.

19. That Canada has chosen to avoid concrete evidence that BC has been chronically underpricing timber does not mean that the evidence does not exist. The evidence does exist, it has gone entirely unrebutted, and meets the United States' burden in this arbitration.

A. Purpose of Reforms

20. During the two years preceding the 2006 reforms, BC undertook a rigorous analysis of its log grading system to account for the generally good quality of MPB timber.¹⁷ BC announced that “[t]he increasing harvest of mountain pine beetle timber has prompted the change to the grades. It is widely recognized that although the tree may be dead and dry, much of the timber may be used to produce good quality wood products.”¹⁸ BC based this statement, upon a full year of testing, performed jointly by industry and province. That testing confirmed that less than half of one percent of lodgepole pine previously graded Grade 3 (a dead and dry log that passes the 50/50 test) went to Grade 4—the rest went into Grades 1 and 2. Only about 11 to 12 percent of the timber tested were Grades 4 and 5 (lumber reject under the old system), which would move into the new Grade 4.¹⁹ This means that BC's testing prior to the 2006 reforms

¹⁷ Tr. 840:8-13.

¹⁸ C-17, CAN-030070.

¹⁹ C-12, CAN-000010-11.

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determined that less than 15 percent of all MPB timber, including what was considered to be the worst available timber, should be graded Grade 4 under the new system. And this does not even take into account the practice of “high-grading,” whereby mills choose to leave in the field (and thus not bring to the mills for grading) the timber they deem unsuitable for lumber production.

21. BC implemented the 2006 reforms based upon this testing, and based upon what it knew about the progression of the infestation. In fact, by 2006, the infestation had reached its peak.²⁰ Under the new system “the majority of {dead and dry} timber will be assessed as saw logs, recognising their potential to produce good quality lumber.”²¹ In other words, BC expected that a majority of MPB timber would be graded as Grades 1 or 2 (the sawlog grades), because that majority of MPB timber can produce *good quality lumber*. Throughout the hearing, Canada maintained that there was no contradiction or problem with the notion that it was possible to produce large amounts of good quality lumber from Grade 4 MPB timber and that a log’s failure to pass the 50/50 test was irrelevant to whether it could actually be made into lumber.²² This central proposition of Canada’s defense is entirely contrary to BC’s assumptions and expectations in 2006 and to the log grading and pricing system put in place in 2006.²³

²⁰ Tr. 315:10-14.

²¹ C-22, CAN-000420.

²² Tr. 136:5-137:2; 1645:16-17.

²³ C-108; Tr. 343:19-344:1.

B. By Design, The New System Accounted For All Aspects Of MPB Timber

22. Based on two years of testing, BC knew the extent of the attack and the anticipated peak of the outbreak.²⁴ Shortly after the implementation of the April 2006 grading reforms in the BC Interior, BC also implemented a new MPS, which, like the reformed grading system, was intended to allow the BC Interior to take a more market-oriented approach to the sale of timber. Canada insisted that the new MPS be grandfathered by the SLA. Since 2007, however, Canada has circumvented the MPS by selling MPB timber for the flat, minimum stumpage rate. Canada generally avoided the subject at the hearing.

1. The Reformed BC Timber Pricing System Was Expected To Price Most MPB Timber At Normal Stumpage Rates

23. To implement its stated intention to price MPB timber for the first time using variable, market-sensitive stumpage rates, BC made important changes to its grading and pricing system in 2006. It made these changes because it anticipated an increase in the volume of MPB timber in the harvest. In the new MPS, BC specifically added adjustment mechanisms to accommodate any loss of timber value caused by the MPB. In this way, ordinary stumpage rates are adjusted downward to capture any differences in value between MPB timber and green timber. What was *not* part of the system was what BC later did in 2007—that is, returning to the pre-2006 system of selling nearly all MPB timber at the flat, market-insensitive, minimum stumpage fee. By changing grading practices to assign lumber-suitable MPB timber to Grade 4, BC took MPB timber out of the variable stumpage rates constructed by the MPS, circumventing

²⁴ C-23, CAN-037131.

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its own market-sensitive pricing system and Canada's commitments under the SLA. Had BC relied on its MPS's incorporation of the effects of the MPB attack in the variable prices for Grades 1 and 2, we likely would not be where we are now.

24. Under the new system, BC expected the vast majority of MPB timber—including 95 percent of what had previously been sold as Grade 3—to be sawlog quality and priced according to the Interior variable stumpage rate, *not* categorically downgraded and sold for the flat minimum stumpage fee of \$0.25 per cubic meter as before. The United States accepted the reformed system and Canada's warranty in agreeing to the SLA, which grandfathered the MPS.²⁵

25. Although Canada repeatedly stated at the hearing that longer-dead MPB timber loses quality, the grandfathered system was designed to account for loss in quality, and Canada has never even attempted to justify BC's changes from what was provided in the grandfathered pricing system. Canada had no response to the United States' demonstration that the grandfathered system has specifically taken into account the effects of so-called "longer dead" MPB timber by adjusting downward the stumpage fees for all Grade 1 and Grade 2 timber. Timber purchasers have been paying lower stumpage fees because of the effects of "longer dead" MPB timber in the harvest. And yet, rather than selling MPB timber at correctly reduced stumpage fees that already take into account the effects of the MPB on the harvest, instead Canada has essentially given away MPB timber for the fixed minimum stumpage fee. On this point, Canada remained, as it was before the hearing, dismissive and nonresponsive.

²⁵ SLA, art. XVII, ¶ 4(b).

2. The MPS Has Multiple Mechanisms To Account For MPB Attack

26. Although Canada has gone to great lengths to portray BC Interior's grading and pricing system as "regrettably complex,"²⁶ in fact, this system can be understood. Crown timber in BC is harvested from auction tracts and long-term tenure tracts. In its simplest form, under the MPS grandfathered by the SLA, the BC Ministry uses winning bids from timber auctions as the basis to calculate an Average Market Price (AMP) for all tenure timber. It identifies characteristics of the winning bids to develop a regression that it uses to construct stumpage fees for individual tenure tracts. That is, it adjusts the AMP to construct stumpage prices for individual long-term tenure tracts based on that tract's specific characteristics.²⁷ As demonstrated below, the mountain pine beetle and its effects have prominent roles in MPS pricing.

27. In theory, competitive, open auctions can help construct a market price of Crown timber on a representative sample of timber tracts.²⁸ Although BC's MPS does not generate true market prices or function as an actual market, it is designed to respond to the MPB attack by constructing a price for MPB timber that, as Canada warranted in the SLA, is more market sensitive than the prices at which BC previously sold MPB timber under its old system.

²⁶ Tr. 108:8-9.

²⁷ C-2, App. A; Stmt. Def. ¶¶ 62-66.

²⁸ C-2, App. A; Stmt. Def. ¶ 62; R-62 at 8.

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28. Thus, under the 2006 MPS, the “central concept” is that winning bids from auctions of standing timber are used to establish an average “market value” of timber.²⁹ This average “market value” is then used and adjusted to set stumpage prices for the far larger volume of timber sold on long-term tenure tracts.³⁰

29. The major steps in the transmitting the auction prices to long-term tenure tracts³¹ are these:

- The Ministry runs a regression on winning bids from the auction sector, using a number of variables such as tree species, location, lumber prices, and level of MPB attack;³²
- Using the coefficients of the variables determined in the regression, the MPS then calculates an Estimated Winning Bid (EWB) for each of the active timber tracts in the Interior (these tracts are called “cutting permits” or “cutting authorities” in the MPS documents).³³
- The EWB for each tract is reduced by the Tenure Obligation Adjustment (TOA) for the tract, resulting in a “market price” for each tract; if the calculated price is less than \$0.25, then \$0.25 is used.³⁴ The TOA is the cost of certain tenure obligations, such as roadbuilding and reforestation.³⁵

²⁹ R-9, AD at 1.

³⁰ *Id.* Under the BC MPS, a sample of winning BCTS timber auction bids (which in theory should be a reflection of market prices) are used to set stumpage prices for the remaining timber (about 80 percent) that is harvested from long-term tenures on Crown land. However, the MPS does not replicate an actual market or result in the sale of timber for true market prices. Part of the U.S. compromise in the SLA was to accept provincial timber pricing system as it existed on July 1, 2006, in exchange for Canada’s imposition of the Export Measures.

³¹ C-2, App. A, ¶ 2; C-25 at CAN-028644; R-9AD at 1.

³² C-2, App. A, ¶¶ 4, 8; R-9AD at 3; R-8 at 16 (Table A-1).

³³ C-2, App. A, ¶ 3; R-9AD at 3; C-25 at 2.

³⁴ C-2, App. A, ¶¶ 11-12; C-25 at 2; Stmt. Def. ¶ 65.

³⁵ Stmt. Def. ¶ 65, n.62. R-126 at CAN-028622.

- The prices are then weighted by volume and averaged to determine the AMP.³⁶ The AMP is generally an average of all the estimated timber prices for all the marks (cutting authorities) across the Interior, and is recalculated on a quarterly basis.³⁷
- The final step in the MPS is to adjust the AMP to calculate the stumpage price for timber on each tract.³⁸ The adjustments in this final step are “waterbedded,” or evened out, to be aligned to the AMP, so that the overall stumpage rates paid on long-term tenure tracts are equal to the AMP.³⁹

a. Auction Bids Take Into Account Any Loss of Value Caused By MPB Attack On The Auction Tracts

30. The most immediate mechanism built into the 2006 MPS that accounts for the effects of the MPB on timber is the process of offering stands of timber for auction. The Ministry expects auction bids to account for visible timber characteristics, such as MPB attack.⁴⁰ Professor Athey agreed that “if the MPB attack in any way reduces the value of the stand, that loss of value would . . . be reflected in lower bids for the tract.”⁴¹

31. For example, if MPB attack is a visible characteristic (an attacked tree changes from “green” to “red” to “grey”), and MPB-attacked timber is less valuable than unattacked timber, then any loss of value will be reflected in lower bids for auction tracts

³⁶ C-2, App. A, ¶ 14; R-9AD at 4; Stmt. Def. ¶ 65.

³⁷ C-25 at 5.

³⁸ R-9, AD at 4; C-2, App. A, ¶¶ 15-16.

³⁹ Stmt. Def. ¶ 66.

⁴⁰ Tr. 1378:5-14.

⁴¹ Tr. 1375:11-14. *See also* Tr. 152:21-153:5 (Canada concedes that bidders consider the effects of the MPB on auctioned stands. “That’s the market at work. That is the way it’s supposed to work.”).

showing signs of attack.⁴² [

] ⁴³ the MPS accounts for this small loss of profitability related to MPB timber by assuming that bidders acting rationally will lower their bids – that is, lowering the amount they are willing to pay for the timber.⁴⁴ In principle, this is the way a market ordinarily would operate.

32. The MPS regressions on the auction bids since 2006 have showed this, in fact, to be exactly the case.⁴⁵ The MPS regression uses a list of variables, or characteristics, to “explain” the auction prices.⁴⁶ These variables include the level of MPB attack. The regression produces a coefficient for each of the variables; a positive coefficient means that the variable increases auction prices, and a negative coefficient means that the variable decreases auction prices. The coefficient for MPB attack is

⁴² Tr. 1378:5-14. It is important to distinguish between *visible* timber characteristics, such as MPB attack, and *other* characteristics, such as the timber and lumber grades that will ultimately be assigned. Bidders can see MPB attack, and adjust their bids accordingly; in contrast, bidders cannot see the grades that will be assigned to the timber after harvest. This is a critical distinction to keep in mind when evaluating Canada’s “bid effect” theory. Canada’s theory is that bidders can somehow adjust their bids to fully account for the volume of Grade 4 in the harvested timber. Stmt. Def. ¶¶ 268, 273. This is impossible at the time bids are prepared because the volume of Grade 4 is not known until harvest.

⁴³ See, e.g., R-5, ¶ 11; R-12, ¶¶ 65-79.

⁴⁴ It is also important to recognize that any loss of value is greatly minimized by the practice of leaving the worst MPB timber “in the forest.” C-107, ¶ 8; R-12, ¶ 64; R-5, ¶¶ 14-15. [] this practice is widespread in BC, allowing lumber producers to use and process into lumber only the best MPB logs at their sawmills. *Id.*

⁴⁵ Tr. 1378:15-18; C-103, ¶ 17.

⁴⁶ C-102, App. A, Table A-1; C-25 at 6; R-8, App. A, Table A-1.

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negative, meaning that the greater the level of MPB attack on a tract, the lower the auction price (and, for tenure tracts, the estimated auction price) for that tract.⁴⁷

33. Professor Athey explained that the MPB attack coefficient is negative because BC “discovered a negative relationship between the attack variable and [] bid prices.”⁴⁸ Then, when the MPS transmits auction bids to stumpage prices on the tenure tracts, the negative coefficient operates to reduce stumpage prices if there is more attack on the tenure tracts.⁴⁹ Thus, stumpage prices province-wide are *already* lower because of MPB attack, and they will be pushed even lower if there is more attack on the tenure tracts than the auction tracts.

34. Professor Athey’s report shows the MPS regression with all of the variables and coefficients.⁵⁰ The coefficient for the MPB attack variable (called simply “Attack”) is -3.38.⁵¹ This means that in the database of winning auction bids used to run the regression, MPB attack is associated with *decreased* bid prices.⁵² Therefore, the grandfathered MPS system assumes that rational bidders have responded to MPB attack in auction tracts by adjusting their bids, resulting in lower stumpage prices for the timber harvested from those tracts. Further, as demonstrated below, because the MPS uses auction bids to set stumpage prices on long-term tenure tracts, it has carried any loss of

⁴⁷ C-103, ¶ 17; Tr. 1381:20-1383:11.

⁴⁸ Tr. 1382:9-14.

⁴⁹ Tr. 1382:2-8.

⁵⁰ R-8, App. A, table A-1.

⁵¹ *Id.*

⁵² Tr. 1382:2-15.

value caused by the MPB through to the tenure sector. Again, the MPS already has reduced the stumpage price on tenure tracts due to the presence of MPB timber in the auction tracts.⁵³

b. Variable Stumpage Prices On Tenure Tracts Also Account For Any MPB-Related Loss Of Timber Value

35. Auction tracts account for only 20 percent of the tracts harvested each year in British Columbia.⁵⁴ The remaining 80 percent of timber sold to lumber producers in the BC Interior is from long-term tenures held mostly by lumber producers themselves.⁵⁵ As Dr. Neuberger explained in his rebuttal expert report,⁵⁶ and Professor Athey at the hearing, the MPS was designed to account for MPB attack by lowering sawlog stumpage prices paid by producers for timber harvested on these tenure tracts.

36. There are numerous places where the grandfathered MPS has accounted for MPB attack in setting stumpage prices on tenure tracts. First, an increase in the level of MPB attack has reduced Estimated Winning Bids (EWB) and, as a matter of mathematical certainty, the AMP since 2006. This is mainly because every EWB is derived from a database of BCTS auction bids, meaning that because auction bids have

⁵³ Tr. 1383:19-1384:1.

⁵⁴ C-2, ¶ 27 n.18

⁵⁵ *Id.*

⁵⁶ C-103, ¶¶ 16-19.

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been reduced for MPB attack,⁵⁷ every EWB – defined as the predicted bid based on the auction data – necessarily has been reduced as well.⁵⁸

37. Professor Athey explained at the hearing how the decrease in auction prices associated with MPB attack transmits to the much larger tenure sector.⁵⁹ Professor Athey’s work confirmed that changes in winning auction bids transmit to the EWB in 12 to 18 months.⁶⁰ Her simulation (carried out by the BC Ministry of Forests) showed that a \$3 increase in average winning bids caused almost the exact increase in the average EWB 12 to 18 months later.⁶¹ The average EWB would be expected to respond similarly to a decreasing trend in average auction bids.⁶²

38. Moreover, the MPS regression explicitly accounts for MPB attack in setting stumpage prices on long-term tenures.⁶³ It uses a factor for reduction of lumber recovery factor (LRF Reduction Factor) in one variable and, beginning in July 2008, “Attack” variables to calculate the EWB.⁶⁴ With regard to the LRF Reduction Factor,⁶⁵

⁵⁷ C-103, ¶ 16.

⁵⁸ C-2, App. A, ¶ 3.

⁵⁹ Tr. 1381:20-1382:15.

⁶⁰ R-150, App. 1, p. 4-6.

⁶¹ R-150, App. 1.

⁶² *Id.*

⁶³ C-103, ¶¶ 16-19.

⁶⁴ C-2, App. A, ¶ 6; C-103, ¶ 18.

⁶⁵ It is undisputed that the LRF Reduction Factor was part of the 2006 MPS grandfathered by the SLA. C-24 at 11-12. The factor was part of a composite variable called the Real Stand Lumber Price, later called the Stand Value Index, in the MPS

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Dr. Neuberger has described how the addition of this factor in the 2006 MPS affected Grade 1 and 2 prices.⁶⁶ The LRF Reduction Factor operates so that “the more MPB-attacked lodgepole pine in a stand, and the more severe the level of attack, the lower the Grade 1 and 2 stumpage prices for the stand.”⁶⁷

39. The Ministry’s Scott Fletcher testified that the LRF Reduction Factor reduced stumpage before July 1, 2007, but after that date reduced stumpage only negligibly.⁶⁸ But Mr. Fletcher’s methodology was flawed because he admitted that he and Professor Kalt had designed the LRF Reduction Factor simulation to generate the very result that Mr. Fletcher ultimately obtained.⁶⁹ His simulation assumed no difference in harvest profile characteristics between the auction tracts and the tenure tracts, meaning that the removal of the factor would necessarily have no effect on the AMP.⁷⁰ In reality, of course, the characteristics of the auction tracts will never perfectly match those of the

regression. Tr. 1136:15-1137:18; C-2, ¶¶ 27-28. This variable measures the share of each species in the tract, the LRF for that species, and the price of the lumber produced from that species. C-2, ¶¶ 27-28. Thus, at the same time BC implemented the new log grades in April 2006, BC reduced the lodgepole pine LRF by 3 board-feet per cubic meter (bf per cubic meter) for “green-attack” lodgepole pine, by 33 bf per cubic meter for “red-attack,” and by 83 bf per cubic meter for “grey-attack.” C-2, ¶ 27; C-2, App. A, ¶ 6; C-24 at 11-13. In light of the fact that the maximum LRF for lodgepole pine is 267 BF/cubic meter, the LRF reductions were significant, reducing LRF by at least 1 percent for green-attack, 12 percent for red-attack, and 31 percent for grey-attack. C-2, ¶ 27.

⁶⁶ C-2, ¶ 27.

⁶⁷ C-2, ¶ 28.

⁶⁸ Tr. 1137:14-1138:18, 1146:5-12.

⁶⁹ Tr. 1139:8-1140:23.

⁷⁰ *Id.*; R-151, K at 3.

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tenure tracts. This design feature rendered Mr. Fletcher's LRF Reduction Factor simulation meaningless on this point.⁷¹

40. Moreover, Mr. Fletcher intentionally limited his simulation to omit the effects of the MPB Attack variables on stumpage prices.⁷² The Attack variables in the MPS regression are separate from the LRF Reduction Factor.⁷³ Professor Athey explained how these variables affect the AMP by targeting the amount of green, red, and grey attack in the auction tracts.⁷⁴ She further explained that the use of these variables means that the AMP will be adjusted up or down depending on the level of attack on the auction tracts as compared to the level of attack on the tenure tracts.⁷⁵ If the average level of MPB attack (represented by the "Attack" variable in the regression) in the auction tracts is the *same* as the level of MPB attack in the tenure tracts, then the AMP

⁷¹ After the AMP is calculated, the level of MPB attack also affects the final stumpage rate on a particular stand. This happens through another MPS equation and what is called the "Value Index." C-2, App. A, ¶¶ 15-16; R-09,AD at 5-6. At this stage, the effect of MPB attack is effectively averaged out, or "waterbedded," across all harvested tracts. So where stumpage rates on tracts with MPB attack are lower, stumpage rates on tracts with less or no MPB attack are higher, so that the average stumpage rate across all tracts equals the AMP. The important point here is that this "waterbedding" occurs *after* the calculation of the AMP; therefore, "waterbedding" does not affect the multiple reductions of the AMP itself (see above) caused by MPB attack.

⁷² Tr. 1141:4-17.

⁷³ From 2006 to 2008, MPB attack was measured in the MPS regression with a variable called "Salvage." Since the third quarter of 2008, MPB attack has been measured using several variables with the word "Attack" in them (for example, "Green and Other Attack," "Red and Grey Attack," and "Total Attack"). Tr. 1141:4-14 (Fletcher); C-2, App. A, ¶ 7.

⁷⁴ See Tr. 1381:11-1383:11.

⁷⁵ *Id.*

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will not be further lowered as a result of MPB attack.⁷⁶ Under these unique circumstances, the variable will not act to lower the AMP and, with the AMP, stumpage prices on tenure tracts.⁷⁷ But if there is *more* MPB attack on the tenure tracts, on average, than the auction tracts, then the AMP will be lower than the auction prices. Conversely, if there is *less* MPB attack on the tenure tracts, the AMP will be *higher* than the auction prices.⁷⁸ This is how a negative coefficient functions mathematically in the MPS regression. Canada presented no evidence to contradict Professor Athey's and Dr. Neuberger's conclusions that MPB Attack variables influence the AMP and, therefore, stumpage prices on the long term tenures.

41. Thus, to the extent that MPB attack is present on the tenure tracts, the predicted winning bid on the tenure tract is lowered. This, in turn, results in a lower AMP and lower stumpage rates on tenure tracts. This is the way the MPS works to adjust the stumpage price for Grade 1 and 2 logs in beetle-attacked tracts. Canada and its economist Professor Kalt ignore the effects of the "Attack" variables entirely, and misrepresent the effect of the LRF on the AMP.

⁷⁶ *Id.*

⁷⁷ *See id.*

⁷⁸ *Id.* A correct understanding of Mr. Fletcher's simulations, which he claims show that there is no change in the AMP from the LRF Reduction Factor, shows that his work is consistent with Professor Athey's testimony. Mr. Fletcher's simulations purported to show no effect because he removed the LRF variable from the regression, then re-ran the regression. The regression then rearranged the remaining coefficients to cancel out the effect of the removed variable, creating the illusion that the LRF factor had no effect. This would have been the result had he removed any variable or combination of variables. Mr. Fletcher's simulation is completely beside the point, because a negative coefficient for any variable (such as LRF or MPB Attack) results in a lower EWB for tenure tracts with MPB attack, and a lower overall AMP.

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42. There is a final place in the MPS where MPB attack is considered, and this is the one on which Canada has focused, to the extent Canada focuses on the MPS at all. After the AMP is calculated, the level of MPB attack also affects the final stumpage rate on a particular stand. This happens through another MPS equation and what is called the “Value Index.”⁷⁹ Here, there is an additional effect of MPB attack, but it is effectively averaged out, or “waterbedded,” across all harvested tracts. So where stumpage rates on tracts with MPB attack are lower, stumpage rates on tracts with less or no MPB attack are higher, resulting in an average stumpage rate across all tracts that equals the AMP. The important point here is that “waterbedding” occurs *after* the calculation of the AMP; therefore, “waterbedding” does not affect the multiple reductions of the AMP itself (see above) caused by MPB attack.

43. The steps in the grandfathered MPS which account for MPB attack are shown in Figures 1 and 2, below, for both auction tracts and long-term tenure tracts. The blue circles identify where MPB attack has the effect of lowering Grade 1 and 2 stumpage prices; the red-shaded boxes identify the places where the MPB-related price reductions take place.

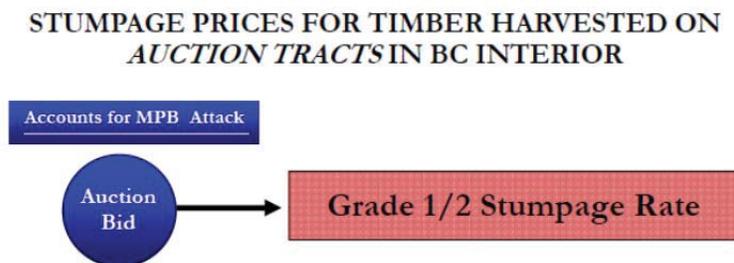


Figure 1. Stumpage rates on auction tracts, where the winning bid (if greater than the reserve price) is the stumpage rate for timber harvested from the tract. Here, any

⁷⁹ C-2, App. A, ¶¶ 16-17; R-9AD at 5-6.

perceived loss of value from MPB attack has an immediate, direct effect on stumpage prices.

**STUMPAGE PRICES FOR TIMBER HARVESTED ON
TENURE TRACTS IN BC INTERIOR**

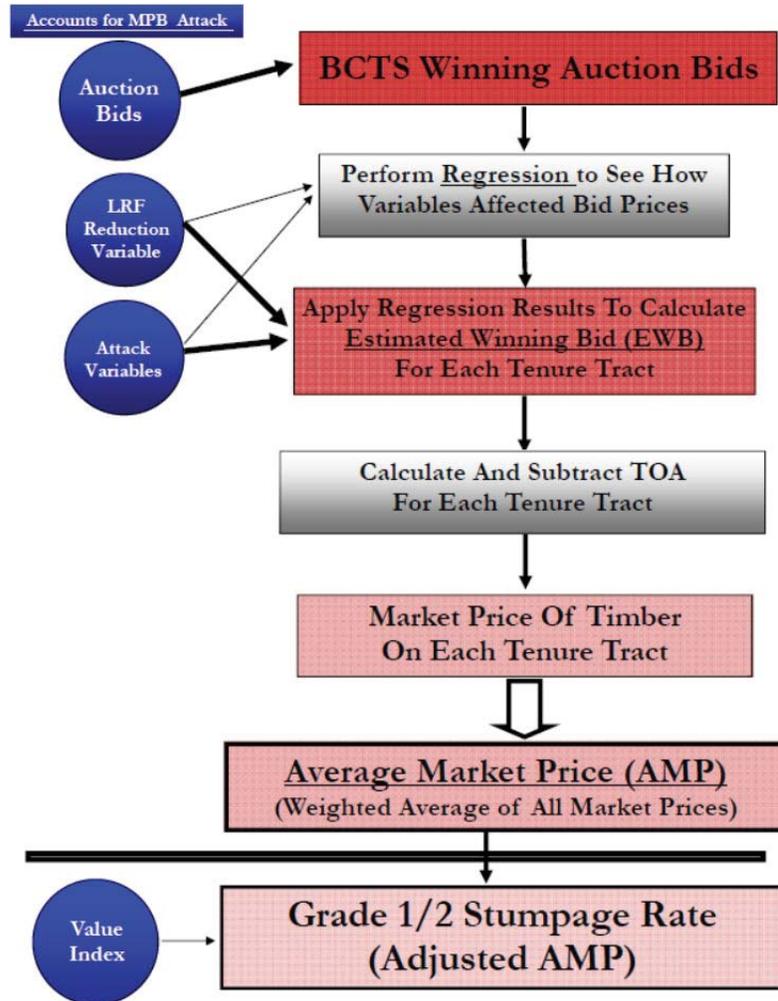


Figure 2. Stumpage rates on tenure tracts, where winning auction bids determine the stumpage rate for timber harvested from tenures. Here, MPB attack has the immediate, direct effect on auction bids, plus indirect effects via the MPS regression. Only the effect in the last step (value index) is “waterbedded.”

3. The MPS System Was Grandfathered By The SLA

44. The BC Interior MPS, and the BC MPS documents incorporating the 2006 reforms, are expressly named in the SLA.⁸⁰ The legal effect was twofold: first, Canada

⁸⁰ SLA, arts. XVII(4)(a), XXI(35).

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expressly warranted to the United States that “a central purpose of the MPS is to implement a system that is more sensitive to market forces than pre-existing systems.” Second, Canada ensured that the BC timber pricing system, including the pricing methods and equations named in the documents (and including changes that maintained or improved the extent to which the system reflected market conditions), would not be a breach of the SLA.⁸¹ Although Canada repeatedly stated at the hearing that Canada’s warranty was merely “a warranty of purpose,”⁸² whatever Canada meant by that, it does not change the fact that Canada acknowledged in its warranty to the United States that its old system of selling all MPB for the flat, market-insensitive minimum stumpage fee was necessarily *less* sensitive to market forces than that established by the new MPS.⁸³ By definition, therefore, Canada’s warranty in the SLA means that BC’s return to the same principles as embodied in its pre-April 2006 pricing system *cannot* be a movement toward market conditions, or even toward a system that maintains the manner in which the system reflects market conditions as of July 1, 2006.

45. The undeniable fact is that the BC Interior system, as it existed on July 1, 2006, was designed to account for the loss of value in MPB timber in the fluctuating Grade 1 and 2 timber prices. Canada understood in early 2006 that the United States wanted BC to “address the beetle wood issue as part of any negotiated settlement.”⁸⁴ In the words of Dr. Neuberger, “changes in the MPS system were explicitly designed to

⁸¹ SLA, art. XVII (2)(a), 4(b).

⁸² Tr. 111:6-19; 1671:20-1672:12.

⁸³ See SLA, art. XVII (2)(a), 4(b).

⁸⁴ C-20; Tr. 859:25-860:7; 862:6-10.

account for the progression of the MPB infestation.”⁸⁵ Canada does not deny this in any of its filings, except for a brief comment that one MPB-related price factor should have “almost no effect.”⁸⁶

C. Misgrading Timber As Grade 4 Provides A Benefit To Lumber Producers Under The MPS

46. As explained above, auction bids, the MPS regression, and the stumpage equations assist in having Grades 1 and 2 stumpage prices in the tenure sector, like Grade 1 and 2 stumpage prices in the auction sector, account for any loss of value caused by the MPB. In Dr. Neuberger’s words, any losses in timber quality caused by the MPB “are already taken into account through the grandfathered MPS system.”⁸⁷ That is, the losses in timber quality due to the MPB “are already captured in the various mechanisms discussed above that adjust the Grade 1/2 stumpage prices under the MPS.”⁸⁸ Any loss of value occasioned by the MPB will produce lower Grade 1 and 2 stumpage prices, *not* the flat \$0.25 per cubic meter stumpage fee that Canada argues is correct in this case.

47. Further still, misgrading timber as Grade 4—selling it at the flat \$0.25 per cubic meter rate instead of the reduced Grades 1 and 2 stumpage rates—provides a benefit to Canadian producers by providing them with timber at a low market-insensitive

⁸⁵ C-2, ¶ 28.

⁸⁶ Can. Rej. ¶ 195.

⁸⁷ C-103, ¶ 19.

⁸⁸ *Id.* at ¶ 20. The MPS’s ability to lower stumpage rates for MPB attack addresses Professor Kalt’s claim that the MPB has resulted in the loss of millions of dollars in lumber value. R-9, ¶¶ 72-96. Even accepting Professor Kalt’s exaggerated figures for argument’s sake (they result from multiple unreasonable assumptions regarding lumber recovery and lumber quality trends in the absence of the MPB), the design of the MPS insured that these losses were offset by the lower sawlog stumpage prices that these producers were supposed to pay.

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rate. At the time that the 2006 reforms were created and implemented, BC officials explicitly stated that the \$0.25 per cubic meter flat minimum stumpage rate [

] ⁸⁹ Accommodating MPB-killed timber within sawlog stumpage prices was a central element of the 2006 MPS grandfathered by the SLA. The United States does not challenge the mechanisms in the grandfathered MPS that adjust sawlog prices for MPB attack; to the contrary, the dispute in this arbitration relates to changes in the process that resulted in over 50 percent of the MPB timber being removed altogether from variable, market-based pricing.

48. Canada cannot legitimately deny that the grandfathered MPS system was designed to account for the loss of value in MPB timber by lowering sawlog stumpage fees. The Ministry's response to its industry's subsequent complaints that MPB timber was being over-priced should have been to assure industry that the MPS accounts for loss in value—or to make changes to the MPS if, in fact, the mechanisms in place were not adequately accounting for value. Indeed, [

] ⁹⁰ But the Ministry neither relied on its MPS nor sought to make market-oriented changes to the MPS. Instead, BC took the short-cut—the path that would bring immediate relief to its industry—by altering grading practices and conventions so that most MPB timber would *not* be priced at a market-sensitive fee but instead sold for the flat, market-insensitive, Grade 4 price.

⁸⁹ C-9 at CAN-019762; C-16 at CAN-019779.

⁹⁰ C-52 at CAN-010640 (emphasis added).

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49. The problems associated with MPB timber could have been, and were, accommodated within the grandfathered MPS without requiring changes in grading conventions to downgrade MPB timber to Grade 4. The 2006 BC system expressly took MPB timber into account, in its auction system, the AMP, and its average stumpage rates accordingly; there was no need to misgrade MPB timber. As explained below, misgrading not only underprices lumber-quality timber at the flat minimum rate (the “share effect” of misgrading), but further lowers the AMP and average stumpage rates on sawlogs (the AMP effect of misgrading).

50. The design of the BC system to accommodate MPB timber, and more specifically any loss of value in MPB timber, is consistent with statements by the BC Ministry of Forests in 2006 that the vast majority of formerly Grade 3 MPB timber would be graded as Grade 1 or 2, and priced using variable sawlog stumpage.⁹¹ Industry was included in creating the reformed system.⁹² In other words, the 2006 timber pricing system, by building in mechanisms to price MPB timber, furthered the expectations of both the BC Ministry and industry.

51. At the hearing, Canada attempted to downplay the Ministry’s estimate that 95 percent of the former Grade 3 logs would be graded as sawlogs under the new system by noting that “remember, by definition, Grade 3 logs passed the 50/50 test.”⁹³ Canada

⁹¹ C-12 at CAN-000003, CAN-000010 (Ministry test results showed 99 percent of Grade 3 logs moved to new Grades 1 and 2); C-18 at CAN-007148 []; C-20; C-22; C-25 at CAN-028639 (95 percent).

⁹² Industry representatives were included on the ISAC, the committee responsible for formulating and implementing the 2006 system. *See, e.g.*, C-12 at CAN-000003, C-18 at CAN-007146, C-19 at CAN-007431.

⁹³ Tr. 1649:6-11.

implied that this figure did not account for a perhaps large volume of MPB logs were lumber reject under the old system and did not pass the 50/50 test. But Canada neglected to acknowledge the rest of the pre-reform testing. The pre-April 2006 log grade testing suggested that the 95 percent estimate was, if anything, highly conservative, as Canada itself suggested may be the case.⁹⁴ In the pre-April 2006 reform tests, only 0.3 percent of lodgepole pine, and 0.5 percent of all species shifted from sawlog Grade 3 under the old system to lumber reject Grade 4 under the new system.⁹⁵ Moreover, the pre-reform testing showed that only 11 to 12 percent of the timber tested was considered lumber reject, so there was never a huge volume of MPB logs that had failed the 50/50 test under the old system.⁹⁶ Accordingly, to the extent that the MPS assumed that MPB timber would be graded and priced as sawlogs, it used a conservative estimate. Yet, since 2007, most of the MPB timber has been removed from the variable pricing aspect of the MPS system and sold instead for the flat lumber reject stumpage fee.

D. The New System Worked As Planned At First

52. Consistent with BC's pre-reform testing showing that only 11 to 12 percent of the timber tested was lumber reject, Dr. Neuberger explained at the hearing that the total volume of lumber reject timber in the pine harvest was approximately 10 to 15 percent before the April 2006 grading reforms took effect.⁹⁷ After the April 2006

⁹⁴ *Id.* ("And I can't tell you what explains the 5 percent variance, and it may have been a different grader, but that 95 percent was based on actual experience in 2005-2006, maybe going back to 2004.").

⁹⁵ C-12 at CAN-000010.

⁹⁶ *Id.*

⁹⁷ Tr. 1226:11-15.

reforms took effect, the percent of Grade 4 in the harvest rose to approximately 15 to 20 percent until April 2007, when the share of Grade 4 in the pine harvest began to rise sharply.⁹⁸

53. Dr. Neuberger did not conclude that the Grade 4 share of 15 to 20 percent experienced prior to April 2007 was necessarily “appropriate;” rather, to be conservative, he used a benchmark of a Grade 4 share of 17.8 percent, which he described as a “non-misgrading quantity,” in calculating his preferred remedy.⁹⁹ As Dr. Neuberger explained in response to questions by the Chairman, 17.8 percent misgrading as a benchmark for his preferred remedy “appears pretty high compared to the profile of the harvest in that year,” and he add that “it’s pretty generous to suggest that there was no misgrading in that period and that that is necessarily the right number.”¹⁰⁰ In any event, in the one year period following the implementation of the April 2006 grading reforms, the level of lumber reject timber in the pine harvest was not significantly greater than the lumber reject share experienced prior to implementation of the new reforms. Canada has never explained how such a large volume of MPB timber suddenly failed the 50/50 test beginning in April 2007.

E. The Empirical Evidence In The Record Contradicts The Baseline Premise Of Canada’s Explanation For The Rise In Grade 4 Timber

54. Canada has consistently asserted that the rise in the share of Grade 4 timber was attributable to its industry harvesting a larger volume of pine that had been

⁹⁸ Tr. 1226:16-20.

⁹⁹ Tr. 1226:6-10.

¹⁰⁰ Tr. 1323:18-23.

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dead for more than two years.¹⁰¹ According to Canada, it was not that the grading standards changed after 2006, it was that the pace of the MPB outstripped the pace of harvest, forcing the industry to harvest more and more trees that were dead two or more years.¹⁰² Canada claims that this meant that the harvest was characterized by more heavily checked timber, reflected in the increasing share of Grade 4.¹⁰³ Canada repeated this explanation at the hearing.¹⁰⁴

55. The evidence presented by the expert scientific witnesses told a far different story. Expert witnesses for both parties testified that timber that has been dead for up to five or six years is generally characterized by very little checking. The evidence in the record contradicted Canada's only defense to the allegations of misgrading and underpricing timber.

56. The evidence adduced at the hearing showed that even accepting Canada's claims as to the changing character of the post-2006 pine harvest, the vast majority of the harvested timber still would have been unchecked or very mildly checked (which would have been consistent with Grades Grade 1 or 2) and should have been sold at ordinary stumpage prices. Canada's explanation for the rise in Grade 4 timber is unsupported by any evidence.

¹⁰¹ See, e.g., Stmt Def., ¶¶ 2, 7, 106, 137.

¹⁰² See, e.g., *id.*

¹⁰³ *Id.* ¶137.

¹⁰⁴ Tr. 154:9-15; 1669:3-17

1. **Professor Lewis Has Demonstrated That Little Checking Occurs In Timber Dead For Five Or More Years**

57. Canada's explanation for the rise in Grade 4 has rested largely on Professor Kathy Lewis's shoulders. Dr. Christopher Fettig, a supervisory researcher with the United States Forest Service with years of experience in studying the MPB and other invasive species in western North America, reviewed and summarized the work of Dr. Lewis. That Professor Lewis did not dispute most of Dr. Fettig's opinions makes sense given that Dr. Fettig drew his opinions largely from Professor Lewis's own work.

58. Under the BC Interior grading rules, checking affects the grade assigned depending on the *number* and *depth* of checks. For this reason, the opinions of Dr. Fettig and Professor Lewis on checking were directly relevant to how grades are assigned in the BC Interior. Dr. Fettig's and Professor Lewis's conclusions show that, although checking is the most significant change that occurs to wood when a tree dies, checking is very limited in terms of frequency and depth in trees dead up to six years. The experts noted the following:

- Professor Lewis's work showed that for trees killed by the MPB up to six years since death, there was on average of less than one check per log sample, and the checks that were present averaged about 2 centimeters in depth.¹⁰⁵

¹⁰⁵ Tr. 243:2-244:7; C-194 at 3; R-10, App. 3 at 134, 138.

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- Professor Lewis's work showed that 70 percent of timber dead for six years showed no checking at breast height, the largest (by diameter) section of the tree.¹⁰⁶
- "Breast height" was identified as the place on the tree (1.3 m from the base) where moisture absorption from the ground "disappeared," and one of the areas where the depth of checking was the greatest.¹⁰⁷
- For MPB-killed trees sampled seven or more years since death, there was on average just over two checks per log sample and checks that were present averaged about 3.3 centimeters in depth.¹⁰⁸

59. To form her opinions regarding checking, Professor Lewis counted any check that was visible, even down to one or two centimeters in length.¹⁰⁹ Thus, her results on the amount of checking over time include tiny checks that would not affect the production of lumber, and checks that would have been disregarded under the 2006 grading rules.¹¹⁰

60. Using tree diameter and years since death, Professor Lewis modeled her data in order to create useful graphical representations for both number of checks and

¹⁰⁶ R-10, App. 3 at 135; Tr. 232:5-20.

¹⁰⁷ R-10, App. 3 at 134; Tr. 233:1-13.

¹⁰⁸ Tr. 244:18-245:8; C-194 at 4; R-10, App. 3 at 134, 138.

¹⁰⁹ Tr. 440:12-441:5.

¹¹⁰ The rule directing graders not to count checks of 2 centimeters or less was changed in December 2006, after which time even these checks were counted for purposes of grading. C-82 at CAN-011402.

depth of checks in MPB timber.¹¹¹ She included these graphical representations in her 2009 working paper, and both are reproduced below.

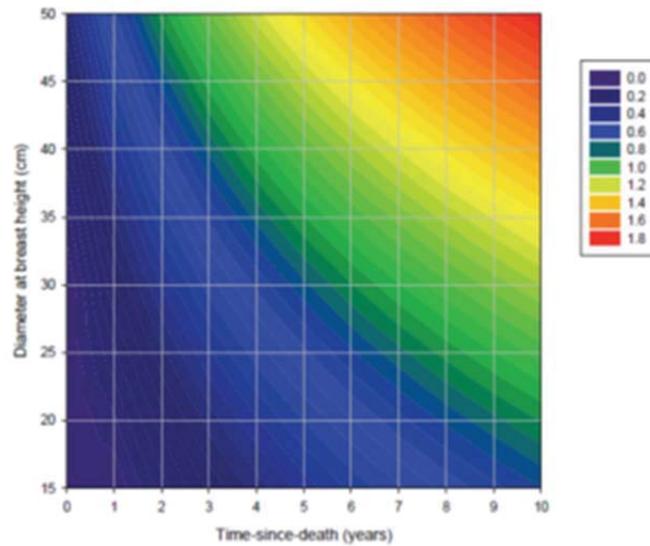


Figure 15. Number of checks at breast height predicted as a function of time-since death and diameter at breast height.

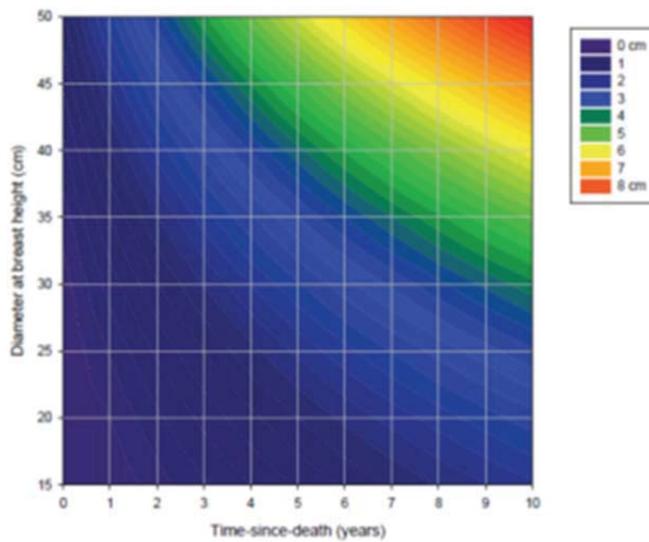
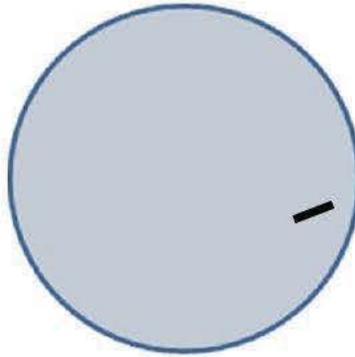


Figure 16. Depth of checking at breast height predicted as a function of time-since death and diameter at breast height.

¹¹¹ R-45 at 27-28.

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61. Professor Lewis's modeling demonstrates that, for example, a tree measuring 30 centimeters in diameter (15 rads), would be expected to have about 1 check at breast height, and that the check (if present) should be about 2 centimeters deep. Even with trim allowance around such a check, the log would easily pass the 2006 grading rules for a Grade 1 log (more than 75 percent of the log volume is available to cut lumber).



62. The Tribunal also should consider that the 2006 log grading rules excluded checks 2 centimeters or less.¹¹² Thus, many of the checks found by Professor Lewis in her work, and even the average checks in trees up to six years since death would have been excluded from the log grading decision.

63. Overall, Professor Lewis's work carried out between 2006 and 2011 confirmed the testing and expectations of Ministry officials leading up to the April 2006 changes to the Interior log grades. The Ministry's tests of the proposed grading rules included tests for rules that allowed grade deductions for checking.¹¹³ Yet these tests showed that less than five percent of Grade 3 MPB timber was graded Grade 4 under the

¹¹² R-19 at 6-62 ("Surface checks 2 cm or less in depth are not entered in the grade reduction calculation."); C-50 at 9-5 (CAN-008509).

¹¹³ C-12 at CAN-000006-11.

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new rules. In other words, over 95 percent of Grade 3 logs moved into Grades 1 and 2 – sawlog grades – under the new rules.¹¹⁴ These tests also made clear that MPB logs with checks do pass the 50/50 test.

64. Professor Lewis's work, which discovered very little checking in MPB timber up to six years since death, is entirely consistent with the Ministry's 2006 test results. Moreover, Professor Lewis's work undercuts Canada's primary argument in these proceedings that the rise in the share of Grade 4 timber in 2007 and beyond was the result of a rising share of timber dead more than two years. If Professor Lewis's work shows anything, it is that the difference between two and three years, or even two and five years, means very little in terms of additional checking. In Professor Lewis's own words, in the period between two and eight years since death, MPB timber is characterized by a "period of stable wood properties," including checking.¹¹⁵ Canada's explanation for the sharp rise in Grade 4 since 2007 was never offered or supported by Professor Lewis.

65. Canada also makes much of the fact that many of Professor Lewis's observations and graphs were from measurements at breast height, and that the timber may have shown more and deeper checking in the middle of the tree, where the wood moisture content is generally lower.¹¹⁶ This is inaccurate. Professor Lewis took 12

¹¹⁴ C-12 at CAN-000010.

¹¹⁵ R-10, App. 3 at 140 ("Following Year 2, there was a period of stable wood properties with little change occurring, although existing checks deepened with time.") The "deepening" referred to was, on average, about 1 centimeter from Year 2 to Year 5, and checks were actually shallower at Year 3 and Year 6. R-10, App. 3 at 134.

¹¹⁶ Tr. 1661:9-17.

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samples along the entire length of each sampled tree.¹¹⁷ She stated in her study that she modeled the breast height sample because that was the point along the tree at which moisture absorption from the ground “disappears.”¹¹⁸ Indeed, the moisture content in the breast height sample (Disc 2) only slightly exceeded that of the sample from the middle of the tree (Disc 4).¹¹⁹ Therefore, Canada’s focus on moisture content is misplaced.

66. Canada also attempted to make much of a statement in Professor Lewis’s rebuttal report that at two years since death, over 70 percent of MPB-killed timber “developed checks in the tree section most likely to check (middle).”¹²⁰ However, this statement is inconsistent with the graph she cites, which does not show checking in the “middle” of the tree, but checks *anywhere* along the length of the tree. In other words, if the sampled tree had a check anywhere, no matter how small, it was counted in the graph.¹²¹

67. Neither Canada nor Professor Lewis ever identified any data in any of her work supporting the “70 percent middle-of-the-tree” statement. In fact, the figure was contradicted by an earlier working paper recording the first phase of her MPB study. In that working paper, Professor Lewis recorded that only 17 percent of trees dead two years

¹¹⁷ R-10, App. 3 at 132.

¹¹⁸ R-10, App. 3 at 134.

¹¹⁹ R-10, App. 3 at 136-37.

¹²⁰ R-152, ¶ 17.

¹²¹ *Id.* ¶ 18; Tr. 234:23-235:23.

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had checking in the middle section.¹²² Even if the “70 percent” figure were accurate, Professor Lewis admitted that she counted any check she could see, no matter how small.¹²³ Her published 2011 paper showed that the average check depth at two years since death was between 2 and 4 centimeters.¹²⁴

68. Professor Lewis’s conclusions are also supported by the MPB log samples she presented as part of her work in this case. For example, she provided photographs of samples from four MPB-killed trees that she cut down in 2011 at between seven and nine years since death.¹²⁵ These samples show a very low degree of checking, and are from logs that, assuming the checking in the samples is representative of that along the tree, would have easily made the grade for Grade 1. In other words, each of the samples are from logs dead for far longer than two years and could not be assigned Grade 4 if the 2006 rules were applied correctly.

¹²² R-73 at 10. The working paper was published in 2006, and summarized her research on trees dead five years or less (Phase 1). Trees with a mortality date of 2004 were trees that had been dead for two years. Only 17 percent of these trees showed checks in the middle section of the tree. Even for trees with a mortality date of 2003 (three years post-death), only 55 percent had a check in the middle section. It is important again to emphasize that Professor Lewis counted every check she could see, no matter how small. Tr. 440:16-441:5.

¹²³ Tr. 440:15-441:5.

¹²⁴ R-10, App. 3 at 134.

¹²⁵ R-10, App. 2 at 2-9.

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Dr. Lewis' sample of a log 7 YSD (sample taken in 2011; tree died in 2004). This sample was taken from middle of the tree and shows only two small checks. R-10, App. 2 at 2. Over 90 percent of wood volume is available to cut lumber.



Dr. Lewis' sample of a log 9 YSD (sample taken in 2011; tree died in 2002). R-10, App. 2 at 4. This sample was taken from the middle of the tree and shows only one large check. Over 80 percent of wood volume is available to cut lumber.

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Dr. Lewis' sample of a log 8 YSD (sample taken in 2011; tree died in 2003). R-10, App. 2 at 7. The sample was taken from the middle of the tree, and shows only one large check. Over 80 percent of wood volume is available to cut lumber.



Dr. Lewis' sample of another log 8 YSD (sample taken in 2011; tree died in 2003). R-10, App. 2 at 9. The sample was taken from breast height. Dr. Lewis provided no photo of the sample taken from the middle of the tree. However, her explanatory table stated that the sample taken from the middle of the tree had only one check; that is, the sample from the middle of the tree showed *less* checking than the breast height sample. Over 75 percent of wood volume is available to cut lumber.

F. The BC Mill Studies And Other Scientific Evidence Confirm That The Vast Majority Of MPB Timber Should Meet The 50/50 Test

69. All of the scientific evidence just discussed, and all of the Ministry's expectations are further borne out by lumber recovery studies assessing the volume and quality of lumber than can be produced from MPB timber. The mill studies and "shelf life" studies in this case date from previous MPB outbreaks in the late 1970s and 1980s to the current MPB infestation in BC. These studies uniformly show that MPB timber can be milled into merchantable lumber for many years after the trees have died, with only little loss of wood volume and lumber quality.

70. Eini Lowell and Kathy Lewis reviewed the published scientific literature comparing the volume and quality of lumber manufactured from MPB timber to that from green timber.¹²⁶ Ms. Lowell concluded from her literature analysis that MPB timber "generally remains suitable for the manufacture of dimension lumber for seven or more years."¹²⁷ Professor Lewis similarly concluded that recovery from green and red stage trees (trees with tight bark) is almost the same as that of live trees, and that recovery from grey-stage timber with loose bark is still sufficient for many products, including lumber.¹²⁸ As an example, in Dobie and Wright (1978), the authors found that lumber grade recovery was essentially identical for green, red, and grey-stage MPB timber with

¹²⁶ C-105; R-37 at 15-16.

¹²⁷ C-105 at 2.

¹²⁸ R-37 at 15- 17; Tr. 465:8-12; R-169 at SLAIII-US0087; C-105, ¶¶ 37-39; R-199.

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tight bark.¹²⁹ All three categories of MPB timber produced over 75 percent Grade 2 & Better lumber. For grey-stage timber with loose bark, recovery of higher grade lumber was somewhat less (63 percent), but still well above the 50 percent threshold in the 50/50 rule.

71. Perhaps the strongest evidence of lumber recovery, in terms of both lumber volume and quality, is provided by the series of British Columbia mill studies dated from 2006 to 2009.¹³⁰ These studies, which were funded by the BC government and carried out by a joint government-industry entity called FPInnovations, provide the most recent assessments of lumber recovery and used MPB trees from BC dead for 5 or more years, and were carried out at different sawmills in four distinct regions in BC.

72. The United States previously discussed the findings and significance of the BC mill studies in the Statement of Case and Reply,¹³¹ and we will not repeat the discussion here aside from the general conclusions. In terms of lumber volume recovery, the mill studies demonstrated that grey-stage timber dead five or more years will produce over 90 percent of the lumber that can be produced from green logs.¹³² Logically, the lumber recovery rates would be even higher for MPB timber between 1 and 5 years since death.

73. In terms of lumber value recovery, while the loss of value ranged from between 5.7 and 23.5 percent, well over 50 percent of the lumber produced from the

¹²⁹ R-70; R-37 at 16; C-105 at 4-5.

¹³⁰ C-5 C-39, C-40, C-41.

¹³¹ Stmt. Case, ¶¶ 78-94; Reply, ¶¶ 67-70.

¹³² C-5 at 20.

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grey-stage logs was “merchantable” under the 50/50 rule (Grade 2 & Better) in all four studies.¹³³ Once again, these results would be expected to be even better had MPB timber less than five years since death been used. The bottom line is that the small reductions in lumber volume and value observed in the mill studies are fatal to Canada’s defense. It is reasonable to expect from the mill studies that the majority of grey-stage timber dead five or more years will pass the 50/50 test.

74. Canada’s attempts to cast doubt on the results of the BC mill studies fall far short of the mark. As an initial matter, it should be noted that, while Canada submits that, for purposes of these proceedings, none of the many rigorous, scientific studies on lumber recovery are reliable (even though it has relied on them for years), it simultaneously submits that the entirely non-scientific field experience that led to the scaling changes in 2007 is a reliable basis on which to alter grading practices in ways that it knew would lead to more downgrades to Grade 4. Canada’s assertions that its 2007 scaling changes were “tested” or backed by science should be assessed in light of its insistence elsewhere that the leading research in the field, and studies that the BC government commissioned specifically to understand the effects of the MPB infestation on lumber quality, are unreliable.

75. Turning to Canada’s specific points, Canada’s first criticism is that [

] ¹³⁴ But this claim is flatly contradicted by

¹³³ C-39 (greater than 90 percent of lumber processed from grey-stage sample was “merchantable”); C-40 (61.7 percent); C-41 (71 percent); C-5 at 19 (84 percent).

¹³⁴ R-12, ¶¶ 244, 270; Stmt. Def. ¶ 195.

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contemporaneous statements from the BC Ministry, where BC in 2008 called the mill studies “real world benchmarks to help predict what impact processing higher volumes of grey stage MPB logs could have on individual operations.”¹³⁵ In FPInnovations’ 2007-2008 Annual Report, the company stated: “Given the configurations of the sawmills, companies can now more accurately predict how much volume and value loss they can expect when processing grey stage MPB logs.”¹³⁶ Similarly, a Ministry researcher wrote in 2008 that the studies provided “statistically sound data to assist industry and government in the assessment of economic shelf-life for MPB-attacked logs.”¹³⁷ The BC government’s contemporaneous statements and reliance on the studies¹³⁸ should be accorded more credibility than Canada’s contradictory statements offered in these proceedings.¹³⁹

76. Canada’s second attack on the BC mill studies was made through Professor Lewis, who speculated in her rebuttal report that the grey-stage samples in the studies may have included timber, even green-stage and red-stage timber, dead for less than five years.¹⁴⁰ But Professor Lewis was quick to walk away from this statement. She

¹³⁵ C-110, CAN-030083-84 at CAN-030083.

¹³⁶ C-111 at 13.

¹³⁷ C-112, CAN-050775-79 at CAN-050777 (the author was an employee of Forestry Innovation Investment (FII), an agency of the BC Ministry of Forests).

¹³⁸ C-110; C-111; C-112.

¹³⁹ [

] See Stmt. Def. ¶
195 (bracketed as confidential and redacted from the public version); R-12 (entire exhibit excluded as confidential).

¹⁴⁰ R-152, ¶¶ 32-39.

testified that she had no basis to believe that the study authors were incompetent or that the authors would falsify their results.¹⁴¹ She admitted she had no evidence that the grey samples consisted of something other than grey-stage trees, and that her statement is based solely on the fact that the timber stands from which the grey samples were harvested contained earlier-dead trees.¹⁴² She admitted that she would expect that the study authors would have selected for only grey-stage trees, and that if she were carrying out the studies it would have been important to have a pure sample of grey-stage trees.¹⁴³

77. In her rebuttal report, Professor Lewis offered for the first time the surprising new view that, using special aerial survey drawings she obtained of the areas in the mill studies, the sampled areas may not have had any grey-stage timber in them at all.¹⁴⁴ This theory did not withstand scrutiny at the hearing.¹⁴⁵ Professor Lewis admitted that the aerial survey data was inexact, and that an authoritative, Ministry-prepared map of MPB attack in 2003 showed attacked pine exactly where her maps showed there was none.¹⁴⁶

¹⁴¹ Tr. 467:23-468:3.

¹⁴² Tr. 469:1-6.

¹⁴³ Tr. 469:7-470:2.

¹⁴⁴ R-152, ¶¶ 35-37, App. 1.

¹⁴⁵ Tr. 470:5-478:9.

¹⁴⁶ Tr. 471:21-472:17; 477:4-478:9; R-172 at 5. At the hearing, we used a 2003 map to demonstrate that there was red-stage 1-2 year dead MPB timber in the exact area where the grey-stage timber in the Princeton study was obtained in 2008. Thus, it is perfectly reasonable to conclude, contrary to Professor Lewis's statement, that the study authors were able to locate grey-stage timber dead five or more years. The same demonstration can be done for the other three mill studies at Vanderhoof, Quesnel, and Prince George.

G. The Harvest Profile Bears Out The Expert Evidence

78. The change in the pine harvest profile is entirely consistent with what all of the expert evidence indicates and with BC's understanding of the lumber-suitability of MPB timber. For purposes of this arbitration, the United States has acknowledged that the pine harvest profile continued to change after 2006, and that, with some alterations and caveats, James Snetsinger's breakdown of the harvest during the subsequent years is generally correct. For example, during the hearing the United States presented a graphical representation of Mr. Snetsinger's data, adjusting for what, based on the documentary evidence, would have been left behind in the forest. At the hearing, Canada's industry witness [

] ¹⁴⁷

79. Assuming an adjusted profile based upon [] testimony (and continuing to use the remainder of Mr. Snetsinger's original profile), the breakdown unequivocally establishes that from 2006 to 2010, most of the pine harvest should have been grade Grades 1 or 2. We know this because during that time period most of the pine harvest was five or fewer years dead. MPB pine that is five or fewer years dead is in its prime for manufacture into lumber in part because, as Professor Lewis testified, that timber has minimal checking (and continues to have minor checking until about year

¹⁴⁷ C-203, ¶¶ 49-50, Ex. 2, Ex. 3. *See also* Tr. 959:5-18. Additionally, Tim Ebata testified that to the extent Mr. Snetsinger's data was based upon aerial photos, those photos are of limited value because they cannot be used cumulatively, as Canada has used them—particularly in the maps used during Canada's opening statement. Tr. 363:3-24.

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seven). In terms of specific percentages, in 2007, approximately 98 percent of the harvest was less than five years dead; in 2008, that percentage was approximately 96 percent; in 2009 approximately 92 percent of the harvest was less than five years dead, and in 2010, approximately 18 percent of the harvest was less than five years dead. Again, as Professor Lewis and Dr. Fettig agree, most checking happens between years one and two, and then not until year seven. Most of the harvest during these years should have passed the 50/50 test. Only the bottom segment of the chart (in gray) could have deteriorated beyond what BC was reporting for logs dead two years (and even gray stage timber does not suffer enough checking to fail the 50/50 test). Indeed, BC's projection of shelf life *for making lumber* went from "4-8 years"¹⁴⁸ in 2007 to at least ten to 20 years in 2010.¹⁴⁹ In this respect, it would be reasonable for the amount of Grade 4 to have increased only minimally between 2007 and 2010 (and after). Although Canada is correct that there was more, longer dead MPB timber after 2006, the character of the timber, at least as far as checking, was similar to MPB timber dead less than two years. Timber dead about two years made up a significant portion of the pre-reform pine harvest. All of the changes BC implemented to identify checks (which are discussed in detail below) were simply an attempt to recreate the old grading system in which all visible MPB (MPB that has been dead less than two years) logs were sold for minimum stumpage.

80. This is entirely consistent with what [] and Mr. Snetsinger testified about actual lumber recovery. []

¹⁴⁸ C-44, at CAN-015328-29.

¹⁴⁹ C-108, at 2.

] ¹⁵⁰ [

] ¹⁵¹ Mr. Snetsinger then testified in his rebuttal statement (and attached Wood Markets Report) that live pine (what [

]) yields approximately 44.2 percent of actual lumber.¹⁵² A grey stage log that is 4-5 years dead yields approximately 42.8 percent. That amounts to less than a two percent difference of actual lumber yields between a green log and a grey stage, MPB log. That difference is simply not of a magnitude that would justify the rise in Grade 4 between 2007 and the present, or really any significant rise at all.

81. The evidence, therefore, fails entirely to support Canada's theory that timber prior to 2007 was passing the 50/50 test by a razor thin margin, and after 2007 was failing the 50/50 test by a razor thin margin. And it is important to note that this theory was offered by counsel only — never by any witness. Canada's witnesses did testify, however, [

] So, according to both the science and producers' experience, the harvest profile is in reality, of much better quality than Canada has represented in this case.

82. Finally, contrary to Canada's contention that mills do not possess data tracking what becomes of Grade 4 logs, [

¹⁵⁰ Tr. 926:19-927:1.

¹⁵¹ Tr. 938:16-939:9.

¹⁵² R-149 at Appx. A at 2.

] ¹⁵³ [

] ¹⁵⁴ [

] ¹⁵⁵ This data would

be enormously helpful in assessing the accuracy of actual grading at an actual mill, but Canada has determined not to provide the data to the United States or even to attempt to seek whatever permissions it would need to do so.

83. Regardless, there is no dispute that companies like [] are using MPB timber that has been graded Grade 4 and manufacturing that timber into lumber; in fact this is a point that Canada strenuously emphasizes.¹⁵⁶ [] would not rationally do this if that timber were not suitable to be made into lumber. It simply cannot be failing the 50/50 test in quantities [] Rather, it should be passing the 50/50 test, consistent with the empirical evidence *on which BC relies*. This evidence tells us that until a log is seven years dead, it likely has no more checking than it did at two years dead. And if checks are the most important factor toward downgrade, a log generally should remain Grade 1 or Grade 2 until at least seven years since death. This is consistent with what BC anticipated when it enacted the 2006 reforms.¹⁵⁷

¹⁵³ Tr. 1652:21:1653:19 (characterizing the United States' contention as a "tirade").

¹⁵⁴ Tr. 924:19-20, *see also* Tr. 942:13-24.

¹⁵⁵ Tr. 942:13-943:17.

¹⁵⁶ Tr. 136:5-137:2; Tr. 1644:19-22; Tr. 1645:16-17.

¹⁵⁷ Canada contends that the correlation between Grade 4 and the percentage of pine greater than two years dead is meaningful. It does not follow that the percentage of the

H. Professor Kalt's Drying Studies Only Confirm Misgrading

84. In his rebuttal report, and again at the hearing, Professor Kalt presented a log dryness analysis that, Canada claimed, showed that there was no change in Grade 4 patterns after 2006, when the United States remedy assumes that misgrading began.¹⁵⁸ Taking BC Ministry data from 66,000 scaled loads of BC Interior logs, Professor Kalt focused on approximately 20,000 loads that consisted of at least 80 percent pine and had available data on “years since death.”¹⁵⁹ Professor Kalt then defined “log dryness” as the inverse of “log density,” and purported to show that drier logs were more likely to end up as Grade 4.¹⁶⁰ He grouped the different loads into “buckets” according to the percentage of Grade 4 in the load, and he found that the buckets with higher percentages of Grade 4 tended to come from drier loads. This, Canada maintains, indicates that there was no misgrading.

85. Professor Kalt's dryness analysis established nothing of the sort. If Professor Kalt had wished to use dryness as an indicator of log quality, then he should

harvest dead three or more years *determines* the proper amount of Grade 4. Indeed, when the alleged correlation in 2006 is removed, misgrading becomes the only plausible explanation. Some substantial share of Grade 4 lodgepole pine even in 2006 is likely to have been caused by factors other than the MPB. Many factors other than the MPB can cause a log to be downgraded from a sawlog: fire, other pests, damage during hauling, and so on. Data on the record demonstrate that this is in fact the case. Professor Kalt's work papers show that in 1999 – just as the current MPB epidemic was beginning – more than 9 percent of the lodgepole pine harvest was graded as Grades 4, 5, and 6, and another 9 percent was graded at Grade 3 and also sold for minimal stumpage rates. It is reasonable to assume that some non-zero portion of the 2006 Grade 4 lodgepole pine harvest also was unrelated to MPB attack. Indeed, Canada has conceded that there is a “base level of Grade 4” that has nothing to do with MPB attack. Tr. at 1650:3-8.

¹⁵⁸ Tr. 1471:3-1476:19; R-151 (Kalt Rebuttal ¶¶ 67-71 & Figures 5a-e and 6).

¹⁵⁹ Tr. 1471:11-25; R-151 (Kalt Rebuttal ¶ 67).

¹⁶⁰ Tr. 1471:9-1476:19; R-151 (Kalt Rebuttal ¶¶ 67-71 & Figures 5a-e and 6).

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have examined how the Grade 4 share of logs of a *given dryness level* (impliedly, at a given quality level) changed over time. That is, to perform a meaningful analysis, Professor Kalt should have put the log loads into a “bucket” according to the level of dryness of the load, and then tested whether the Grade 4 shares of the buckets increased over time. If the share of Grade 4 in fact increased over time in buckets of equivalent dryness, then that would suggest the presence, not absence, of misgrading. And that is precisely what Ministry data examined by Professor Kalt showed.

86. As shown in the table below, data from 19,859 loads that appear in Professor Kalt’s Figures 5a-e and 6, are divided into 10 dryness buckets. Using the buckets that Professor Kalt used in his analysis, the exhibit shows how the percentage of Grade 4 changes *within each dryness bucket* from 2006 to 2010.¹⁶¹ The results are illuminating. In the least dry buckets, which likely correspond to live or recently dead pine, there was generally only a small increase in the percentage of Grade 4 over time. In the driest buckets, which likely correspond to middle and late grey stage attack pine, the Grade 4 percentages were high, even in 2006, and there was only a small increase since 2006. The buckets with a middle level of dryness, which likely correspond to red attack and early grey stage attack, however, showed a substantial increase in the amount of Grade 4, suggesting a significant change in grading policy or misgrading.

¹⁶¹ Kalt workpaper, Fig. 5-6_Dryness_(Years Since Death) YSD.

**Grade 4 Percentages By Load Dryness Levels
Including Only Observations That Appear In Kalt Figures 5a-e And 6**

Dryness Bucket	2006	2007	2008	2009	2010
.00107	16.2%	16.3%	12.8%	10.1%	4.0%
.00112	4.0%	8.9%	9.9%	8.4%	6.6%
.00122	8.2%	10.2%	13.6%	8.1%	12.0%
.00132	10.9%	16.4%	22.3%	20.4%	20.0%
.00142	15.1%	22.5%	37.0%	37.6%	35.3%
.00152	17.8%	25.7%	51.2%	54.2%	56.5%
.00162	21.9%	30.6%	55.8%	65.7%	62.4%
.00172	30.1%	41.8%	65.0%	69.7%	71.7%
.00182	53.1%	63.5%	75.8%	78.0%	74.6%
.00187	84.2%	82.9%	83.8%	84.9%	78.7%
Total	19.6%	28.7%	51.2%	52.7%	49.2%

Figure 3.

Source: Backup to Kalt Figure 5 from Kalt Workpapers

- 1) 201108_SLA_Log_Dimensions_v3 mdb
- 2) Sample Log Dimension data 2006_2007v3.accdb
- 3) Fig5-6_Dryness_YSD.sas
- 4) log_YSD_readin.sas

87. Figure 3 above shows a striking increase in Grade 4 in 2007 and after in the buckets exhibiting a middle range of dryness. For example, in the dryness bucket represented by 0.00152 (inverse) log density, the Grade 4 percentage was 17.8 percent in 2007, 51.2 percent in 2008, 54.2 percent in 2009, 56.5 percent in 2010, and 53.3 percent in 2011. These results show a remarkably disparate grading treatment of logs with the same level of dryness, and, according to Professor Kalt’s assumption, the same apparent level of quality. After 2006, similar logs were significantly more likely to be assigned Grade 4. Thus, rather than suggesting an absence of misgrading as Canada suggests, in fact the dryness data on which Professor Kalt relied in his rebuttal report and at the hearing provide powerful, corroborating evidence of misgrading.

88. Figure 4 below presents the same analysis using all of Professor Kalt’s data for 24,739 pine-dominated loads, rather than excluding some of these loads as

Professor Kalt does due to the absence of data on years since death.¹⁶² The more comprehensive data set depicted in Figure 4 corroborates misgrading even more starkly than the limited data set shown in Figure 3. Figure 4 demonstrates not only a huge increase in the percentage of Grade 4 since 2006 for logs of middle dryness, but also significant increases in the low-dry and high-dry log load categories as well. These data confirm that grading policy changes occurred in BC Interior after 2007 and they resulted in having logs of similar dryness graded differently. Logs of similar dryness were increasingly assigned Grade 4. Canada had no explanation for this change in grading results.

Grade 4 Percentages By Load Dryness Levels Excluding Marks With Less Than 80% Pine Volume						
89. Dryness Bucket	2006	2007	2008	2009	2010	2011
.00107	10.3%	13.3%	14.1%	10.1%	3.7%	13.2%
.00112	3.9%	8.0%	9.9%	7.5%	7.3%	7.1%
.00122	7.7%	10.2%	13.0%	9.2%	12.6%	17.5%
.00132	10.4%	15.6%	21.7%	22.9%	21.1%	24.4%
.00142	14.8%	22.0%	37.3%	37.1%	36.2%	36.1%
.00152	17.8%	25.5%	50.6%	53.5%	57.9%	53.3%
.00162	22.3%	30.0%	55.7%	65.1%	63.5%	60.5%
.00172	30.6%	41.0%	64.7%	69.6%	70.7%	65.0%
.00182	52.2%	64.6%	76.1%	77.7%	74.0%	54.5%
.00187	76.9%	84.2%	84.0%	84.6%	78.7%	73.2%
Total	19.0%	27.7%	50.1%	51.5%	49.3%	38.6%

Figure 4.

Source: Backup to Kalt Figure 5 from Kalt Workpapers

- 1) 201108_SLA_Log_Dimensions_v3 mdb
- 2) Sample Log Dimension data 2006_2007v3.accdb
- 3) Fig5-6_Dryness_YSD.sas
- 4) log_YSD_readin.sas

I. What Actually Happened in May 2007

90. The evidence in these proceedings—including the scientific data, harvest profile, and BC documents and witness testimony—support the U.S. explanation for the

¹⁶² R-151, Kalt Figures 5a-e and 6.

rapid increase in Grade 4 and leave no other possible explanation. A sudden and rapid deterioration in timber quality does not explain the Grade 4 increase; rather, a sudden and rapid change in BC's grading practices explains the rise. BC changed its grading practices to provide immediate assistance to its industry in a bad economy. The SLA went into effect just before the most devastating downturn in the housing market in decades. By 2007, the United States housing market was "collapsing,"¹⁶³ and the BC lumber industry—by far the largest supplier of housing wood to the United States—was struggling.¹⁶⁴ Burdened by a depressed housing market and a strong Canadian dollar against the United States dollar, BC lumber producers faced what West Fraser, the largest lumber producer in the world, called "the most difficult year" in over a half century.¹⁶⁵

91. The 2006 reforms generally worked as planned immediately after the reforms took effect, and by the end of one year, the industry was complaining about the having to pay more stumpage in a bad market, and complaining about the financial toll the SLA's requirements were taking.¹⁶⁶ Industry complaints caused BC to look for ways to provide financial relief. First, BC allowed local scaling communities to institute their own solutions. After concluding that use of "local knowledge" was ineffective in producing consistent, systemic change, BC provided an "immediate solution" in the form of province-wide changes to the way logs were scaled. This solution took many forms: from amendments to the scaling regulations, to kiln warming, to changes in bucking

¹⁶³ Tr. 1499: 8-12.

¹⁶⁴ See R-15 at 4.

¹⁶⁵ R-15 at 4.

¹⁶⁶ *Id.*

practices. Each contributed to the dramatic increase in Grade 4 between May 2007 and the present.

1. The Industry Took Matters Into Its Own Hands By Developing Local Knowledge Contrary To The 2006 Reforms

92. As early as December 2006, the Interior Scaling Advisory Committee, Grading Subcommittee noted a “concern that there is a drop in number of Grade 4,” and that members “[k]now checks are deeper.”¹⁶⁷ These concerns led directly to the issuance of BC’s February 2007 memo encouraging local scaling communities to develop so-called “local knowledge” in the assessment of checks.¹⁶⁸ To be clear, concerned over the decrease in flat-stumpage fee timber, the industry pressed BC for changes that would increase that percentage of flat-fee stumpage. Unable to find a market-based reason to change the definition of Grade 4, the industry preferred to change the way checks were treated, despite the implications for the SLA.¹⁶⁹ And by sending the local knowledge memo to the entire industry, BC allowed the industry to take make the first attempt remedy the industry’s frustration without making any formal changes.

93. In deciding to encourage local knowledge, the BC Ministry did not rely on empirical data on the correlation of grading and log quality. Rather, the Ministry was responding to industry complaints that it “knew” that checks were deeper than they appeared, or, in other words, that logs being assigned to Grade 2 or higher should have

¹⁶⁷ C-138, CAN-007174-76 at CAN-007176.

¹⁶⁸ C-45, CAN-010975.

¹⁶⁹ C-145, CAN-011549 (noting that to redefine Grade 4 would “{e}mulate practice.” In the subsequent transcription of the white board, [] C-153, CAN-011573-78, at CAN-011577. This is a substantive and revealing alteration.

been assigned to Grade 4. Industry wanted to be able to assign more logs to Grade 4. And the BC Ministry explored how to accommodate this, without even verifying its industry's observations in any rigorous, empirical way, even though the Ministry and industry had just completed two years of testing the logs grades and scaling conventions.

94. Just three months after the wide dissemination of the local knowledge memo, the first dramatic rise in Grade 4 occurred.¹⁷⁰ During the hearing, Canada made light of the rise in Grade 4 that followed on the heels of the local knowledge memo.¹⁷¹ Professor Kalt insisted that his regression analysis showed no causation between the rise in Grade 4 and the memo. Canada then suggested that the initial increase was simply the result of the seasonal difference in grading,¹⁷² ignoring the reality that the 2006 reforms worked almost exactly as expected the previous year—through all four seasons.¹⁷³

95. The local knowledge memo and subsequent reaction was just the beginning of BC's concerted effort to bring the industry some economic relief by increasing the amount of Grade 4 and accompanying low stumpage fees.

2. Because The Local Knowledge Directive Provided Inadequate Relief, BC Instituted Changes To The Scaling Regulations

96. Throughout 2007, the industry expressed its concern and anxiety to the Ministry, repeatedly raising the issue of checks¹⁷⁴ and insisting that the current approach

¹⁷⁰ US Opening Demonstrative 1-2.

¹⁷¹ Tr. 1674:16-22.

¹⁷² Stmt. Defence, ¶ 218.

¹⁷³ US Opening Demonstrative 1-2.

¹⁷⁴ See, e.g., C-138 (December 2006 ISAC meeting minutes) CAN-007174-76, at CAN-007176; C-139 (January 2007 ISAC grading sub-committee meeting minutes), CAN-

of relying on local knowledge was “not enough.”¹⁷⁵ [

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97. [

] ¹⁷⁷ [

] ¹⁷⁸ while Jeff Monty, the manager for BC’s scaling section,¹⁷⁹

[

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] ¹⁸¹ [

011000-05 at CAN-011003; C-115 (March 2007 ISAC meeting minutes), CAN-007183-89 at CAN-007189; C-49 (September 2007 ISAC meeting minutes), CAN-011306-29 at CAN-011309.

¹⁷⁵ C-49, CAN-011306-29 at CAN-011309 (“local knowledge is not enough.”).

¹⁷⁶ C-52, CAN-010637-010644, at CAN-010640.

¹⁷⁷ *Id.*

¹⁷⁸ C-52. CAN-010637-010644, at CAN-010640.

¹⁷⁹ Tr. 633: 7-13.

¹⁸⁰ C-52, CAN-010637-010644, at CAN-010640.

¹⁸¹ *Id.* at CAN-010640-41.

] ¹⁸² [

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James Crover, Scaling Policy Forester at the Ministry, admitted on cross-examination, BC ultimately decided to address industry's concerns through a "scaling approach."¹⁸⁴

The "scaling approach" consisted of BC's development and promulgation of the December 2007 scaling requirements.¹⁸⁵ Throughout these proceedings, the United States has identified five particular changes that led to an increase in the amount of timber graded as Grade 4, each of which is addressed, in turn, below:

- the creation of rules applying only to MPB-killed timber, especially MPB timber with less than 50 percent bark coverage;
- the treatment of checks two centimeters or less in depth as grade deductions;
- the deduction of a two centimeter collar;
- the length-of-check convention;

BC also introduced two additional changes to the grading system during this time:

- the increased use of bucking before scaling;
- and kiln warming

98. With respect to the changes to the scaling manual, each of them was in place in July 2007 and codified in December 2007 as part of the new scaling

¹⁸² Tr. 645: 7-15; C-52, CAN-010637-010644 , at CAN-010637.

¹⁸³ Tr. 668: 4-13; *see also* C-52, CAN-010637-010644, at CAN-010637.

¹⁸⁴ Tr. 641: 23-642: 2; *see also* Tr. 668:4-13.

¹⁸⁵ Tr. 641: 23-642: 2; *see* Tr. 668:4-13; *see also* C-82.

requirements and are, as the United States established during the hearing, departures from the grandfathered system. Canada has attempted to characterize these changes as mere clarifications.¹⁸⁶ Not only are these *post hoc* rationalizations extremely confusing, they are directly contradicted by the text of BC's own scaling manual¹⁸⁷ and contemporary documents demonstrating that the December 2007 scaling requirements were, in fact, changes from the grandfathered scaling and grading system. Each of these changes is discussed in turn below.

a. Rules Specific To MPB-Killed Timber

99. The log grades introduced by the 2006 reforms and grandfathered by the SLA did not distinguish between live and dead pine.¹⁸⁸ In fact, the primary motivation for the 2006 reforms was to move away from a system that was based only whether a log came from a live or dead tree.¹⁸⁹ After April 2006, all pine was graded against the same standard and in the same manner,¹⁹⁰ a system that BC had implemented specifically “to

¹⁸⁶ See, e.g., Tr. 1686: 12-13 (2 cm defect rule enacted to “resolve a conflict in the Scaling Manual”).

¹⁸⁷ The grandfathered scaling and grading system, meaning the rules in effect on July 1, 2006, are contained in Exhibit R-19, on the pages bearing the legend “Amendment No. 7 April 1, 2006.” Additionally, the April 1, 2006 amendments contained in Exhibit R-19 are also found in Exhibit C-50, the version of the scaling manual published on May 1, 2007. However, the section numbers have been changed and some minor changes have been made to the text. The 2008 version of the scaling manual is located at Exhibit C-48.

¹⁸⁸ C-22, CAN-000420.

¹⁸⁹ *Id.*

¹⁹⁰ R-19 at 6.6.3.3 (Premium Sawlog – Grade Code 1), 6.6.3.4 (Sawlog - Grade Code 2) at 6-108-111.

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ensure beetle wood is appropriately priced.”¹⁹¹ The 2006 reforms did not contemplate that BC would price MPB-timber differently from other pine.

100. In December 2007, however, BC violated this understanding when it introduced the new scaling requirements, a set of amendments to the grandfathered system applicable only to MPB-killed timber.¹⁹² Under the December 2007 scaling requirements, logs with blue stain or beetle galleries – MPB timber – were graded under a different procedure from all other timber.¹⁹³ The new scaling requirements then further distinguished between MPB-killed timber with less than 50 percent bark coverage and MPB-killed timber with more than 50 percent bark coverage, assessing each category by its own set of standards.¹⁹⁴ The new procedure and standards for the grading and scaling of MPB-timber in the 2007 scaling requirements were later codified in the 2008 version of the scaling manual.¹⁹⁵

101. These amendments departed from the grandfathered system. The grandfathered system did not distinguish between logs from live versus dead trees and did not contain special procedures or standards applicable only to MPB-killed timber or based upon bark coverage. By contrast, the December 2007 scaling requirements re-introduced the pre-2006 distinction between logs from live and dead trees, thus having

¹⁹¹ C-20, CAN-000442.

¹⁹² C-82, CAN-011400-402 at CAN-011402; *see also* Tr. 516: 10-13.

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ C-48, CAN-007998-8174 at CAN-008123 (procedure) (9-7); *id.* at CAN-008131-32 (Log Requirements to Make the Grade) (9-15-16).

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the practical effect of reverting to a system of grading based, at least in part, upon whether or not a log came from a dead tree — a characteristic the BC Ministry has stated is *not* determinative of log quality.¹⁹⁶

102. Additionally, the scaling requirements singled out for particular consideration MPB-killed logs with less than 50 percent bark coverage. Under the 2007 amendment, logs of a certain size (8-9 rads) with less than 50 percent bark could be downgraded based upon fewer defects than under the 2006 reforms. Specifically, as forestry expert Tom Beck testified, requiring fewer checks to downgrade a log with less than 50 percent bark coverage allowed scalers to downgrade those logs based upon fewer checks, meaning that a greater number of those logs would be downgraded.¹⁹⁷ Mr. Beck stated that this distinction is “really significant” because a large number of logs and volume fall within the 8-9 rad range.¹⁹⁸

103. Embedded within the 2007 scaling requirements applicable only to MPB-killed timber were at least three more explicit changes to the scaling and grading system that allowed scalers to more easily downgrade MPB timber. These additional changes also resulted in logs that would have been Grade 2 under the grandfathered system likely being classified as Grade 4 under the 2007 amendments.¹⁹⁹

¹⁹⁶ C-22, CAN-000420.

¹⁹⁷ *See* C-82, CAN-011400-402 at CAN-011402; Tr. 562:19-563:3.

¹⁹⁸ Tr. 562:19-563:3.

¹⁹⁹ Based upon discussions that occurred at an ISAC meeting in February 2008, it appears that BC considered the December 2007 conventions would result in a 20% increase in grade 4. C-145, CAN-011549; *see* C-153, CAN-011573-011578, at CAN-011577-78.

b. Surface Checks Less Than Two Centimeters In Depth

104. Under the grandfathered system, shallow surface checks were not considered for grade reductions.²⁰⁰ In particular, the 2006 scaling manual states that “[s]urface checks 2 cm or less in depth are not entered in the grade reduction calculation.”²⁰¹ The 2006 scaling manual repeats the same phrase in the sawlog requirements, specifically declaring in the grade requirements that “outside surface checks 2 cm or less in depth are not accounted for in the grade reduction.”²⁰² Thus, in April 2006, BC’s timber grading system explicitly stated that checks less than two centimeters in depth were not considered when determining the grade of a log.²⁰³ Additionally, Mr. Crover, BC’s senior Ministry official responsible for timber scaling and grading policy during the relevant time period,²⁰⁴ confirmed that, under the 2006 scaling manual, surface checks less than two centimeters in depth did not serve as a basis for downgrading logs²⁰⁵ and that the 2006 Interior Grade Endorsement Seminar Student

²⁰⁰ See, e.g., R-19 at 6.4.4 (“Surface checks 2 cm or less in depth are not entered in the grade reduction calculation.”); 6.6.6.4.2 (“Outside surface checks 2 centimeters or less in depth are not accounted for in the grade reduction.”); see also C-81, CAN-007343-56 at CAN-007354 (“confusion between surface checking and grade deduction checks”).

²⁰¹ R-19 at 6.4.4 (Factors Unique to Interior Grading).

²⁰² R-19 at 6.6.3.3 (Premium Sawlog – Grade Code 1), 6.6.3.4 (Sawlog - Grade Code 2) at 6-108-110.

²⁰³ R-19 at 6.4.4 (“Surface checks 2 cm or less in depth are not entered in the grade reduction calculation.”); 6.6.6.4.2 (“Outside surface checks 2 cm or less in depth are not accounted for in the grade reduction.”); see C-82, CAN-011400-402 at CAN-011402 (quoting Scaling Manual 9.2.2.).

²⁰⁴ Tr. 570:16-571:12.

²⁰⁵ Tr. 676: 6-9.

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manual instructed that surface checks two centimeters or less in depth must be ignored and would, therefore, not serve as a basis for downgrading.²⁰⁶

105. Starting informally in May 2007 and formally in December 2007, however, BC began to consider surface checks less than two centimeters in depth as part of the grade reduction calculation. In the scaling requirements, BC stated that the “current statement” in the scaling manual that “surface checks 2 cm or less in depth are not part of the grade reduction calculation” would “no longer be applicable.”²⁰⁷ In addition to that explicit repeal of the grandfathered rule, BC further stated that “[a]ll visible checks at log ends must be considered, regardless of depth or width, or whether a feeler gauge can be inserted. For example: a thin black line visible at the log end and/or bole may be considered a check.”²⁰⁸ This change to the scaling rules was introduced in July 2007 and formally took effect in December 2007.²⁰⁹ The change was also incorporated into the 2008 version of the scaling manual: the prohibition on deducting for checks less than two centimeters in depth was removed from section 9.2.2 regarding checks.²¹⁰ Therefore, beginning in December 2007, BC scalers were able to deduct for all visible checks when, under the grandfathered system, scalers could only deduct if a

²⁰⁶ Tr. 679: 1-8; *see also* C-177, CAN-020826-020870 at CAN-010282.

²⁰⁷ C-82, CAN-011400-402 at CAN-011402; C-84, CAN-010278-325 at CAN-010289; C-48, CAN-007998-8174 at CAN-008123.

²⁰⁸ C-82, CAN-011400-402 at CAN-011402.

²⁰⁹ C-82, CAN-011400-402 at CAN-011400 (“The scaling requirements for checks are to be implemented December 1, 2007.”).

²¹⁰ C-48, CAN-007998-8174, at CAN-008122 (9-6).

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check was at least two centimeters or more in depth. This was a change to the scaling and grading system that increased the share of Grade 4 timber.

106. Importantly, the changed treatment of checks two centimeters or less in depth enabled BC scalers to downgrade logs, meaning that logs that would have been classified as Grade 2 under the grandfathered system could be classified as Grade 4 under the December 2007 changes. Under the plain text of the changes to the scaling manual, a check that would not have been a grade deduction under the grandfathered system suddenly became a grade deduction. As master scaler Frank Duran explained, and Canada did not challenge, *all checks, including shallow surface or end checks*, became eligible for deductions when a scaler graded a log after December 2007.²¹¹ Therefore, once the grandfathered rule was rescinded, scalers were able to deduct volume associated with small surface checks, as well as any trim allowance and any volume lost in accordance with the so-called “ten centimeter between defects” rule.²¹² Additionally, Mr. Tom Beck testified that BC scalers were allowed, after December 2007, to consider “shallow surface checks which are two centimeters or less deep . . . as a possible factor for downgrading” and that this change “contributed to the major increase in Grade 4 that occurred between 2007 and 2009.”²¹³ Canada did not challenge Mr. Beck on this conclusion. The un rebutted evidence demonstrates that the sudden consideration of checks two centimeters or less in depth as deductible defects was a clear change from the grandfathered scaling manual and led to an increase in grade 4 logs.

²¹¹ C-106, ¶¶ 14, 16-18.

²¹² C-107 ¶ 43; C-106 ¶ 14; Tr. 1622:20-16:23:5.

²¹³ Tr. 514: 19-25.

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i. *Canada's Response*

107. To the extent Canada attempted to downplay this change, it merely confused the issue by offering contradictory and implausible explanations of its own rules.

108. As discussed above, the 2007 amendments changed sections 9.2.2 and 9.2.3 of the scaling manual. Prior to the 2007 amendments, the sections read as follows:

9.2.2 Surface or Weather Checks

- Logs subjected to prolonged decking prior to scaling and logs cut from trap trees (an insect control measure) are graded as if they were without checks.
- Surface checks 2 cm or less in depth are not a part of the grade reduction calculation.

In circumstances where surface checks and end checks are due to delays in scaling the Forest Service may order the checks to be disregarded.

9.2.3 Delay in Scaling

For the purpose of assessing checks, “a check is a check, is a check”, unless;

- logs have been decked for a period of time such that the ends of the logs are dark and weathered,
- a field scale was previously conducted on the timber, or
- a determination has been made by the District Manager that a delay has occurred.²¹⁴

109. [

²¹⁴ C-50, CAN-008253 at CAN-008509.

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110. [

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111. When the amendments went into effect, only the second and third proposed deletions were, in fact, deleted.²¹⁶

112. Canada attempted to downplay the significance of the deletions by suggesting that its removal was a matter of “interpretation” of the Scaling Manual rather than a substantive change to it. James Crover was the Scaling Policy Forester for the

²¹⁵ C-52, CAN-010637-010644 at CAN-010637-38.

²¹⁶ C-48, CAN-007990-008174, at 008122-23.

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Ministry of Forests and Range in 2007, and in that capacity he reviewed the proposed amendments for consistency with scaling policy and made recommendations to his superiors.²¹⁷ He testified that “we had been interpreting 2-centimeter surface checks as being not contributing to grade reduction, *and the primary reason for that had been because of delay in scaling,*” because “with normal, healthy trees, if there’s a 2-centimeter surface check, we consider that it is associated with some failure to scale the wood in an appropriate length of time.”²¹⁸ In his view, “rescind[ing] [the second bullet of section 9.2.2 of the grandfathered scaling manual] would be following up on the other part of our note in the Scaling Manual which talks about check scalers may choose to allow those surface checks.”²¹⁹ Later in his testimony, he repeated this justification, explaining that, in his view, “if those checks were not due to delay in scaling, such as would be the case with a mountain pine beetle infestation where the wood was coming in already dead, already having lost its bark, then the checking that would have resulted from the exposure to the elements unprotected by bark could not be considered to be due to a delay in scaling.”²²⁰ This testimony is not supported by the text of the Scaling Manual.

113. Before the December 2007 Scaling Requirements, section 9.2.2 of the Scaling Manual was plain: “Surface checks 2 cm or less in depth are not a part of the

²¹⁷ See Tr. 575:14-19.

²¹⁸ Tr. 642:18-24 (emphasis added).

²¹⁹ Tr. 642:25–643:2.

²²⁰ Tr. 657:15 – 657:21; *see also* Tr. 674:19-22 (stating that under the April 2006 amendments to the Scaling Manual, shallow surface checks could serve as a basis for downgrading a log).

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grade reduction calculation.”²²¹ That provision was essentially the same in the April 2006 version of the Scaling Manual.²²² Neither the 2006 version nor the 2007 version imposed any limitation on the requirement that checks less than two centimeters were not considered as part of the grade reduction. The purpose of measuring checks is to assess the volume of a log that is available for the manufacture of lumber, and because surface checks two centimeters or less do not prevent the area affected by the check from being manufactured into lumber, there is no reason they should be considered as part of the grade reduction.

114. Tom Beck explained why two centimeter checks do not prevent the area of the log where they occur from being manufactured into lumber.²²³ The nominal depth of a two-by-four piece of lumber is 3.8 centimeters, and, therefore, a two centimeter check in a log cannot penetrate through any lumber that could be cut from that section of the log.²²⁴ The small check in the log may, no doubt, result in a small check in the lumber, but such a check would not prevent the manufacture of lumber as that term is used for purposes of the first prong of the 50/50 rule. Indeed, Mr. Beck demonstrated several real-life examples of high grade lumber containing checks that could have been caused by the

²²¹ C-50, CAN-008253-008742 at CAN-008509.

²²² R-19 § 6.6.6.4.2 (p. 6-110) (“Outside surface checks 2 cm or less in depth are not accounted for in the grade reduction.”).

²²³ *See* Tr. 518:10-520:1; *see also* C-107, ¶¶ 46-49 & Fig. 5.

²²⁴ Tr. 519:18-22 (“[R]emember a piece of lumber that two-by-four that we looked at is 1.5 inches or 3.8 centimeters deep, and so a check would have to be at least that deep to penetrate through the full [sic] from face to face . . .”).

type of shallow surface checks contemplated by section 9.2.2.²²⁵ [

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115. Thus, before BC promulgated the December 2007 Scaling Requirements, the second bullet of section 9.2.2 reflected an implementation of the proposition, frequently invoked by Canada,²²⁷ that a log's suitability for manufacture into lumber be determined by its visible physical characteristics. If the manual could impose requirements and explicitly tie them to delay, such as those found in section 9.2.3, there is no reason to assume that 9.2.2 – which says nothing whatsoever about delay – concerned delay at all.

116. The text of the 2007 Scaling Manual supports this this reading of sections 9.2.2. and 9.2.3. The first bullet directs scalers to treat logs subject to prolonged decking or logs cut from trap trees as if they had no checks.²²⁸ Thus, the delay of prolonged decking *or* a tree's status as a trap tree could result in any checks being disregarded, and since only one of those has to do with delay, it stands to reason that section 9.2.2 is not related to delay-caused checks.

²²⁵ See generally Tr. 496:8 – 502:1 (discussing lumber samples and noting checks in the wood).

²²⁶ Tr. 900:21-901:2; 904:16-24.

²²⁷ See, e.g., Tr. 1685:1-12 (“{T}he challenge of the scaler is one of assessing the visible characteristics of each log’ {A scaler} determin{es} what can be recovered from {a log} with strict reference to schedules of log grades. That means by the book, by the Scaling Manual, by the process that the scaler is instructed to follow under the grandfathered system.”) (quoting R-19 § 6 (p. 6-1)).

²²⁸ C-50, CAN-008253-008742 at CAN-008509.

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117. Mr. Crover undermined Canada's position regarding the second bullet of section 9.2.2 later in his testimony when he suggested that the deletion was limited. In response to a question from the Tribunal about how to reconcile the decision, reflected in the December 2007 Scaling Requirements, to delete the second bullet point of section 9.2.2 but to leave in the first bullet point and the text box, Mr. Crover explained that the second bullet in section 9.2.2 "was no longer applicable . . . in those situations where we were dealing with a log with less than 50 percent of the bark, with checking, and with either blue stain or beetle galleries evidenced on the log."²²⁹ To further clarify, he stated: "In all other situations, for pine, for all other species, 9.2.2, to the best of my recollection, *in its entirety*, still applied."²³⁰ That is incorrect, but telling. The implicit limitation he testified he recalls, can be found nowhere in the December 2007 Scaling Requirements or in the cover memorandum announcing the amendments.²³¹ When confronted with that contradiction, Mr. Crover explained it away in the shallowest of terms: "It doesn't state that directly. That was the way we interpreted it and the way we meant people to use it."²³² He referred to no contemporaneous documentation to support his statements, and we are aware of none.

118. Taken as a whole, Mr. Crover's testimony justifying the change to the treatment of checks 2 centimeters or less relied upon two implicit assumptions. First,

²²⁹ Tr. 660:15-18; *see also* Tr. 688:2-10 (providing explanation of the change to section 9.2.2 that is coherent only if understood as limiting the change to logs with less than 50 percent of their bark).

²³⁰ Tr. 660:19-21 (emphasis added).

²³¹ *See* C-82, CAN-011400-02 at CAN-011400, CAN-011402.

²³² Tr. 690:6-8.

before the December 2007 Scaling Requirements someone reading the manual had to understand that there was an unwritten requirement that the checks should be ignored only if they were caused by delay. And second, after the implementation of the amendments, which were purportedly intended to clarify the rules, a new unwritten requirement that the rules applied only to logs with less than 50 percent of their bark.

ii. *Canada Further Confuses The Witness Testimony*

119. Relying on selective evidence, Canada contended at the hearing that the deletion of the second bullet point in section 9.2.2 “resolve{d} a conflict” in the grandfathered Scaling Manual.²³³ Even Canada concedes that its “difficult” theory is to follow.²³⁴ Canada’s argument proceeds as follows: The second bullet of section 9.2.2 must be read in conjunction with the “bolded box right under it, which calls out, ‘In circumstances where surface checks and end checks are due to delays in scaling, the Forest Service may order the checks to be disregarded.’”²³⁵ When read in conjunction with the box below it, the second bullet of section 9.2.2 should be understood to contain a “negative pregnant” – or a tacit requirement that “if checks were not caused by delay,

²³³ Tr. 1686:12-13.

²³⁴ See, e.g., Tr.1685:18-20 (referring to the December 2007 amendments as an “admittedly difficult-to-read document”); *id.* at 1686:7-8 (“Nobody ever said scaling manuals were easy to read . . .”); *id.* at 1686:22-23 (noting that Canada’s argument about the changes to the scaling manual is “not all that easy to understand”); *id.* at 1710:15 (noting “difficulties” with explaining Canada’s argument); *id.* at 1711:4 (acknowledging that Canada’s argument is “a little difficult to follow”); *id.* at 1711:9, 1711:23, 1712:4 (repeatedly apologizing for Canada’s explanation and saying “again, this is complicated”).

²³⁵ Tr. 1687:22-25.

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they could be considered.”²³⁶ With that assumption made, then the second bullet of section 9.2.2 is actually redundant because it duplicates the language in section 9.2.3.²³⁷

120. Canada’s reading renders a provision redundant when the only plausible reading would give effect to all the provisions of 9.2.2 and 9.2.3. The second bullet of section 9.2.2 must be read in conjunction with the box that follows to mean that *all* surface checks 2 centimeters or less are not considered in the grade reduction and that checks greater than 2 centimeters that are caused by delay may be disregarded.²³⁸ That logical and harmonious reading gives full effect to each provision, and avoids the redundancy introduced by Canada’s reasoning. More importantly, it reflects the basic principle that lumber can be produced from portions of a log with checks 2 centimeters or smaller, making the cause of the check irrelevant.

121. Once again, Canada’s reasoning, if correct, would prevent a junior scaler from passing her scaling test. One such test required takers to know that the definition of [

] ²³⁹ Thus, when the second bullet of section 9.2.2 states “{s}urface checks 2 cm or less in depth are not a part of the grade reduction calculation,” it means

²³⁶ Tr. 1688:20-22.

²³⁷ Tr. 1688:22-1689:4 (“And that reading would be consistent with 9.2.3 . . . which says, ‘For the purpose of assessing checks, a check is a check is a check, is a check, unless,’ and then it goes back to delay factors, you know, logs have been decked for a period of time, or a field scale was previously conducted or determination is made by a district manager that a delay has occurred.”). As noted above, this reading completely ignores that there is a non-delay based reason for excluding checks in the first bullet of section 9.2.2 – *i.e.*, checks in trap trees. *See* C-50, CAN-008253-008742 at CAN-008509.

²³⁸ *See* C-50, CAN-008253-008742 at CAN-008509.

²³⁹ R-157, CAN-050097-050121 at CAN-050103.

that they are not a part of the process of determining the portions of the log not suitable to manufacture products.²⁴⁰

c. Two Centimeter Collar Rule

122. Not to be confused with the change discussed above (allowing scalers to downgrade for checks less than two centimeters), BC also introduced the so-called “two centimeter collar” rule — a distinct change. Under this new rule, as set forth in the text of the December 2007 scaling requirements, BC scalers were to automatically deduct two centimeters from the radius of an MPB log that is ten centimeters or more in radius and missing more than 50 percent of its bark.²⁴¹ This is an automatic deduction that applies regardless of whether the log has any defects indicating that the outer two centimeters of the entire log is, in fact, not suitable for lumber production. There was no similar provision in the 2006 Scaling Manual; the two centimeter collar was an entirely new deduction applied from December 2007 onward. The two centimeter collar was introduced in July 2007 and formally incorporated into the 2008 Scaling Manual at section 9.5.4.2 (Log Requirements to Make the Grade), under number one, bullet point four.²⁴²

123. The application of a two centimeter collar was an entirely new practice and deduction that inescapably contributed to logs that would have been classified as

²⁴⁰ See C-50, CAN-008253-008742 at CAN-008509.

²⁴¹ C-82, CAN-011400-402 at CAN-011402. As discussed elsewhere in this brief, although the text of the December 2007 scaling requirement and the 2008 scaling manual both indicate the rule applies only to logs at least ten centimeters in radius, Mr. Crover testified that, “as a matter of practice” the deduction was taken from all MPB-killed logs with less than 50 percent bark covering. Tr. 697:19-698:2.

²⁴² C-48, CAN-007998-8174 at CAN-008131 (9-15).

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Grade 2 under the grandfathered system being classified as Grade 4 following the promulgation of the December 2007 scaling requirements.²⁴³ As Tom Beck explained, the automatic deduction of two centimeters from the radius of a ten centimeter log results in over one-third of that log's volume being deemed unavailable for the manufacture of lumber.²⁴⁴ Thus, that log is immediately viewed as having less than two-thirds of its volume available for the manufacture of lumber, even if the entire volume is, in reality, available, and even if that volume will ultimately be used for the manufacture of lumber.²⁴⁵ Therefore, as Mr. Beck concluded in his report and oral testimony, if any defect is present elsewhere in the log, then the automatic deduction is likely to lead to the downgrading of the log to Grade 4.²⁴⁶

124. In response to the Tribunal's questions, Mr. Beck demonstrated that, after December 2007, the application of the two centimeter collar would have likely led to the downgrade of the log portion represented in Exhibit R-223N when that same log portion would not have been downgraded under the grandfathered scaling regime.²⁴⁷ Notably, Canada did not, at any time, challenge Mr. Beck on any of his conclusions regarding the impact of two centimeter collar upon the downgrading of logs. The unrebutted evidence

²⁴³ C-107 ¶¶ 44-45.

²⁴⁴ *Id.* at ¶ 44 & n.21 (calculating that 36 percent of the total volume would be deducted); Tr. 555:6-10.

²⁴⁵ *See* C-107 ¶ 44.

²⁴⁶ *Id.* at ¶ 45; Tr. 520: 6-16; 555: 16-21.

²⁴⁷ Tr. 559:25-560:22.

therefore establishes that the introduction of the two centimeter collar rule changed the grandfathered scaling rules and contributed to the increase in Grade 4.²⁴⁸

125. Again, Canada attempted to depict the change as more of a clarification. Specifically, Mr. Crover conceded that the December 2007 Scaling Requirements “introduced” the 2-cm-collar rule, but he insisted that it was a “conservative measure,” consistent with the Scaling manual.²⁴⁹ Mr. Crover explained that he and his colleagues decided to impose the rule after they came to the conclusion sometime in late 2007 that “checking was frequent and widely distributed around the bole” of trees that had lost bark and that “we realized that our scalers were not able to see the full extent of those checks.”²⁵⁰ As a preliminary matter, Mr. Crover’s testimony is at odds with Canada’s insistence on a strict, literal reading of the Scaling Manual because it reveals the intention to grade logs based on physical characteristics that are *not* visible.²⁵¹ Under Canada’s own view, adopting new standards that evaluate logs on what cannot be seen is a departure from the grandfathered system and one that prices increased and significant numbers of logs in the low, flat stumpage category.

²⁴⁸ Furthermore, if the rule is applied as described by Mr. Crover, then the rule would potentially lead to even greater numbers of logs being downgraded, because the two centimeter deduction has a larger impact upon logs with smaller radii.

²⁴⁹ See Tr. 681:5 – 682:7.

²⁵⁰ Tr. 681:14-22.

²⁵³ See, e.g., 1685:1-4 (“{T}he challenge of the scaler is one of *assessing the visible characteristics of each log*’ {A scaler} determin{es} what can be recovered from {a log}.”) (quoting R-19 § 6 (p. 6-1) (emphasis added)). The quoted document continues: “with strict reference to schedules of log grades. That means by the book, by the Scaling Manual, by the process that the scaler is instructed to follow under the grandfathered system.” R-19 § 6 (p. 6-1).

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126. Moreover, Mr. Crover's testimony made clear that the conclusion was based upon an unpublished two-day study of 180 logs from one forest district and anecdotal accounts from industry and Ministry scalers.²⁵² By Canada's own standards, that is a woefully inadequate basis for an Interior-wide change. Canada has taken the position that the Mill Studies, which together tested more than 50 times more logs than were examined in the study Mr. Crover relied on,²⁵³ cannot be used as a gauge of lumber recover in the Interior.

127. Had BC tested the December 2007 Scaling Requirements on actual logs, it might have seen the inherent flaws in their anecdotal analysis. But it did not do any such testing.²⁵⁴ It did not even attempt to "develop the science" to justify its choices after the changes were promulgated, as Dr. Oliviera did with kiln-warming, after the method was approved industry-wide.²⁵⁵ Indeed, the evidence confirms that the December 2007 Scaling Requirements resulted in excessive downgrading for reasons unrelated to the production of lumber. As noted above, Mr. Beck explained that surface checks two centimeters or less in length do not affect a sawmill's ability to manufacture lumber

²⁵² See, e.g., Tr. 680:5-10 ("{W}e didn't rely on the Williams Lake study {R-31} completely. As noted earlier, we had the observations of Ministry and industry scalers who were talking to us and telling us that they had issues."); see also R-31, CAN-028337-41 at CAN-028337 [] In his witness statement, Mr. Crover noted that [] was consistent with one earlier study. R-3 ¶ 97 & n.75 (citing R-37). He did not, however, state that he and his colleagues relied upon that study when developing the December 2007 amendments, and his testimony omitted any reference to the study, making clear that the study referred to in his witness statement was not considered.

²⁵³ See, e.g., C-5, at CAN-007007; C-39, at CAN-29339-42; CAN-40, at CAN-029254; C-41 at CAN-029282.

²⁵⁴ Tr. 673:10 (acknowledging that the December 2007 amendments "were never tested on physical logs").

²⁵⁵ See Tr. 787:19 – 789:13.

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from the portion of the log that they affect. Deducting a two centimeter collar thus serves no purpose other than to contribute to a downgrade. On a 10-rad log, a two-centimeter collar amounts to an automatic deduction of 36 percent of the log's volume, regardless of whether checks of any length are actually present.²⁵⁶

128. Indeed, Professor Lewis's research found that even eight, nine, or ten years after death, trees had on average fewer than two checks in any given section of log.²⁵⁷ For trees harvested three years after death, which was the approximate average time since death of the MPB-killed trees in the 2007 harvest, there was less than half a check in any given section of log.²⁵⁸ During the hearing, Professor Lewis testified her research in 2009 that found, for example, that one would expect a tree 30 centimeters in diameter that had been dead for seven years to have one check in the section of the tree at breast height.²⁵⁹ When making the measurements in these studies, Professor Lewis and her colleagues counted "any [check that] was observable on the rough cut surface. . . , [e]ven if it was only a centimeter."²⁶⁰ Those results do not comport with Canada's explanations for why the Ministry changed the scaling requirements in December 2007.

129. In an even more confounding revelation, Canada actually conceded that the 2 centimeter collar applied more broadly than the plain language of the December

²⁵⁶ For 9-rad logs, the deduction is about 40 percent, and for 8-rad logs, the deduction is about 44 percent.

²⁵⁷ Ex. R-10 App. 3, at 138; *see also* Tr. 231:15-232:20.

²⁵⁸ *See* R-10 App. 3, at 138; R-7 at 16 (presenting the average years since death of the harvests from 2006 to 2010).

²⁵⁹ Tr. 443:5-9 (discussing R-45).

²⁶⁰ Tr. 440:16 – 441:5.

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2007 Scaling Requirements permits. That document is clear that the 2 centimeter collar applies only to logs 10 rads or larger.²⁶¹ Mr. Crover acknowledged, however, that “{t}hat’s the way it reads,” but nonetheless insisted “that’s not the way it was intended to be applied.”²⁶² And he confirmed that “{a}s a matter of practice,” the rule applied to logs less than 10 rads.²⁶³ Assuming the amendment was a change, Mr. Crover conceded that the change went beyond event the text of the amendment and was applied more broadly, to result in more downgrades.²⁶⁴

130. Perhaps Mr. Crover is correct—that BC scalers pay little attention to the precise text of the scaling manual—but that undermines Canada’s whole defense in this arbitration, which is that the quality of timber simply declined and strict adherence to the scaling manual resulted in more Grade 4.

131. In any event, Mr. Crover assumed without explanation that there is greater than 10 centimeters between the checks – a physical impossibility that allows him to avoid applying the 10-cm-between-defects rule.²⁶⁵ Then, and again without explanation,

²⁶¹ See C-82 CAN-011400-02 at CAN-011402.

²⁶² Tr. 695:20-21 (discussing C-82).

²⁶³ Tr. 697:25-698:2 (discussing C-82).

²⁶⁴ See R-148 App. A at 1. Mr. Crover’s explanation makes no sense when read in the context of the scaling manual. To take one example, Mr. Crover attempted to show how the December 2007 Scaling Requirements apply to an 8-rad log with two 4 centimeter checks. But in doing so, he demonstrated just how convoluted Canada’s position is. The hypothetical log has less than 50 percent of its bark, but no checks other than the two 4-centimeter checks identified; and Professor Lewis’s testimony and research strongly suggest that even if the log were harvested 10 years since death, it is unlikely that it would have any additional checks. R-10, App. 3 at 138.

²⁶⁵ See R-148 App. A at 3 & n.56.

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he applied the 2-cm-collar rule, with no explanation as to why he deviates from the text of the December 2007 Scaling Requirements, which state that the rule applies to logs 10 rads or larger.²⁶⁶ Applying the geometric calculations correctly shows that if no 2-centimeter collar is applied then 85 percent of the log is available for the manufacture of lumber, an amount that is more than sufficient to pass the first prong of the 50/50 test.²⁶⁷ Once the collar is applied, however, there is less than 50 percent available, resulting in a downgrade.²⁶⁸ Thus, instead of justifying the December 2007 Scaling Requirements, this example is a case in point of how a log that would have passed the 50/50 test under the grandfathered system on November 30, 2007 would have failed the test on December 1, 2007 under BC's new regime.

132. The example is not an aberration. To choose another from the record, the new rules would have made at least one question on the Fall 2006 Interior Scaling Examination impossible to answer. In 2006, a prospective scaler needed to know that [

] ²⁶⁹ But after the introduction of the 2 centimeter collar rule, this same log might be graded 2, depending on how the scaler interpreted the bark

²⁶⁶ See R-148 App. A at 3.

²⁶⁷ See R-148 App. A at 3-4. Even if the 10-cm-between-checks rule were applied, a 32 cm² area would be unavailable, leaving just under 70 percent of the log available for the manufacture of lumber. See *id.*

²⁵³ See R-148 App. A at 4. If both the 2-centimeter collar and the 10-cm-between-check rule were applied, then a mere 32 percent of the log would be available for the manufacture of lumber.

²⁶⁹ R-157, CAN-050097-050121 at CAN-050106

coverage.²⁷⁰ An aspiring scaler simply would not have enough information to answer the question.

133. The 2 centimeter collar rule was a substantial change in the scaling manual and one that placed a significant number of logs that would otherwise be Grade 2, into Grade 4. There was no purpose to this change except to increase the amount of Grade 4. In fact, the change directly contradicted many of the basic tenets of the grading rules that were grandfathered in 2006. The change merely represents another step in BC's efforts to provide an "immediate solution" to an industry in decline—an immediate solution that did not require the lengthy process of changing the pricing system.

d. Length Of Checks Convention

134. Additionally, BC implemented a new convention that instructed scalers, for the first time, to *assume* that a check visible at the log end but not visible on the surface actually ran half the length of the log, up to a maximum of 2.5 meters.²⁷¹ This allowed BC producers to assess a grade reduction for the entire log segment if the log exhibited end checking. Like the two centimeter collar, the convention of running a check half the length of a log was an entirely new rule. Although logs are assessed in 2.5 meter sections under the grandfathered system, the grandfathered system did not include any rule that allowed a scaler to assume an entire log section contained a defect visible only at the end. Instead, the grandfathered system required scalers to make grading and

²⁷⁰ Applying a 2-centimeter collar to a 12 rad log makes just under 70 percent of the log available for the manufacture of lumber. That would result in a decrease from grade 1 to grade 2. See C-50, CAN-008253-008742 at CAN-008513 (providing for species other than hemlock, balsam, or cedar – *i.e.*, pine – to receive a grade of 1 “at least 75 percent of the gross scale can be manufactured into lumber”).

²⁷¹ C-82, CAN-011400-402 at CAN-011402; C-84, CAN-010278-325 at CAN-010283.

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scaling decisions based upon what they can see. For instance, the timber grading chapter of the 2007 Scaling Manual repeatedly states that a scaler must “assess the visible characteristics of each log{.}”²⁷² The December 2007 changes, however, included a special section entitled “length of checks convention,” setting forth this new convention. The rule was incorporated into the 2008 Scaling Manual as part of section 9.2.2.²⁷³ Thus, from December 2007 onward, scalers were able to assume that a defect visible at the end of the log but not visible on the log’s surface, ran half the length of the log, up to a maximum of 2.5 meters, when scalers had not been able to assume so under the grandfathered system.

135. Applying the convention to a log five meters in length would allow a scaler to assess a grade reduction for half the log if the log exhibited a visible check on one end; this could be 50 percent of a five meter log, a common log length. The rule had an especially significant impact when combined with the new ability to consider any visible check, instead of just those that were more than two centimeters in depth. When using the two rules together, a scaler could treat an entire log segment as a grade reduction, simply because there was a visible check on the end, even if that check would not affect lumber recovery.

²⁷² C-50 CAN-005253-09842 at CAN-008440 (8.1 Timber Grading, at 8-2 “The scalers’ challenge is to assess the visible characteristics of each log[.]”), CAN-008442 (8.3 Principles of Timber Grading, at 8-4 “It is the job of the scaler to assess the visible characteristics of each log{.}”).

²⁷³ C-48 CAN-007998-8174 at CAN-008122 (9.2.2 Checks) (“If the surface check is visible at the log end, but not visible on the surface of the log, the convention is to run the check half the length of the log, or 2.5 m (metres), whichever is less. This convention must only be used if it cannot be determined how far the check runs due to ice, snow, or mud. This convention is not to be used if the bole is bark covered, or if the actual length of the check can be determined.”).

136. Each of these changes that BC made to the scaling regulations *are* changes, not mere “clarifications.” Because they are changes that do not “maintain or improve the extent to which stumpage charges reflect market conditions,”²⁷⁴ they do not qualify as exceptions to paragraph 2 of Article XVII of the SLA establishing that grants or benefits that BC provides to its lumber producers “shall be considered to reduce or offset the Export Measures.” Under the plain and ordinary meaning of paragraph 2 therefore, these changes to BC’s scaling regulations circumvent Canada’s commitments under the SLA.

e. BC Urged The Use Of Bucking To Facilitate Downgrading Of MPB Timber

137. As the United States demonstrated, the Ministry’s 2008 decision to encourage bucking before scaling has diverted sawlog timber to Grade 4 in a manner that is inconsistent with the 50/50 rule. This demonstration went unrebutted.

138. In a November 13, 2008 memorandum, the Director of the Ministry’s Revenue Branch announced the new policy of actively encouraging bucking at scale sites, indicating in the subject line that the memorandum was “Follow up to The Honourable Pat Bell’s Request.”²⁷⁵ Although Canada’s position has evolved somewhat during this proceeding,²⁷⁶ it appears now that Canada maintains this new procedure in fact related to diagnostic bucking, which does not change the log length for purposes of

²⁷⁴ SLA, art. XVII 2(a).

²⁷⁵ C-83 CAN-011867-1868 at CAN-011867.

²⁷⁶ Stmt. Def. ¶ 210 (citing R-3 ¶ 106); *id.* ¶¶ 212-213; Can. Rej. ¶¶ 96-99.

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scaling, and was, according to Canada, grandfathered.²⁷⁷ Contrary to Canada's contention, the practice of bucking before scaling was a new practice, intended to increase a logs chances of being graded Grade 4.

139. The November 2008 Ministry memorandum provides that "enhanced scaling practices" were to be developed, sets forth a December 1, 2008 *implementation* deadline, and calls upon ISAC to "develop the criteria, process and controls to accommodate the bucking."²⁷⁸ Far from establishing that the type of bucking at issue was the "historic practice" of diagnostic bucking as Canada contends, the November 2008 memorandum characterizes the bucking policy as "the *new* bucking practices" and "the *new* process to facilitate the bucking of logs at scale sites."²⁷⁹ Thus, by its very terms, the November 2008 memorandum introduced a new policy and makes no reference to a historic practice.

140. Canada never confronted the memorandum's focus on the need to "develop{ } the criteria, process and controls to accommodate the bucking of MPB-killed timber at non-kin-warming scale sites,"²⁸⁰ and never explained why the purported "historical practice" of diagnostic bucking would require development of "the criteria, process and controls" as would be expected from a new policy. Instead, Canada provided

²⁷⁷ Can. Rej. ¶¶ 98-99 (citing Crover Suppl. Stmt. ¶ 42 (Ex. R-148)); Tr. 605:4-8, 606:8-11; *see also* Tr. 174:23-175:5; Tr. 1681:15-1682:1.

²⁷⁸ C-83 CAN-011867-011868 at CAN-011867.

²⁷⁹ *Id.* (emphasis added); *see also* Tr. 1682:6-19.

²⁸⁰ Tr. 607:4-609:1 (quoting and discussing C-83, CAN-011867-011868).

testimony that “in this case,” a “historical practice” requires “gaining additional information.”²⁸¹

141. Moreover, Canada’s attenuated position was directly contradicted by Canada’s own industry witness [

]²⁸² It is thus inconceivable that, in November 2008, BC would have elevated such a practice by encouraging its use on a widespread basis.

142. In light of the evidence, including the testimony of Canada’s own industry witness, Canada’s focus on this belated theory of diagnostic bucking appears to be nothing more than a post-hoc attempt to divert the Tribunal from the evidence before it. Accordingly, Canada has not presented any credible evidence that, in November 2008, BC was encouraging diagnostic bucking — rather than bucking at scale sites prior to scaling.²⁸³

143. As for Canada’s contention that BC’s new policy of encouraging bucking did not give rise to misgrading, again, the evidence demonstrates otherwise. Canada has failed to refute the demonstration that BC encouraged bucking despite the reality that this practice was being abused to misgrade sawlogs as Grade 4 logs.

²⁸¹ Tr. 608:9-609:1.

²⁸² Tr. 953:7-10.

²⁸³ [] See C-161 CAN-028695-029698, at CAN-028698 [

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144. The bucking of logs to less than five meters in length creates enormous risk of misgrading because scalers applied a convention in which they assumed that defects accounted for half of the log length.²⁸⁴ By doing so, the remaining log length fell below 2.5 meters, which was the minimum sawlog length.²⁸⁵ Thus, when scalers applied this convention to logs less than five meters in length, a significant proportion of those logs were scaled as Grade 4.²⁸⁶ ISAC was aware that the “majority of all scalers scale by convention” in the absence of external indicators.²⁸⁷

145. At the same time that BC was encouraging bucking as an option for non-kiln sites, it was well aware of the problem in bucking timber less than five meters in length and the downward effect it had on stumpage fees. [

] ²⁸⁸ [

] ²⁸⁹ [

] ²⁹⁰

²⁸⁴ C-163, CAN-012173-74, at CAN-012174; C-87, CAN-007362-007371 at CAN-007368.

²⁸⁵ C-163, CAN-012173-74, at CAN-012174; C-87, CAN-007362, at CAN-007368; *see also* C-50, CAN-008253-008742, at CAN-008496 (2007 Scaling Manual § 8.6.8); C-164, CAN-012410-11 at CAN-012411.

²⁸⁶ C-163, CAN-012173-74, at CAN-012174; C-87, CAN-007362, at CAN-007368.

²⁸⁷ C-165, CAN-007050-55, at CAN-007053; *see also* C-164, CAN-012410-11, at CAN-012411 (stating that use of the convention related to logs less than 5 meters is “wide-spread”).

²⁸⁸ In our reply brief, we inadvertently referred to this internal audit as being dated June 2008 rather than November 2008. U.S. Reply ¶ 213.

²⁸⁹ C-166, CAN-054983-55001, at CAN-054993.

146. Despite Canada's attempts to distance itself from [],²⁹¹ []²⁹²
[]²⁹³ []²⁹⁴ []
147. []²⁹⁵ []

²⁹⁰ C-166, CAN-054983-55001, at CAN-054999.

²⁹¹ Tr. 610:7-624:2; Tr. 615:1-19, Tr. 616:18-20.

²⁹² Tr. 616:18-20.

²⁹³ C-166, CAN-054983-55001, at CAN-054989.

²⁹⁴ *Id.* at CAN-054989 (emphasis added).

²⁹⁵ Tr. 613:22-614:6, 615:9-19, 616:14-20, 617:7-11, 618:10-13.

] ²⁹⁶ [

] ²⁹⁷ [

] ²⁹⁸

148. And yet other evidence establishes that the new bucking policy led to misgrading. For example, after the new policy was introduced, [

] ²⁹⁹ [

] ³⁰⁰ [

] ³⁰¹

²⁹⁶ C-166, CAN-054983-55001, at CAN-054999.

²⁹⁷ *Id.*

²⁹⁸ *Id.*

²⁹⁹ C-86, CAN-026568, at CAN-026568.

³⁰⁰ *Id.*

³⁰¹ *Id.*

f. Kiln Warming Constituted A Change To The Grading System

149. Finally, Canada allowed the practice of kiln-warming—a practice that Canada appears to concede was a change that is compensable under the SLA. At the hearing, Dr. Oliveira explained that he studied scans of logs that had been warmed in kilns—not the actual logs themselves—and was satisfied that kiln warming did not cause new checks to appear in logs. But Dr. Oliveira confirmed that he understood that minor end checks and surface checks were not important for grading purposes.³⁰²

150. His assumption was significant, because kiln warming was introduced at approximately the same time that new scaling conventions were being implemented, [

]³⁰³ Accordingly, even if Dr. Oliveira had confirmed that kiln warming did not cause the type of check that would traditionally be relevant to grading, nothing in Dr. Oliveira’s testimony establishes that kiln warming did not cause the type of checks that, after the implementation of the December 2007 scaling conventions, would lead to downgrading.

151. BC took all of these steps – allowing unregulated use of local knowledge, drastically changing scaling requirements, allowing widespread use of kiln-warming, and the increased use of bucking – to provide an “immediate solution” to the industry. BC determined that the solution would be more immediate if it came in the form of changes to the way logs were graded, rather than in the form of pricing changes. BC recognized that pricing changes were more likely to implicate the SLA and would require more

³⁰² Tr. 800:8-801:13.

³⁰³ C-52 [

]

formal regulations. Thus it took these less formal, non-transparent steps to accomplish the goal of selling the majority of MPB timber at a low, flat fee.

152. This action constitutes a change to the grading and MPS that does not move BC's system toward the market. Placing up to 70 percent of timber intended to be priced at market-sensitive rates, into a flat fee category is most definitely a move away from the market pricing of timber.

J. Professor Kalt's Regression Does Not Demonstrate That No Misgrading Has Occurred

153. Canada's defense to the overwhelming evidence of misgrading consisted of the reports and testimony of its long-time witness Professor Joseph Kalt.³⁰⁴ Professor Kalt offered no direct evidence that the sharp increase in the share of Grade 4 was or was not the result of misgrading. Instead, Professor Kalt's primary contribution to Canada's defense was a specially-designed economic regression that, according to him, showed that the changing share of Grade 4 over time was statistically aligned with the rise of red and grey stage timber in the harvest.³⁰⁵

154. Canada made much of the regression at the hearing, contending that the results should be interpreted to mean that the rise in the share of Grade 4 timber in British Columbia was caused by a loss of timber quality, not misgrading.³⁰⁶ We address Professor Kalt's regression in this section, demonstrating that Professor Kalt's work explains nothing, and in no way refutes the United States' case.

³⁰⁴ R-9; R-151.

³⁰⁵ R-9, ¶¶ 146-49; Tr. 1453:21-1469:13.

³⁰⁶ Tr. 1670:15-1671:3.

1. Professor Kalt's Regression Is Fundamentally Mis-Designed

155. Professor Kalt designed a regression model using certain “natural causes”—red attack, grey attack, and temperature—to “test” whether he could explain the rise in Grade 4 over time.³⁰⁷ Professor Kalt claimed that these three variables, when combined into a regression simultaneously, “explain” about 90 percent of the variation in the share of Grade 4 timber since 2007.³⁰⁸

156. Professor Kalt testified that he also used his regression to “test” whether actions by the BC government were related to the Grade 4 variation.³⁰⁹ He concluded that, from a statistical standpoint, there were no actions by the BC government, with the exception of kiln warming, that contributed to the rise in Grade 4 over time.³¹⁰ Neither conclusion is valid.

157. At the outset, Professor Kalt's work should be considered in the context of his long-standing relationship with Canada. Professor Kalt has been a softwood lumber advocate for Canada and British Columbia since 1991, submitting over 20 witness reports and testifying in numerous hearings in various trade disputes, all for the purpose of defending Canada's softwood lumber trade practices.³¹¹ In this light, his conclusions in this arbitration are not unexpected.

³⁰⁷ R-9, ¶146; Tr. 1454:21-1457:12.

³⁰⁸ R-9, ¶ 147; Tr. 1460:8-24.

³⁰⁹ Tr. 1464:25-1465:3.

³¹⁰ Tr. 1465:19-1469:3.

³¹¹ R-9, App. D.

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158. The first issue with Professor Kalt's regression analysis is its faulty design. The regression is based on "red attack" timber dead only one to two years.³¹² In other words, implicit in his regression analysis purporting to find a relationship between MPB attack and Grade 4 is the idea that MPB timber only one to two years dead should be graded Grade 4. No expert scientific testimony in this case or scientific literature supports Professor Kalt's premise. In fact, the science is exactly the opposite.

159. The work of Kathy Lewis and Eini Lowell establish that timber dead for only one to two years is almost uniformly usable for lumber, nearly to the same degree as green timber.³¹³ Ms. Lowell concluded from her review of the scientific literature that MPB timber generally remains suitable for the manufacture of lumber for seven or more years.³¹⁴

160. Independent industry studies recognize small (or no) losses associated with timber one to two years after death.³¹⁵ In fact, Canada offered a statement from the primary author of the 2010 Wood Markets Report showing almost no loss in lumber recovery from MPB timber for the first *three years* after death, whether lumber recovery is measured in nominal or actual dimensions. The table of lumber recovery factors is reproduced below.³¹⁶

³¹² Tr. 1456:5-9; 1510:12-1511:1, 1512:14-1513:2; R-9, Figures 18, 19.

³¹³ C-105, ¶ 4; R-10, App. 3 at 134, 135, 138.

³¹⁴ C-105, ¶ 52.

³¹⁵ C-102 at 32 (no change in lumber recovery between green timber, timber 1YSD, and timber 2 YSD); R-149, App. A at 2; C-114 at 19-20.

³¹⁶ R-149, App. A at 2.

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Lumber Recovery Factors at "Average " BC Interior Sawmills (with no optimization)

	Green - No Attack	Dead Green: 1 Yr.	Red Dead: 2-3 Yrs.	Grey: 4 -5Years	Grey: 8 Years	Grey: 12 Years
Lumber Recovery Based on a NOMINAL Dimension Count						
Lumber Recovery - Nominal (%)	65%	65%	64%	63%	59%	56%
Lumber Recovery - Nominal (BF/m3)	276	276	271	267	250	237
Lumber Recovery Based on a NET (Actual Size) Dimension Count						
Lumber Recovery - Net/Actual (%)	44.2%	44.2%	43.5%	42.8%	40.1%	38.1%
Lumber Recovery - Net/Actual (BF/m3)	187	187	185	182	170	161

161. Further, BC’s own mill studies demonstrate only small losses in lumber recovery and value associated with the processing of MPB timber dead *five or more* years.³¹⁷ Thus, the overwhelming evidence is that there should be no rise in the share of Grade 4 for MPB timber one and two years since death, and really no rise in the share of Grade 4 for several years beyond. Although there is certainly a small amount of checking in MPB timber dead for more than two years, the expert testimony and scientific evidence demonstrates that we should not expect a significant rise in the share of Grade 4 until (at the earliest) the timber has been standing seven or more years post death.

162. Even Canada’s explanation in this arbitration for the rise of Grade 4 timber – the harvesting of more and more timber dead *for more than two years* – is inconsistent with Professor Kalt’s work.³¹⁸ Canada even included photographs of red-stage log samples in its Statement of Defence, samples that showed very little checking and, assuming the samples were representative of the source logs, would have been graded Grade 1.³¹⁹ In fact, if Professor Kalt’s work truly demonstrated that the rise in

³¹⁷ C-5 at 20.

³¹⁸ Stmt. Def., ¶¶ 2, 7, 106, 137.

³¹⁹ Stmt. Def., ¶ 80 (Figs. 8 and 9). Canada has acknowledged the high quality of the red-stage samples. Tr. 126:12-22; 155:3-5 (“But if it’s red attack, then they’re still getting it within about two years. And within about two years, it probably still looks pretty good.”).

Grade 4 timber was in some way explained by the rise of red-stage timber in the harvest, this would be far more probative of misgrading.

163. Counsel for Canada, realizing the inconsistency between Professor Kalt's treatment of red-stage timber and Canada's position in the arbitration, attempted unsuccessfully to steer Professor Kalt away from the problem at the hearing on re-direct examination.³²⁰ Instead, Professor Kalt reiterated that his regression analysis is based on red-stage timber dead one to two years.³²¹

164. Professor Kalt's use of one to two year red stage timber in his regression is clearly wrong. Canada may not rely on a regression analysis that is squarely at odds with its position in the arbitration.

165. The bottom line is that Professor Kalt's regression is ill-conceived. The one to two year red-stage data has no place in an analysis that purports to explain a rise in Grade 4 timber. Yet Canada has not shown the results of a regression that removes the red attack data. It is, therefore, impossible to know whether Professor Kalt's work validly explains any aspect of the rise in Grade 4 since 2007.

2. Professor Kalt's Regression Suffers From A Number Of Technical Problems As Well

166. The second problem with Professor Kalt's regression is that it is plagued by technical defects recognizable by trained economists. Dr. Neuberger explained the

³²⁰ Tr. 1548:9-1550:16.

³²¹ *Id.*

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defects in the regression in his rebuttal report.³²² We summarize them for the Tribunal here.

167. The first technical issue is that key variables in Professor Kalt's regression (Grade 4 percentage, red attack, and grey attack) all have a rising trend over time, a problem that economists commonly call "non-stationarity."³²³ Regressions with non-stationary variables result in over-estimates of the explanatory power of the regression and make variables appear to be related when they are not.³²⁴

168. Ultimately, this means that Professor Kalt has shown nothing but that several variables that increase over time are correlated, and, as he himself points out, correlation is not causation.³²⁵ Dr. Neuberger reviewed Professor Kalt's regression design, concluding that the design rendered it likely to find statistically significant results whether the tested variables were closely related or not.³²⁶ In other words, Professor Kalt's regression was designed to produce seemingly strong results, results that in reality are spurious.³²⁷

169. Another problem with Professor Kalt's regression relates to what economists call "serial correlation." Serial correlation occurs when regression

³²² C-103, ¶¶ 83-91; C-103, App. E.

³²³ C-103, ¶ 85.

³²⁴ *Id.*

³²⁵ Tr. 1454:21-1455:9.

³²⁶ C-103, ¶ 85; C-103, App. E, ¶ 2.

³²⁷ *Id.*

“residuals” – unexplained variations – persist from year to year.³²⁸ One cause of serial correlation is that a relevant variable has been excluded from the regression.³²⁹ To be fair, Professor Kalt attempted to eliminate the serial correlation in his regression, but the fact that it arose in his regression is indicative of a problem in the selection of variables.³³⁰

170. Professor Kalt’s regression results do not hold up when these problems are addressed. For example, Dr. Neuberger explains in his rebuttal report that a common method of dealing with non-stationary variables is to run a regression using the changes in each of the variables between consecutive time periods (called “first differences”).³³¹ When Professor Kalt’s regression is run on first differences, his results change. Red attack no longer has any statistically significant effect on the Grade 4 share.³³² Furthermore, the share of the Grade 4 variation that is explained by the model falls from 90 percent, as claimed by Professor Kalt, to less than 50 percent.³³³ After applying standard tests to Professor Kalt’s regression, Dr. Neuberger concluded that “Dr. Kalt’s results cannot be relied on to show that the attack variables in his regression explain the fluctuations in the share of Grade 4 in the BC Interior pine harvest.”³³⁴

³²⁸ C-103, ¶ 89-90.

³²⁹ *Id.*

³³⁰ *Id.*

³³¹ C-103, ¶¶ 87-88.

³³² C-103, ¶ 88.

³³³ *Id.*

³³⁴ *Id.* ¶ 86.

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3. Professor Kalt's Regression Fails To Consider Misgrading As An Explanation Of The Rise In The Share Of Grade 4 Timber

171. There is one final reason why Professor Kalt's regression results cannot be trusted. The regression model is flawed because it excludes any consideration of misgrading and, thus, assumes the conclusion it purports to prove. By omitting misgrading, the regression mistakenly attributes the power to explain the increase in Grade 4 to the included variables, when in fact it is the misgrading that is causing the Grade 4 share to rise.

172. An example in another context is helpful to make this point clear. Say an economist is trying to explain rising hunger in a country where a problem with the food crop caused a small decline in food production, but at the same time the government started a program that prevented food from getting to people. If the economist ran a regression where hunger was a function only of food production, he or she would likely find that the drop in food production "explained" the rising hunger. But the omission of a variable measuring the government program would lead the economist to attribute far too much explanatory power to the change in food production. The regression would be "fooled" because the food shortage was, in a sense, providing "cover" for the government's failure that the regression ignored.

173. A similar problem afflicted Professor Kalt's regression here, where he tried to explain the incidence of Grade 4 by looking at red and grey attack, but leaving out of the regression other policy changes that happened around the time that influenced timber grading. Professor Kalt claimed to account for this at the hearing, stating that he

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put government “actions” into his model.³³⁵ This is misleading at best. Obviously, actions cannot be put into a regression; only data can. For most of the actions, Professor Kalt had no data, he only had a date. His “test” consisted of simply looking at the regression at the time the “action” began, with no lag, to see if any significant portion of the Grade 4 share were unexplained at that time.³³⁶

174. For example, one action identified by the United States that likely led to misgrading was a memorandum in early 2007 directing industry to rely on “local knowledge” to grade MPB logs.³³⁷ For Professor Kalt’s “test” of this event, he simply looked at whether there was a “break” in the regression, that is, whether his “natural factors” (discussed above) already were correlated with the Grade 4 share at that time.³³⁸ If he saw a correlation with his “natural variables,” he excluded the “action” as an explanation.³³⁹

175. In the one place where Professor Kalt had data to input into his regression - kiln warming – he found that the action did in fact raise the share of Grade 4.³⁴⁰ It is also worth noting that Professor Kalt says nowhere in his initial report or his supplemental report that he “tested” actions of the BC government by somehow placing these actions into his regression. He claimed to have “tested” the government actions for

³³⁵ Tr. 1464:25-1465:22.

³³⁶ Tr.1465:19-1466:2;1467:13-1468:8.

³³⁷ C-45, CAN-010975.

³³⁸ Tr. 1465:14-1466:2.

³³⁹ *Id.* Tr. 1465:4-1466:2;1467:11-23.

³⁴⁰ Tr. 1466:7-1467:8.

the first time at the hearing. Before the hearing, the only “testing” he previously claimed to have done was to look for any unexplained Grade 4 in the spring of 2007.³⁴¹ Given the problems with his variables and model (discussed above), he has hardly “tested” whether timber was misgraded in the BC Interior from 2007 forward.

176. The failure on Professor Kalt’s part to recognize any effect of BC policy changes likely is due to how he entered these factors into the regression as discrete events that were only measured as to their immediate effect. His analysis completely missed the United States’ theory in this case – that misgrading grew through an evolving series of government and industry policy changes targeting the grading of MPB timber. These evolving practices are not easily amenable to quantification, since they tended to involve codification of practices that likely affected behavior both before and well after they were officially adopted. Nonetheless, all were directly related to attacked pine, the variable included in Professor Kalt’s regression.

177. By ignoring misgrading, Professor Kalt produced a biased estimate of the effect of attack on the amount of Grade 4. Overall, his regression analysis is only as reliable as the way he set up and defined the variables, and the underlying model. Professor Kalt’s regression provides no reliable basis to conclude that the rise in Grade 4 timber resulted from MPB attack, as opposed to misgrading.

K. The Breach Did Not End In 2010

178. Finally, Canada has suggested that, to the extent the United States claim is valid, BC was misgrading timber only until 2010, when it allegedly changed its

³⁴¹ R-151, ¶ 32.

system.³⁴² More specifically, Canada speculates that the new system may have had a mitigating effect on the rise in Grade 4 timber since 2007.³⁴³ Yet Canada never presented any evidence or even argument to establish that the 2010 changes have eliminated or abated Canada's circumvention of the Export Measures under the SLA. In fact, Canada mentioned it only in passing during argument. In reality, these changes have had neither removed nor reduced the SLA-inconsistent mispricing of timber in BC Interior that began in 2007.

179. Although Canada has not explained in any sort of detail the allegedly new BC pricing system implemented in July 2010, in essence, Canada is referring to two changes. First, tenure-tract timber stands with more than 35 percent MPB attack are now priced on a "stand-as-a-whole" basis, with BC charging a single lump sum for all of the timber on a stand. Because this timber is neither scaled nor graded, it is difficult to compare directly data on the percentage of the scaled harvest that is Grade 4 after July 2010 with data on the percentage of the scale harvest that was Grade 4 before that date. Second, BC began to phase out the "waterbed" element of the pricing formula for tenure-tract timber stands that continue to be scaled and sold on a per-cubic-meter basis.

180. Significantly, Deputy Minister Hayden clarified that the July 2010 changes "had no immediate implications for revenue."³⁴⁴ She explained that the July 2010 changes might lead to longer-term increases in revenue should they succeed in promoting additional use of the fiber by non-lumber industries such as pellet producers

³⁴² Tr. 1679:14-1680:12.

³⁴³ *Id.*

³⁴⁴ R-6 ¶ 40.

and bioenergy, and that, although these industries have begun to grow, BC's expectation for improved use of fiber (and possibly higher revenues) has been mostly unrealized.³⁴⁵ Further, although Deputy Minister Hayden's testimony established that many technical details of forest policy were outside of her direct scope of responsibility,³⁴⁶ her role as Deputy Ministry required her to focus particularly on total revenue generated by Crown timber sales.³⁴⁷ There is, therefore, no reason to doubt Deputy Minister Hayden's testimony that the introduction of a different pricing system for new tenure-tract cutting authorities issued after July 2010 has had no effect on the total amount of revenue collected by BC.

181. Because Canada is circumventing the SLA through BC's selling of timber to lumber producers for less than the amount that should have been charged under the system grandfathered by the SLA, the exact mechanism by which BC reduces the price for the timber does not affect the existence or the extent of Canada's circumvention. Whether BC achieves a lower price for its timber through kiln warming, "enhanced" scaling practices,³⁴⁸ or through lump-sum sales that achieve the same price is immaterial. If the price BC charges is lower than the price that would have been charged under the grandfathered system—and is not a movement in the direction of market pricing—then Canada has circumvented the SLA. And the testimony of Deputy Minister Hayden is that

³⁴⁵ R-6 ¶¶ 45-48; Tr. 817:9-17.

³⁴⁶ Tr. 856:6-9; *see* Tr. 826:19-827:11, 868:24-869:21 (acknowledging lack of involvement in forestry issues while managing lottery, among other positions).

³⁴⁷ R-6 ¶ 52 ("As Deputy Minister I monitored the Ministry's revenue collections very closely and remained in close contact with my counterpart in the Ministry of Finance.").

³⁴⁸ C-83, CAN-011867-011868 at CAN-011867.

the July 2010 changes did not significantly affect the total price that BC charges for its timber. If that price was a circumvention before July 2010, then it also was a circumvention after July 2010.

182. Because Canada, through BC, circumvented the SLA by selling underpriced timber and effectively reverting to the old pricing system that was far less market-based, Canada is in breach of the Agreement. This breach must be remedied in full.

II. Remedy

A. The United States Is Entitled To A Remedy That Removes The Benefit Conferred Upon BC Lumber Producers By Canada's Breach

183. The parties agree that the SLA requires the Tribunal to make two further determinations if it finds Canada has breached the Agreement. First, the Tribunal is to identify a reasonable period of time, but no longer than 30 days, for Canada to cure its breach. Second, the Tribunal must determine compensatory adjustments to the Export Measures, adjustments to be made should Canada fail to cure its breach within the reasonable period of time.³⁴⁹

184. The breach in this case – the circumvention of the SLA through the sale of underpriced timber to Canada's softwood lumber industry – requires a remedy that (1) accounts for past, current, and future benefits provided to the Canadian industry in breach of the SLA; and (2) eliminates 100 percent of the benefits improperly provided. Any remedy determined by the Tribunal takes the form of adjustments to the Export Measures.

³⁴⁹ SLA, art. XIV ¶ 22.

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185. Consistent with the terms of the SLA, the United States has proposed remedies consisting of adjustments to the export charges collected on softwood lumber exports to the United States from British Columbia. The United States' preferred remedy is based on the work of Dr. Neuberger, who has estimated that Canada's breach resulted in C\$303.6 million in benefits to Canadian softwood lumber producers through the date of the hearing, and an additional C\$83.8 million in benefits that will be bestowed assuming the breach continues until the SLA expires.³⁵⁰ Accordingly, the total amount of the benefit, assuming that Canada does not cure before the expiration of the SLA, is C\$384.4 million. To collect the C\$384.4 million to remedy Canada's breach, an export charge based on the date of award can be determined according to the following table:

³⁵⁰ Tr.1204:14-22; C-203, ¶¶ 36, 56; *see* C-103 ¶ 122.

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**Export Charge Under Preferred Remedy
For Award Dates Between July 2012 And July 2013**

Date of Award	Export Charge For Benefits up to Date of Award	Export Charge For Post-Award Benefits	Total Export Charge
March 2012	8.2%	2.3%	10.5%
⋮	⋮	⋮	⋮
July 2012	9.3%	2.3%	11.6%
August 2012	9.6%	2.3%	11.9%
September 2012	9.9%	2.3%	12.2%
October 2012	10.3%	2.3%	12.5%
November 2012	10.6%	2.3%	12.9%
December 2012	11.0%	2.3%	13.3%
January 2013	11.4%	2.3%	13.7%
February 2013	11.8%	2.3%	14.1%
March 2013	12.3%	2.3%	14.6%
April 2013	12.8%	2.3%	15.1%
May 2013	13.3%	2.3%	15.6%
June 2013	13.9%	2.3%	16.1%
July 2013	14.5%	2.3%	16.7%

Figure 5.

Sources:

- 1) Preferred Subsidy Calculation Workbooks
- 2) Q3 2010 Bid Effect Estimation.xlsx

186. As Dr. Neuberger explained at the hearing, an approximate export charge of 8.2 percent would be necessary to collect the benefit that Canada provided to the BC lumber producers as of the date of the hearing, although the ultimate charge necessary to collect this past benefit depends on the date of award.³⁵¹ Based on his methodology described at the hearing, Dr. Neuberger further calculates an average monthly prospective benefit of \$1.9 million since the date of the hearing, which will provide an additional benefit of \$83.8 million through the expiration of the SLA. Accordingly, an additional

³⁵¹ Tr. 1204:14-22, 1205:3-11.

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2.3 percent export charge during the collection period is necessary to remedy the breach that has occurred, and continues to occur, since the date of the hearing to the current expiration of the SLA (October 12, 2015).³⁵² Exhibit 6 depicts the level of additional monthly export charges that are necessary to offset the continuing aspect of the breach that continues until the end of the SLA, on top of the base export charge to remedy Canada's past breach through the time of the hearing.³⁵³

187. In summary, the United States respectfully requests that the Tribunal find that Canada should apply an additional export charge to softwood lumber products exported from BC Interior to the United States beginning one month after the date of the Award, and continuing until the full amount of the benefit, \$384.4 million (as established in Dr. Neuberger's preferred remedy, including past and continuing benefits conferred until the expiration of the SLA) has been collected. The United States respectfully requests that the Tribunal further find that the additional export charge shall be calculated according to the table above. Figure 5 can be used to determine an additional export charge that will collect the full benefit by the expiration of the SLA. Any remedy that would not account for the continuing nature of the breach in the adjustment to the Export Measures would create an disincentive for Canada to cure the breach, because there would be no way to hold Canada accountable for compliance once the expiration of the SLA nears. Dr. Neuberger's model for a prospective remedy holds Canada accountable for curing the breach without risk of over-collection.

³⁵² C-203, ¶ 56, Ex. 6; *see also* C-190-191.

³⁵³ *Id.*

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188. In Canada's view, the Anti-circumvention provision requires that the remedy for any breach, even one that takes the form of a benefit by Canada to softwood lumber producers or exporters, must calculate the amount by which Export Measures are offset. But Article XVII is breached when a party takes an action that "circumvent{s} or offset{s} the commitments under the SLA."³⁵⁴ Nothing in Article XVII, or the remedy provisions of Article XIV, links the remedy for Canada's breach to the effect of the breach on the Export Measures.

189. Although the Tribunal in *United States v. Canada*, LCIA No. 81010, did not agree with the interpretation of the Anti-circumvention provision advanced by the United States, the Tribunal's determination of remedy in LCIA No. 81010 was explicitly tied and limited to the nature of the breach in that case, and was not based upon a categorical rejection of the interpretation of the provision advanced by the United States. In fact, the Tribunal found that the remedy sought by the United States in that case would have *overcompensated* for the breach.

190. In that case, the breach took a different form from the breach here. Canada, among other things, provided things such as loan guarantees to its softwood lumber producers. Quantifying the benefit conferred by a loan guarantee is quite different from quantifying the benefit conferred by selling underpriced timber. Although both are types of subsidies, a loan guarantee has a more attenuated relationship to the Export Measures. If Canada allows a company to borrow money by guaranteeing a particular loan, it is admittedly difficult to quantify precisely how the producer has benefitted.

³⁵⁴ SLA, art. XVII ¶ 1; US Reply ¶¶ 258-78.

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191. The Tribunal was quite clear in that case that the remedy should “reestablish the level playing field.”³⁵⁵ The Tribunal then noted that, because the remedy must take the form of compensatory adjustments to the Export Measures, the Tribunal retained a certain amount of discretion to fashion an appropriate remedy.³⁵⁶ It found that “nothing in th{e} provision suggests that the reduction or offset will *necessarily* be in the amount of the benefits provided. Whether this is the case is a matter that needs to be assessed in the light of the circumstances of each case.”³⁵⁷ Viewing the benefit as equal to the amount of Export Measure offset, *in that case*, could, in the Tribunal’s view, have led to an overcollection.³⁵⁸ Again, the United States respectfully disagrees with the rationale leading the Tribunal to determine that it should perform any calculation of the offset, nevertheless, the Award stands for the proposition that the facts before the Tribunal were unique.

192. When BC sells underpriced timber, the action directly offsets the Export Measures. In BC, Canada collects export charges from lumber producers and exporters. By underpricing timber to those same lumber producers and exporters, BC is returning the Export Charges in the amount of the difference between what the timber should have sold for, and the C\$0.25 that the timber actually sold for. In other words, if the remedy subtracts the amount Canada did charge, from the amount Canada should have charged, it arrives at the exact and direct amount that BC has offset the Export Measures because it

³⁵⁵ CA-6 ¶ 352.

³⁵⁶ *Id.* ¶ 346.

³⁵⁷ CA-6 ¶ 347 (emphasis added).

³⁵⁸ CA-6 ¶ 349.

is the exact amount BC has given back to the entities that paid the export charges in the first place.

193. Here, the benefit is much more akin to the benefit in *United States v. Canada*, LCIA 7941. In that proceeding, Canada failed to make a particular adjustment in a timely manner, causing certain exporting regions to overexport above what was allowed by the Agreement. The exporters who overexported received a benefit from being incorrectly permitted to overexport. The amount of the overage was calculated and converted to dollars and applied as an export charge, in accordance with the SLA’s requirement that remedies take the form of adjustments to the export measures.

194. Both Tribunals—the 7941 Tribunal and the 81010 Tribunal—considered the particular nature of the breach and determined compensatory adjustments in an amount that remedied the breaches found. Because the nature of the LCIA 81010 breach did not easily lend itself to the approach in LCIA 7941, the Tribunal chose a remedy that accounted for the unique features of the breach in that case – features that are not shared by the breach in this case or in LCIA 7941. But, as in LCIA 7941, where the Tribunal required the remedy to “wip{e} out the consequences of the breach,”³⁵⁹ the Tribunal in LCIA 81010 agreed that the remedy must “reestablish” and “restore the level playing field initially established by the Export Measures.”³⁶⁰

195. Indeed, both Tribunals viewed the SLA similarly, focusing upon the Export Measures as the critical component. In LCIA 81010 Award, the Tribunal noted that the object and purpose of the SLA is “to maintain a level playing field between

³⁵⁹ CA-5 ¶ 309.

³⁶⁰ CA-6 ¶¶ 349, 352.

United States and Canadian producers,” through the mechanism of the Export Measures.³⁶¹ In LCIA No. 7941 – a case about volume, not export charges –the Tribunal similarly held the Export Measures to be paramount, stating that the “subject matter of the SLA” was “the volume of exports of Softwood Lumber Products from Canada to the United States” — in other words, the subject matter of the SLA is the Export Measures.³⁶² Where, as here, export charges are effectively returned, Canada has circumvented the Agreement.

196. In this case, BC conferred benefits on its softwood lumber producers during an economic downturn, where the effect was magnified because the producers were able to survive and invest with the assistance of the BC provincial government. Any award that can be provided under the SLA in this case would not capture the benefit the producers received *at the time of the breach*—in a down market. Disgorging that benefit at a later point in time, in a different market, cannot entirely undo the benefit that BC producers received. Moreover, it would undermine the SLA if the remedies for which it provides do not create a meaningful disincentive to breach. If the BC government knows that it can confer benefits on its producers in a down market and then impose a remedy that recovers only cents on the dollar in a better economy, then breach will be an attractive option for provincial governments. Again, the remedy provisions of the SLA are intended to “wip{e} out” the consequences of a breach, not encourage breach as a rational option.

³⁶¹ CA-6 ¶ 354.

³⁶² CA-5 ¶ 301 (citing CA-4 ¶ 181).

B. Dr. Neuberger's Preferred Remedy Is Highly Conservative And Based On Assumptions That Are Fully Supported By The Hearing Evidence

197. As Dr. Neuberger explained at the hearing, and in his Post-Hearing Expert Witness Report and other reports, his preferred benefit analysis is highly conservative in numerous ways, and it relies upon unrebutted hearing evidence.³⁶³ In reality, the benefit that Canada has conferred upon BC softwood lumber producers is substantially greater than the preferred remedy proposed by Dr. Neuberger. In an abundance of caution, Dr. Neuberger has given Canada every benefit of the doubt.

198. First, Dr. Neuberger's benefit calculations, for both British Columbia Timber Sales and non-British Columbia Timber Sales, take into account a "bid effect," which assumes that one possible response to misgrading was for bidders to increase their bids to reflect the true value of the timber being auctioned. The magnitude of the bid effect Dr. Neuberger incorporates, however, is likely overstated. Because the bid effect is based on the expectations of the bidders, the bids will not, as Professor Athey conceded, reflect the *ex post* realized value of the tract if the bidders' expectations are incorrect.³⁶⁴ In addition, in calculating the degree to which the bid effect is transmitted to the tenure sector, Dr. Neuberger relied upon an exaggerated bid effect that does not distinguish between misgrading and the undervaluation of the Grade 4 timbers sold at the minimum stumpage rate.³⁶⁵ Finally, in calculating the bid effect, Dr. Neuberger made a conservative assumption that the bidder always harvested in the year of the bid (when in

³⁶³ Tr. 1206:8-1207:13; C-203 ¶¶ 33-54.

³⁶⁴ Tr. 1393:9-10.

³⁶⁵ C-203 at ¶¶ 39-41.

reality the bidder has two years to harvest), which overstates the magnitude of the bid effect.³⁶⁶ Had Dr. Neuberger used less conservative assumptions regarding the year of harvest on the bid effect, his preferred remedy benefit calculation would have increased by nearly \$38 million.³⁶⁷

199. In addition, as Dr. Neuberger explained to the Tribunal, his benchmark for his preferred remedy is highly conservative.³⁶⁸ The hearing evidence showed that Canada expected the share of Grade 4 in the lodgepole pine harvest to have been significantly lower than 18 percent under the new grading system. As explained above, Canada expected the Grade 4 share to be approximately 11 to 13 percent.³⁶⁹ Use of the higher benchmark substantially understated the benefit that Dr. Neuberger calculated as the result of misgrading. As a result, his proposed remedy is highly conservative—lower than what would otherwise be justifiable.³⁷⁰

C. Dr. Neuberger’s Preferred Remedy, Which Accounts For A Decrease In Grade 4 Sawmill Share Over Time, Is More Accurate Than His Alternative Remedy That Assumes Deteriorating Timber Will Still Be Used In Sawmills

200. Hearing testimony also confirmed that Dr. Neuberger’s preferred remedy is more accurate than the alternative remedy that modifies the “but-for” percentage of Grade 4 entering sawmills for two reasons. First, evidence adduced at the hearing shows that Dr. Neuberger’s alternative remedy over-estimates the amount of Grade 4 going to

³⁶⁶ *Id.* ¶¶ 35-36; *see* R-62 at 4 (one to three years to harvest).

³⁶⁷ C-203 ¶ 36.

³⁶⁸ Tr. 1323:5-1324:15.

³⁶⁹ *See* C-203 ¶¶ 43-44.

³⁷⁰ *See id.* ¶ 45.

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sawmills even as quality of the harvest deteriorates. Second, Dr. Neuberger's preferred remedy already accounts for a decreasing amount of Grade 4 timber in the share of the harvest that goes to the sawmills over time.

201. Dr. Neuberger was also conservative in calculating the progression of the MPB harvest in his third alternative remedy—the MPB adjusted remedy. As Dr. Neuberger explains in his Post-Hearing Expert Witness Report, he did not have, prior to the hearing, a good estimate that allowed him to quantify the effects of high grading in calculating this alternative benefit, which is based on the effects of the MPB.³⁷¹ Dr. Neuberger's previous MPB-adjusted alternative benefit estimate was based on an estimate of the grey-attack share using information at the harvest site.³⁷² Thus, Dr. Neuberger's pre-hearing estimate represented the amount of grey-attack that was in all timber, not simply the timber that was scaled, which is the more appropriate measure.³⁷³

202. As discussed above, however, [
], allowing Dr. Neuberger to recalculate the MPB-
 adjusted alternative benefit to reflect the evidence presented at the hearing that [
]³⁷⁴ This increased
 the sawmill share of the alternative MPB-adjusted benefit to \$213.3 million, which is

³⁷¹ *See id.* ¶ 52.

³⁷² *Id.*

³⁷³ *Id.* ¶¶ 48, 52.

³⁷⁴ *Id.* ¶¶ 49 (citing Tr. 957-59), 52, Ex. 2 & 3.

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significantly higher than the \$159.9 million MPB-adjusted benefit presented in Dr. Neuberger's rebuttal report.³⁷⁵

203. The new evidence of high-grading at the hearing also reinforced why Dr. Neuberger's preferred remedy is superior to his MPB-adjusted alternative benefit calculation. The principal difference between the two remedies is that the preferred remedy assumes that the share of Grade 4 in the sawmill harvest would have remained constant between April 2006 and March 2007 and subsequent years, absent misgrading, while the MPB-adjusted alternative benefit calculation assumes that the share of Grade 4 in the sawmill harvest would have increased with the progression of the MPB epidemic, even without misgrading. Although it does not appear unreasonable to assume that the Grade 4 share of the sawmill harvest may eventually increase as the MPB epidemic progresses, in fact, the evidence in these proceedings shows that any increase during the relative time period would have been quite small.

204. For example, as discussed above, Professor Lewis's testimony established that checking does not increase significantly between two years since death and eight years since death. The scientific evidence in these proceedings suggests that any major increases in true Grade 4 are unlikely before eight years since death, and timber at this stage has been a very minor share of the harvest during most of the relevant period.

205. Further, even if the share of the harvest that comes from stands with timber more than eight years after the MPB attacked the stand began to increase late in the period, it does not mean that the share of the trees actually harvested that are more than eight years since death also increased in the same way. Nor does it mean that the

³⁷⁵ *Id.* ¶ 52; C-103 ¶ 133.

share of timber more than eight years since death in the sawmill harvest—that is, the portion of the harvest that was actually brought to sawmills and used for lumber production—increased in the same way.

206. High-grading explains, at least in part, why major increases in Grade 4 are unlikely over time. Due to high-grading, the lower-quality trees on stands that contain MPB-attacked wood are cut down but never entered into harvest statistics or brought to the mill. Again, accounting for just the amount of high-grading established at the hearing lowers the projected Grade 4 “but for” share and increases the MPB-adjusted benefit calculation from \$159.9 million to \$213.3 million.³⁷⁶

207. Yet still, based on all the evidence in these proceedings, the right way to account for MPB deterioration is *not* to adjust upwards the share of Grade 4 every year—as in Dr. Neuberger’s third alternative MPB-adjusted benefit calculation—but rather to adjust downwards every year the share of the harvest that is used for lumber production. Dr. Neuberger’s preferred remedy in fact does adjust the harvest share downwards in each year after 2008, and thus already accounts for MPB deterioration. Accordingly, Dr. Neuberger’s preferred remedy is the most reasonable measure of the benefit conferred by misgrading in the BC Interior.

D. Canada Has Not Established That A “Bid Effect” Fully Removes The Financial Benefits To Canadian Softwood Lumber Producers Of Misgrading

208. Canada’s final response on remedy is the “bid effect” theory mentioned above. Canada raised the theory *not* as a defense to the evidence of the misgrading and underpricing of timber, but to argue instead that misgrading does not benefit lumber

³⁷⁶ C-203 ¶ 52.

producers. Canada claims this is so because the design of BC's auction-based MPS should cause timber bidders to bid more for auction tracts containing Grade 4 timber, in order to reflect its greater value as sawlogs. This, according to Canada, should mean that the amount of Grade 4 in the harvest does not affect stumpage rates or stumpage revenue, if the full value of misgraded Grade 4 timber is "captured" in the Grades 1 and 2 stumpage prices.³⁷⁷ Of course, as explained above, if this were true, there would have been no need for BC to undertake any changes to the scaling regulations in 2007, as, under Canada's and Professor Athey's theory, any grading or scaling errors would have been captured in the bids, and there would have been no reason for industry to complain to the Ministry in 2007 about the assignment of MPB logs to Grade 1 and Grade 2.

209. Dr. Neuberger analyzed Canada's theory in his rebuttal report, concluding that although there is evidence of a small "bid effect" post 2008, this effect only partially reduces the benefit of misgrading to lumber producers.³⁷⁸ This makes intuitive sense: Canadian producers acting rationally would not bother misgrading the timber if there were no benefit. Dr. Neuberger reduced his benefit and remedy calculations accordingly.³⁷⁹

210. Canada has not met its burden of proof as the party raising the issue to establish that a "bid effect" entirely removes the benefits of misgrading in this case.³⁸⁰

³⁷⁷ Stmt. Def., ¶¶ 267-76; Can. Rej., ¶ 208.

³⁷⁸ C-103, ¶¶ 92-108.

³⁷⁹ C-103, ¶¶ 121, 125, App. F.

³⁸⁰ As a general matter, the burden of proof rests with the party asserting a claim or fact that, if not substantiated, will result in an adverse decision on the claim or fact. CA-5, ¶¶ 77, 79.

Evidence presented at the hearing confirmed that the “bid effect” is more a matter of economic theory than demonstrated reality, and that Dr. Neuberger is correct that the “bid effect” is incomplete.

1. Canada’s “Bid Effect” Theory

211. Canada’s theory finds its origin in the reports of Professors Susan Athey and Peter Cramton.³⁸¹ Professor Athey testified at the hearing. She and Professor Cramton have worked for the BC Ministry of Forests since 2001 to design and, later, defend its timber pricing system.³⁸²

212. Professor Athey opines that there should be no underpricing of timber even if a significant volume of timber has been misgraded as Grade 4.³⁸³ She states that the additional value of misgraded Grade 4 timber—that is, the value over and above the flat \$0.25 per cubic meter rate that companies actually pay—should be reflected in the BCTS auction bids for Grade 1 and 2 timber.³⁸⁴ In other words, bidders raise their bids on the sawlog grades so as to account for the value of the entire stand, including the true value of the Grade 4 timber in the stand.

³⁸¹ Stmt. Def. ¶ 68; R-8; R-150.

³⁸² R-8, ¶¶ 9, 15, 22; R-62 at 1-2. Professors Athey and Cramton were paid to author a series of 11 advocacy papers for BC, all non-peer reviewed papers that were submitted in previous trade disputes with the United States. R-8, ¶¶ 9,21; Tr. 1370:6-1371:7.

³⁸³ R-8, ¶ 25; R-150, ¶ 5.

³⁸⁴ R-8, ¶¶ 25-29, 78.

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213. Moreover, the theory continues, the higher bids for auction tracts are transmitted through the MPS to timber prices on similar tenure tracts.³⁸⁵ In either case, according to Professor Athey, the actual value of Grade 4 timber should be reflected in higher timber prices, removing the benefit of misgrading to purchasers. The theory is referred to as the “bid effect.”³⁸⁶

214. Importantly, Professor Athey’s “bid effect” theory is based on a series of tenuous assumptions. *First*, BC timber auctions must be truly and sufficiently competitive.³⁸⁷ That is, the level of competition at the auctions must be such that the auctions result in market prices for timber. *Second*, bidders must have knowledge of the volume of Grade 4 timber in the stand on which they are bidding.³⁸⁸ *Third*, the auctioned stands must be representative of tracts throughout the Interior.³⁸⁹ *Fourth*, the MPS must transmit bid prices directly to the tenure sector, uninfluenced by the share of Grade 4 in the harvest.³⁹⁰ *Fifth*, lumber demand must be great enough so as to cause bidders to capture fully any additional value in Grade 4 timber. If any of these assumptions fails, then the “bid effect” does not offset the benefit of misgrading to Canadian softwood lumber producers.

³⁸⁵ R-8, ¶ 79; R-150, ¶ 36.

³⁸⁶ C-103, ¶ 92.

³⁸⁷ R-8, ¶ 21; Tr. 1390:11-13.

³⁸⁸ R-8 ¶ 62.

³⁸⁹ R-8 ¶ 21.

³⁹⁰ R-8 ¶ 76.

215. The assumptions do fail. Although Professor Athey presents auction concepts that appear reasonable in theory, there was little evidence presented at the hearing that the theory or its underlying assumptions are valid in the context of timber pricing in British Columbia. Thus the entire foundation for Canada's "bid effect" is missing. In particular, bidders cannot know the volume of Grade 4 timber at an auction tract with any precision. Moreover, to the extent there is a "bid effect"—and Dr. Neuberger himself detects one in the post-2008 auction data—the effect is incomplete on both the auction and tenure tracts. The bottom line is that Canada has failed to establish that its "bid effect" theory has or will, in practice, substantially remove the benefits of underpriced timber to Canadian softwood lumber producers.

2. The BC Timber Auction System

216. Understanding how the "bid effect" works (or does not work) begins with the basic characteristics of the BC auction system, which are not in dispute. Since 2007, BC has sold 20 percent of Crown timber through sealed bid auctions.³⁹¹ Prior to each auction, BC announces a minimum bid (expressed in dollars per cubic meter), known as a reserve price or "upset price," for each tract.³⁹² The highest bidder is awarded the harvest rights for the tract, and generally has one to three years to harvest the timber.³⁹³

217. The timber is not graded and no stumpage is paid until *after* the timber is harvested,³⁹⁴ so bidders do not know how much of the timber will be Grade 1, Grade 2, or

³⁹¹ R-8 ¶ 61; R-9, ¶¶ 26, 150; R-9I.

³⁹² R-9I; R-62 at 3.

³⁹³ R-62 at 4; Tr. 1385:7-8.

³⁹⁴ R-62 at 4.

Grade 4 at the time they submit their bids. After harvest, the timber taken from the site is graded and the winning bidder (or the sawmill purchasing the logs from the bidder) pays the amount of the bid for each cubic meter of Grade 1 and 2 timber, but only \$0.25 per cubic meter for Grade 4 (lumber reject) timber.³⁹⁵

218. Using the auction data and several equations, the MPS constructs stumpage prices for the remaining 80 percent of Crown timber from long-term tenures held by Canadian lumber producers.³⁹⁶ In the words of Professor Athey, the timber auctions establish “spot prices,” and the MPS equations “translate,” or transmit, the spot prices to the long-term tenures.³⁹⁷

3. BCTS Auctions Are Not Sufficiently Competitive To Generate Market Prices For Auctioned Timber Stands

219. The first problem with Canada’s “bid effect” theory results from the low level of competition for the auction tracts.³⁹⁸ Professor Athey has acknowledged that competition is “essential to a well-functioning auction system.”³⁹⁹ The BC auction system is the basis for Professor Athey’s “bid effect” theory. Yet actual competition has

³⁹⁵ R-62 at 4. Tom Beck explained in his expert report that low-quality timber is left behind at the harvesting site, and is not graded or paid for by the company harvesting the timber. C-107, ¶¶ 8-33. Mr. Beck’s testimony was confirmed at the hearing. Tr. 959:5-18; 960:16-18.

³⁹⁶ R-9 ¶ 150.

³⁹⁷ Tr. 1332:5-22.

³⁹⁸ C-103 ¶ 94, 103.

³⁹⁹ Tr. 1390:11-13.

been hindered in BC by a decreasing number of companies willing to bid and structural deficiencies.

a. The Decline Of Actual Competition In The BC Interior

220. It is undisputed that the number of firms bidding BCTS auction tracts has declined since 2006. Professor Athey confirmed that, as observed by Dr. Neuberger, many BC auctions between 2006 and 2010 had only one bidder, and over half of the auctions had three or fewer bidders.⁴⁰⁰

221. The lack of competition only worsened in 2007 and beyond, when two-thirds of all BC auctions had three or fewer bidders.⁴⁰¹ The BC auction system, despite its best intentions, has not proven sufficiently competitive to generate market prices or to counteract the effects of misgrading.⁴⁰² Dr. Neuberger and Professor Athey agree that one reason for the drop in competition for auction tracts since 2007 is the result of the declining market conditions.⁴⁰³

222. Regardless of the reason, the undisputed lack of competition in BC auctions casts significant doubt on Professor Athey's theory, which she admits requires open, competitive auctions.⁴⁰⁴ Indeed, the MPS regression, and her work using that regression, demonstrate that auction bids are higher with more bidders; in other words,

⁴⁰⁰ C-103 ¶ 103; Tr. 1406:1-13.

⁴⁰¹ C-103 ¶ 103.

⁴⁰² C-103 ¶ 94.

⁴⁰³ C-103 ¶ 103; R-150, ¶ 27.

⁴⁰⁴ R-8 ¶ 21.

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the BC auction data show that, all else equal, competition increases bid prices.⁴⁰⁵ Thus, Professor Athey's own work confirms that the MPS regression includes a measure of number of bidders as a factor influencing bids, and that this variable is statistically significant, meaning that the number of bidders is correlated with higher auction bids.

223. Professor Athey claimed at the hearing that, despite the low number of bidders participating in BC timber auctions, *potential* competition still is an adequate substitute for *actual* competition.⁴⁰⁶ However, the MPS regressions themselves, and the regression she herself presented, indicate that the number of *actual* bidders affects the bid price.⁴⁰⁷ Thus, these regressions contradict Professor Athey's theory that potential competition is enough. She later blamed high reserve prices for the decline in the number of bidders since 2006.⁴⁰⁸ These statements were simply Professor Athey's self-serving guesses, with no basis in any evidence in the record. Canada offered no evidence that, notwithstanding the lack of competition in BC auctions, the winning bids were reflective of market prices, or that reserve prices priced bidders out of auctions.⁴⁰⁹

⁴⁰⁵ Tr. 1408:18-1409:21; R-8, App. A, Table A-1 (positive coefficient for "number of bidders" variable).

⁴⁰⁶ Tr. 1361:17-25; R-150 ¶ 29; R-62 at 5 ("The risk of greater participation induces bidders to place bids closer to their true values . . .").

⁴⁰⁷ Tr. 1409:7-21; R-8, App. A, Table A-1.

⁴⁰⁸ Tr. 1406:23-1407:17.

⁴⁰⁹ In fact, BC sets reserve prices for auction tracts at 70 percent of the bid price it estimates based on past auctions. R-62 at 5. Thus, reserve prices are already discounted far below even what BC considers to be market prices. This is done, presumably, to attract bidders. Given the discounted reserve prices, there is no reason to credit Professor Athey's speculation that reserve prices were high, much less high enough to cause drop in competition since 2006.

224. The evidence in the record contradicts Professor Athey’s “potential competition” and reserve price theories. Professor Athey’s own data confirm that during the period in which the average number of bidders had declined (2006-2010, *see* C-103, ¶ 103), the average winning auction bid fell from over \$25 per cubic meter to under \$12 per cubic meter.⁴¹⁰ Although some of this drop in bid prices was likely due to the worsening of market conditions, Professor Athey does not say how much of the drop in bid prices is the result of the market, as opposed to the demonstrated lack of actual competition.

225. It is reasonable to assume that experienced bidders consider the trend of declining actual competition in responding to the “reserve price” for an auction. It is reasonable to assume that under these circumstances bids will be closer to the reserve price (which is only a fraction of the assessed value of the tract) than they would be in a setting where there is meaningful competition. The end result is a decline in auction prices that is not offset by any theoretical “bid effect.”

b. Competition Is Further Inhibited By Structural Impediments In The BC Interior

226. A second phenomenon in BC affecting competition, and therefore reducing any “bid effect,” is the structure of the BC industry itself. This is because the long-term tenure sector (80 percent) is so much larger than the auction sector (20 percent), and it is the tenure sector, or their contractors, who are bidding on the auction

⁴¹⁰ R-150 App.1 at 5.

tracts.⁴¹¹ This structure affects competition because a decline in tenure prices caused by misgrading pushes auction prices downward, offsetting any bid effect.

227. The structure of the BC industry causes tenure prices to feed into and affect auction prices. Companies that harvest auction timber in BC are usually small “logging firms,” or independent contractors with no sawmill operations of their own.⁴¹² These small companies then sell the harvested timber to BC sawmills.⁴¹³ In other words, the major BC lumber producers generally do not participate in BCTS auctions, but rather buy auction timber from the small logging firms who do.⁴¹⁴

228. []⁴¹⁵ Professor Athey testified that they need to know this in order to forecast prices into the future.⁴¹⁶ Timber bidders must know what price they will get for the timber in order to formulate their bids in the first place. This means that bidders’ bids are limited by the sawmills themselves, sawmills that (as explained below) have a vested interest in lower tenure prices.

229. Most of the BC Interior timber market is controlled by three BC softwood lumber producers: West Fraser, Canfor, and Tolko. These firms account for over 60

⁴¹¹ C-103 ¶ 102.

⁴¹² R-62 at 6; Tr. 1410:1-12.

⁴¹³ Tr. 1411:4-7; R-62 at 6 (“The logging firms place bids in BCTS auctions, and they sell the timber directly to mills . . .”).

⁴¹⁴ *Id.*; Tr. 995:2-8.

⁴¹⁵ Tr. 996:8-11.

⁴¹⁶ Tr. 1412:12-21.

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percent of the lumber manufactured in the BC Interior.⁴¹⁷ The large softwood lumber producers harvest most of their timber from their long term tenures, not from auction tracts.⁴¹⁸

230. These facts are not problematic in and of themselves, but they create a very real incentive and an opportunity for large BC producers to directly influence auction prices, prices that determine the stumpage prices they pay on their tenures. These producers must realize that if they pay higher prices for harvested auction timber, that will lead to higher bids and thus to higher prices for the tenure timber that makes up most of their supply. Thus, market consolidation affects – indeed diminishes – competition. With less competition, there is less of a “bid effect.” This level of consolidation allows large producers to push down timber prices to below market value.

231. The negative effect on competition in BC has been exacerbated by another fact raised at the hearing. Starting in 2002, BC significantly increased the Annual Allowable Cut (AAC) on long-term tenures in the Interior in order to allow more MPB timber to be harvested by tenure holders.⁴¹⁹ With these AAC “uplifts,” BC producers have not harvested all, or even close to all, of the timber available to them for harvest.⁴²⁰ In other words, timber supply in the BC Interior has not been limiting during for most of the MPB infestation. This means that the long-term tenure holders have more than an

⁴¹⁷ Tr. 1411:10-15; R-9AC at 27-29.

⁴¹⁸ Tr. 1411:16-19; R-16 at 11 (West Fraser); R-9T at 8 (Canfor); Tr. 912 :4-12 [].

⁴¹⁹ R-57 at 1; R-9, ¶¶ 44-45; R-9, ¶ 57; R-13 at 45.

⁴²⁰ Tr. 1411:20-23; R-9, ¶ 70 (“{T}he harvest levels in recent years have fallen far short of that available under the AAC limits.”).

adequate supply of tenure timber for their sawmills, which means they have no reason to pay high prices for auctioned timber.

232. [

] ⁴²¹ Professor Athey agreed that lumber manufacturers with tenure timber will consider the cost of tenure logs when deciding how much they are willing to pay for auction logs.⁴²² This makes perfect economic sense: rational lumber producers are not going to pay more for auction logs than it costs them to harvest logs from their tenures.

233. Under these circumstances, when the cost of tenure logs becomes less expensive (due, for example, to misgrading), this pushes down what large producers are willing to pay the logging companies for auctioned timber, which in turns pushes down what the logging companies will bid for the auctioned timber.⁴²³ Dr. Neuberger observed in his second report: “A decline in price for the timber supplied from tenure tracts is likely to reduce the price bidders are willing to pay for timber from BCTS auctions.”⁴²⁴

⁴²¹ Tr. 995:19-996:5.

⁴²² Tr. 1411:24-1412:11. For example, if the cost of timber on West Fraser’s tenures is \$15 per cubic meter, West Fraser would not pay more than \$15 for BCTS auction logs.

⁴²³ Tr. 1414:1-1415:24.

⁴²⁴ C-103 ¶ 102. The opportunity for price manipulation in the BC Interior is also related to the fact that it is the tenure holders and their contractors who are bidding on the BCTS auction tracts. Tr. 1416:12-1417:14. A rational tenure holder, when formulating its bids, would consider that its bids on auction tracts influence the prices it pays on its tenure tracts. Professor Athey claims that this type of “gaming” should be small because auction bids are averaged province-wide, so the actions by one company will be diluted. R-150 ¶ 32. However, Professor Athey cannot know this with any certainty because she has not studied the bidding practices of BC companies. The mathematical fact remains

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234. Professor Athey was careful to say that the relationship between the cost of timber on long-term tenures and the bids for timber at auction depends upon the two being close to one another.⁴²⁵ Her own work showed that, not surprisingly, this has been the case since 2006.⁴²⁶

235. The sequence of events describing the interplay of BCTS auctions, the MPS, and long-term tenure prices provides the setting to show one way that misgrading affects stumpage on long-term tenures in a manner that is not offset by Canada's so-called "bid effect."

- Misgrading on long-term tenures lowers the cost of timber on those tenures because a greater share of the timber will be graded Grade 4 and sold for only \$0.25 per cubic meter;
- Which, in turn, lowers the price long-term tenure holders are willing to pay logging firms for BCTS auction timber;
- Which, in turn, lowers what the logging firms bid for the BCTS auction tracts;
- Which, in turn, lowers the winning bids that the MPS uses to set the Estimated Winning Bids on the tenure tracts;
- Which, in turn, further pushes down stumpage on the long-term tenures, exacerbating the downward pressure on auction prices produced by misgrading.

that, by virtue of the MPS, the large lumber companies in the BC Interior have the power to influence the stumpage rates on their tenure tracts simply by offering to pay less for auction logs.

⁴²⁵ Tr. 1415:2-24.

⁴²⁶ R-150 ¶ 48. Counsel for Canada confused this point at the hearing by misreading the "Tenure Average Estimated Winning Bid" line to mean average tenure stumpage prices. Tr. 1426:10-1427:19. Professor Athey also was confused in using the Ministry's graph. *Id.* The stumpage price on an *auction* tract is the amount of the winning bid. However, under the MPS, *tenure* stumpage prices are calculated by calculating the Estimated Winning Bid (EWB), then subtracting the Tenure Obligation Adjustment (TOA). Tr. 1436:1-1438:7. Thus, the average EWB is *not* the average tenure stumpage price, which will always be less than the average EWB.

236. The problem with Professor Athey's "bid effect" theory is not in its concept. Although her theory may function in some auction settings, its application here is faulty given the reality of the BC system and BC industry.

237. The bottom line is this: systematic misgrading of timber in BC pushes down both stumpage prices on tenure tracts and bids on auction tracts, and does so in a way that Canada's "bid effect" will not offset through higher bids. In other words, the absence of robust competition in BCTS auctions tends to push bid prices down, undercutting any "bid effect" on the benefits of misgrading. The BC timber pricing system is structured so that Canadian softwood lumber producers necessarily will benefit financially from misgrading. For this reason, Canada has not carried its burden with respect to the "bid effect."

c. Canada Has Not Shown That Its "Bid Effect" Theory Operates In The Context Of Timber Misgrading

238. The next major flaw in Canada's "bid effect" theory relates to the inability of bidders to recognize and account for misgrading in their bids. As stated previously, Professor Athey's theory is that misgrading is neutralized by higher bids for Grade 1 and 2 timber, bids that fully account for the true value above \$0.25 per cubic meter in timber misgraded Grade 4. Yet Professor Athey and Canada offer no evidence that bidders have, in fact, fully accounted for misgraded Grade 4 timber in their bids over the violation period (2007 to present).

239. The hearing testimony of both Dr. Neuberger and Professor Athey made this point clear. Dr. Neuberger agreed with the uncontroversial concept of bidders'

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bidding what they believe to be the perceived value of the timber.⁴²⁷ He disagreed, however, with Professor Athey's untested assumption that bidders will recognize and account for the volume and value of Grade 4 timber in the auction tracts.⁴²⁸ There is good reason to credit Dr. Neuberger's testimony on this point.

240. First, by its nature, misgrading is inherently uncertain because it relates to grading outcomes that may or may not occur in the future.⁴²⁹ Bids are for Grade 1 and 2 timber; bidders do not know – and cannot know – the percentage or volume of Grade 4 timber on a given tract before it is harvested and graded.⁴³⁰ Logs are graded by the sawmills (not the bidders), and only after the trees are harvested, not when they are standing. Moreover, successful bidders have several years to harvest the timber, and grading only occurs at that time.⁴³¹

241. This means that a bidder may not know of a grading result until years after the winning bid on the tract was submitted; this makes comparing timber price, timber quality, and timber grade extremely difficult. Professor Athey's repetitive response that log grades are publicly reported a mere "six days" after scaling is beside the point.⁴³² The "six day" period occurs months or years after the winning bid, and there is no

⁴²⁷ Tr. 1197:2-13.

⁴²⁸ Tr. 1197:24-1199:9.

⁴²⁹ Tr. 1198:3-16.

⁴³⁰ Tr. 1392:5-9.

⁴³¹ R-62 at 4 ("Bidders typically have between 1 and 3 years to harvest the timber, with an average of about 1 ½ years."); Tr. 1385:7-8.

⁴³² Tr. 1364:7-24; 1395:3-11.

evidence that bidders are able to accurately compare timber characteristics to the eventual grades in an accurate manner. Yet Professor Athey's theory depends on exactly this.⁴³³

242. Second, bidders could not know whether the rise in Grade 4 was the result of timber characteristics, scaler incompetence, or government policies. Professor Athey conceded that bids are based only on bidders' expectations, and that bidders need to see some sort of pattern in order for their expectations to change and influence their bids.⁴³⁴ Yet the Grade 4 share steadily increased after 2006; there was no new equilibrium level to which bidders could adjust. Bidders were, in the words of Dr. Neuberger, always chasing the uncertainty, rendering them unable to anticipate the timber grades on auction tracts with certainty.⁴³⁵

243. Here, misgrading of BC timber was increasing over time, so bids at best would underestimate amount of misgrading. It would have taken time for bidders to recognize their mistakes and adjust bids for misgrading. Thus, the "bid effect" will not be as strong or instantaneous as Professor Athey believes is theoretically possible.

244. Further, the uncertainty with respect to Grade 4 is beyond the uncertainty one might find in a regular market. Professor Athey agreed at the hearing that bidders in BC "face substantial uncertainty" in making their "best guesses."⁴³⁶ Yet she and Canada have not shown or even attempted to show that bidders overcame the uncertainty inherent in predicting misgrading between 2006 and 2011 in order to incorporate the actual value

⁴³³ See Tr. 1199:3-9.

⁴³⁴ Tr. 1393:4-6; 13910-14.

⁴³⁵ Tr. 1198:22-1199:2; Tr. 1402:3-22.

⁴³⁶ Tr. 1404:20-25.

of the misgraded Grade 4 logs into their bids. That uncertainty will expose bidders to increased risk that they may miscalculate their bids. Increased risk, of course, may cause the bidders to reduce their bids.

245. Professor Athey's response is that her theory should work if "on average, the bidder errors are not biased in one way or the other" and "{a}s long as bidders' expectations regarding the volume of the timber that will be scaled as Grade 4 are correct on average."⁴³⁷ Yet Canada has no evidence that those expectations were correct on average. This omission is critical because, as Professor Athey concedes, "bidders can't possibly know exactly how much of the scaled volume from a tract is going to be Grade 1 and 2 versus Grade 4 at the time they bid."⁴³⁸ Her entire theory depends on the ability of bidders to know and fully price the volume of Grade 4 timber into their Grade 1/2 bid. Thus, the entire foundation for Canada's "bid effect" is missing. Moreover, when the volume of Grade 4 timber is the result of misgrading, Professor Athey's theory has merit only if bidders are able to predict the extent to which the province misapplies its own grading system. Once again, there is no evidence that bidders were able to predict and account for this.

d. Any "Bid Effect" In Auctions Will Be Delayed In The Tenure Sector

246. Not only is the "bid effect" incomplete, even where there is a "bid effect," it is far from immediate as far as transmitting to the long-term tenure sector. Professor Athey largely agreed that there will be 18 months before any rise in auction prices will affect stumpage prices on long-term tenures. This means that lumber producers in BC –

⁴³⁷ Tr. 1392:16-23.

⁴³⁸ Tr. 1392 5-9.

where 80 percent of the timber is harvested from tenure tracts – necessarily benefit from misgrading.

247. In her initial report for Canada, Professor Athey did not address how her “bid effect” theory affected stumpage prices on tenure tracts. Instead, her opinions were limited to how a “bid effect” might arise on auction tracts where, according to Dr. Athey, bidders will increase their bids in order to capture the increased value of Grade 4 timber above \$0.25 per cubic meter.⁴³⁹

248. Dr. Neuberger observed in his rebuttal expert report that Professor Athey failed to offer any “actual analysis of whether any ‘bid effect’ at the auction stage carries forward to the tenure sector.”⁴⁴⁰ In response, Professor Athey attempted to explain for the first time how and how quickly a “bid effect” in the auction sector is transmitted to the tenure sector.⁴⁴¹

249. The testimony shows considerable agreement on this point. Both experts agree that there is a significant lag in the transmission of increases in auction prices to the tenure sector. Dr. Neuberger explained that the lag is the result of two aspects of the BC MPS: (1) the MPS regression uses hundreds auction results from the previous five years; and (2) the MPS is updated with the previous year’s auction data only once a year, in July.⁴⁴² This largely agrees with Professor Athey, whose work used Ministry simulations

⁴³⁹ R-8 ¶ 25.

⁴⁴⁰ C-103 ¶ 95.

⁴⁴¹ R-150 ¶¶ 35-48.

⁴⁴² Tr. 1199:10-20 (A whole calendar year’s worth of auctions enter the database every July 1. In other words, any auction with an auction date in 2008 enters the database for MPS prices effective July 1, 2009.)

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showing that an increase in auction prices begins to affect the average EWB and, later, tenure stumpage prices, 18 months (six quarters) after the price increase.⁴⁴³

250. Therefore, to the extent Canada contends there is a “bid effect” (an increase in auction bids to account for Grade 4 timber that is worth more than \$0.25 per cubic meter), the MPS mechanism insures that it will not be transmitted to tenure stumpage prices, if at all, until 18 months later. Canada’s discussion obscures this significant time lag, a fact that undercuts one of the primary assumptions underlying the “bid effect” theory.

251. In fact, Dr. Neuberger’s analysis shows that the true lag in the bid effect is longer than 18 months. When the MPS is updated to include a winning auction bid, the bid is added to a database that includes winning bids from the preceding five years. That database contains over 1,000 auctions.⁴⁴⁴ This means that any “bid effect” in the most recent years in the data set will be diluted by data from auctions from the years before there was a bid effect. Dr. Athey’s simulation artificially increased all auction bids by the same amount over an entire year in order to produce increases in tenure prices in the following year.⁴⁴⁵ But Mr. Fletcher, who ran the simulations for Professor Athey, testified that this is not a realistic assumption of how a “bid effect” would function.⁴⁴⁶

⁴⁴³ R-150 ¶ 48 (an increase in winning bids in Q1-2007 shows up in the EWB in Q3-2008).

⁴⁴⁴ C-2, App. A, ¶ 4.

⁴⁴⁵ R-150 ¶ 46.

⁴⁴⁶ Tr. 1149:14-1150:1.

Professor Athey has not simulated, and therefore has not demonstrated, the complex reality of bids changes by varying amounts on different tracts over time.

4. Professor Athey's Theory Does Not Consider The Effect of Increased Grade 4 On The Tenure Obligation Adjustment (TOA)

252. Hearing testimony also confirmed another deficiency in Canada's "bid effect" defense. Misgrading of timber as Grade 4 increases the TOA on tenure tracts. Because the TOA is a subtraction from the estimated winning bids on tenure tracts, a greater TOA necessarily leads to a lower stumpage price.⁴⁴⁷ The resulting reduction in tenure stumpage prices is wholly disconnected from auction bids, meaning that the benefit to softwood lumber producers is not offset by any theoretical "bid effect."

253. Stumpage prices on tenure tracts are calculated using a complex series of equations starting with a database of timber auction data.⁴⁴⁸ Canada's "bid effect," to the extent it exists, occurs at the very first step, namely winning auction bids: if bidders perceive the value of Grade 4 timber to be greater than \$0.25 per cubic meter, bidders will increase their bids accordingly.⁴⁴⁹

254. The TOA reduces stumpage prices to account for certain forestry costs borne by tenure owners, such as surveys, forest road building, and reforestation.⁴⁵⁰ However, on the auction tracts there is no TOA because the province assumes forest

⁴⁴⁷ C-2 ¶ 68, n.50.

⁴⁴⁸ C-2 App. A, ¶ 3; R-09,AD at 2-3; R-9, App. A, ¶ 7.

⁴⁴⁹ R-8 ¶ 25.

⁴⁵⁰ R-126 at 1-4.

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management responsibilities on those tracts.⁴⁵¹ Because TOAs simply do not exist on auction tracts, any increase or decrease in TOAs for tenure tracts is irrelevant to auction bidders. So by definition, tenure TOAs have no effect on the value of auction timber to bidders.

255. The TOA directly reduces the AMP and, through the MPS, stumpage prices on tenure tracts.⁴⁵² Dr. Neuberger observed in his rebuttal expert witness report that the share of Grade 4 is a direct input into the TOA on tenure tracts, creating a benefit to lumber producers in the form of reduced stumpage prices.⁴⁵³ Where timber is misgraded as Grade 4, tenure owners will reap the benefit, a benefit that will not be offset by an increase in auction prices.

256. Canada understood the functioning of the TOA in its Statement of Defense, agreeing that the share of Grade 4 timber is “incorporated” into the AMP calculations.⁴⁵⁴ Nonetheless, Professor Athey claimed in her rebuttal report, and again at the hearing, that the share of Grade 4 has no effect on the TOA.⁴⁵⁵ Her belated

⁴⁵¹ R-126 at 1; R-09AD at 4 (“Timber obligation adjustments are necessary for timber sold under long-term tenure because, unlike bidders in auction, the licensee is generally responsible for the cost of planning, main road building, and silviculture.”)

⁴⁵² C-25 at 1-2; R-09AD.

⁴⁵³ C-103 ¶ 101. This is part of what he calls the “AMP effect” in his benefit calculations.

⁴⁵⁴ Stmt. Def., ¶ 65.

⁴⁵⁵ R-150 ¶ 51; Tr. 1419:1-1420:2. Dr. Neuberger first observed that the share of Grade 4 timber increases the TOA, and therefor reduces tenure stumpage prices, in his initial expert report submitted with the United States’ Statement of Case. C-102, ¶ 68, n.50. Neither Canada nor any of its witnesses (including Professor Athey) disputed this point in its Statement of Defense. Instead, Professor Athey made the claim for the first time in her rebuttal expert report. R-150, ¶¶ 50-51.

statements with respect to the TOA, however, appear to reflect a wordplay provided by the Ministry officials. Professor Athey herself had no knowledge of the TOA calculation or role in its design.⁴⁵⁶ She admitted that her response related to the TOA was supplied by the Ministry, and that she had done nothing to verify what the Ministry had told her.⁴⁵⁷

257. An examination of the TOA equation in BC's own manual confirms Dr. Neuberger's observation that the share of Grade 4 on a tenure tract reduces the stumpage price paid by the tenure owner. The relevant BC Interior manual is titled "Interior Market Pricing System / Tenure Obligation Adjustments," which explains the purpose of the TOA is to adjust (reduce) stumpage prices to reflect tenure-specific costs.⁴⁵⁸

258. The TOA reduces stumpage prices to account for certain forestry costs borne by tenure owners, such as surveys, forest road building, and reforestation.⁴⁵⁹ The equation for the TOA is as follows:⁴⁶⁰

$$TOA = \frac{FPA + RD + RM + BS1 - LG}{1 - LG} * RFM - MLRC$$

259. The variables FPA, RD, RM, and BS are the forestry costs incurred by the tenure owners. The variable RFM adjusts for the fact that some costs are incurred in

⁴⁵⁶ Tr. 1417:21-1418:1.

⁴⁵⁷ Tr. 1420:13-1421:9.

⁴⁵⁸ R-126 at 1.

⁴⁵⁹ R-126 at 1-4.

⁴⁶⁰ R-126 at 5.

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advance of harvest, and the MLRC variable is the road costs paid by others to the tenure owner. LG is the “Low Grade Percent Adjustment,” which is the percentage of non-sawlog-grade timber, such as Grade 4. Because $1 - LG$ is in the denominator of the equation, the larger the percentage of low grade timber (Grade 4), the larger the TOA. Two simple examples using a mark in the MPS database illustrate this.

260. Say the forestry costs (FPA + RD + RM + BS) are \$15.00 per cubic meter, the RFM is 103 percent, and the MLRC is \$1.00 per cubic meter. Now, suppose that in Example 1, only 5 percent of the timber is Grade 4, but in Example 2, 40 percent of the timber is Grade 4. The TOAs in the two examples are as follows:

EXAMPLE 1 (5 percent Grade 4) → **TOA = \$15.26 per cubic meter**

EXAMPLE 2 (40 percent Grade 4) → **TOA = \$24.75 per cubic meter**

261. Thus, a rise in Grade 4 has a significant effect on the TOA and, through the MPS, on the AMP and (ultimately) on stumpage paid on long-term tenure tracts. In the examples above, an increase from 5 to 40 percent in the share of Grade 4 results in an increase of over 60 percent in the TOA.

262. Canada has presented no evidence that bidders somehow price the benefit of the higher TOAs on tenure tracts into their bids for the auction tracts. And indeed, this would make no sense: an increase in the value of timber on tenure tracts (caused by the higher TOA) will not increase the value of timber on auction tracts to the successful bidder; there is no increase in the value of the auction timber for the bidder to price into his bid. Canada’s only response is the conclusory statement that it is “impossible for

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misgrading to have any impact on the TOA adjustment.”⁴⁶¹ This denial makes no sense given the equation in BC’s own manual explaining how the TOA is calculated.

263. Canada’s and Professor Athey’s denial fell apart at the hearing when confronted with the TOA equation.⁴⁶² Professor Athey appeared to have never seen the equation before.⁴⁶³ She eventually conceded that, using the TOA equation itself, the larger the share of Grade 4, the larger the TOA.⁴⁶⁴ Professor Athey later admitted at the hearing that the use of the Grade 4 variable in the TOA equation allows the TOA to be converted into units (\$ per cubic meter of sawlogs) that can then be used to reduce stumpage, which is expressed in these same units (\$ per cubic meter of sawlogs).⁴⁶⁵ Grade 4 is not a “sawlog” grade.

264. On the next day of the hearing, Canada’s final witness, Professor Kalt, admitted to the effect of Grade 4 on the AMP. In fact, he had never denied the effect in either of his expert reports.⁴⁶⁶ Professor Kalt explained at the hearing that there are “direct” benefit effects from misgrading in both the BCTS and the tenure sectors from a greater volume of timber sold at the flat minimum Grade 4 price.⁴⁶⁷ To remedy this

⁴⁶¹ R-150 ¶ 51.

⁴⁶² Tr. 1420:3-1424:2.

⁴⁶³ Tr. 1420:3-1421:9.

⁴⁶⁴ Tr. 1423:8-1424:2.

⁴⁶⁵ Tr. 1438:13-20.

⁴⁶⁶ *See, e.g.*, R-9, App. A.

⁴⁶⁷ Tr. 1481:5-1482:17. By “direct” benefits, Professor Kalt was referring to benefits that derive from misgraded timber that should have been charged at the Grade 1/2 price

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benefit, he (in agreement with Dr. Neuberger) states that the misgraded Grade 4 timber must be re-priced at the Grades 1 and 2 rate. But Professor Kalt also admits to an indirect AMP effect (i.e., lower Grades 1 and 2 price due to misgrading) caused by two things, lower auction bids that considered and priced more of the timber as Grade 1 or 2, instead of Grade 4; and the equations leading to the AMP which are affected by the share of Grade 4.⁴⁶⁸

265. With respect to this latter point, he states that with misgrading, “you are changing the amount of Grade 4, and that affects and creates some benefit under the calculations of the AMP.”⁴⁶⁹ The only “calculations of the AMP” that he could be referring to is the TOA effect, since that is the only place where there is a change in the AMP calculation when using different Grade 4 percentages.⁴⁷⁰ Professor Kalt also testified that he and Dr. Neuberger’s calculations are “harmonized” as far as how the share of Grade 4 changes the AMP.⁴⁷¹ Thus, there is no disagreement between Dr. Neuberger and Professor Kalt that the increased share of Grade 4 in the harvest produces a benefit in the form of a lower AMP, a benefit that Professor Kalt explains in his hypothetical example of the proper method to calculate the remedy for misgrading.⁴⁷²

but was instead charged at 25 cents. Dr. Neuberger refers to this “direct” effect as the “Share Effect” of misgrading.

⁴⁶⁸ Tr. 1481:23-1482:10.

⁴⁶⁹ Tr. 1482:18-22.

⁴⁷⁰ R-126 at 5.

⁴⁷¹ Tr. 1484:10-16.

⁴⁷² R-151 ¶ 141.

266. The bottom line is that the greater the share of Grade 4 timber on a tenure tract, the greater the TOA, the lower the AMP, and the lower the stumpage price for Grade 1 and 2 timber on the tract. So an increased share of Grade 4 timber results in two distinct benefits for long-term tenure owners: (1) there is more timber sold at the flat \$0.25 per cubic meter price (the share effect); and (2) the price of Grade 1 and 2 timber on tenure tracts is much lower (the AMP effect). Canada's "bid effect" theory does not account for these benefits.

5. The Use of A Reserve Price Reduces Any "Bid Effect"

267. On the final day of testimony, the Tribunal asked Professor Kalt questions related to the "reserve price" on BCTS auction tracts that Professor Kalt was unable to answer.⁴⁷³ Reserve prices (also called upset prices) are published prior to the auction.⁴⁷⁴ If no bid is received above the reserve price, then the auctioned tract is not sold.

268. A reserve price system presents several places where any "bid effect" (bidding more for the Grade 1-2 timber to reflect greater value in the Grade 4 timber) will be delayed or reduced. This is true in cases where the added value of the Grade 4 timber over and above \$0.25 per cubic meter allows the bidder to offer a bid at or just above the reserve price.

269. An example is useful. Suppose that the BCTS has three auctions whose winning bids will be used to determine stumpage rates. All three auctions involve the same amount of timber, and all have \$20 reserve prices. Without misgrading, the auctions have high bids of \$18, \$18, and \$25. The first two auctions, because the bids are

⁴⁷³ Tr. 1555:1-9.

⁴⁷⁴ R-62 at 3.

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below the reserve price, result in no sale. The third results in a sale. The average winning bid in these three auctions is \$25, the amount of the one auction that resulted in a sale. Tr. 1336:17-22; 1439:15-18 (Athey) (there are “many instances in which stands are not sold because the reserve price was not reached,” and these tracts will not be included in the auction database).

270. Now, contrast this to where there is misgrading, and so the bidders add \$3 to their bids to reflect the value of the Grade 4 timber on the auction tracts in excess of \$0.25 per cubic meter. Now the auctions have high bids of \$21, \$21, and \$28. All three sales take place because they exceed the reserve price, and all three sales are included in the auction database used to set tenure stumpage prices. In this scenario, however, the average winning bid is just over \$23.

271. Thus, in this example, while misgrading *increased* bids by \$3, it actually *lowered* the average bid used to calculate the stumpage rates on the tenure tracts. Stumpage prices on tenure tracts are lower because of the reserve price. The reason for this effect is that misgrading will overcome the reserve price in a number of auctions, resulting in the addition of low-valued tracts to the sample used to transmit those auction prices to tenure stumpage prices.

272. As shown here, the use of a reserve price will in certain cases lower stumpage prices, providing a benefit to lumber producers. Neither Canada nor Professor Athey has acknowledged or attempted to explain how this aspect of misgrading is offset by a “bid effect.” And it is difficult to imagine how it could.

6. Overall, The Bid Effect Is Far From Complete In Offsetting The Financial Benefit Of Misgrading To Softwood Lumber Producers

273. Dr. Neuberger and Professor Athey agree that there should be a bid effect that will offset a portion of the financial benefit of misgrading.⁴⁷⁵ Specifically, Dr. Neuberger found that the change in Grade 4 share in the harvest is correlated with a small increase in auction prices in 2008, 2009, and 2010.⁴⁷⁶ That is, bidders perceived an increased value in Grade 4 timber above the \$0.25 per cubic meter flat rate, and priced some of that increased value into their bids for Grade 1 and 2 timber.⁴⁷⁷ Dr. Neuberger also found that the increase in value of Grade 4 logs was due to an increase in the quality of Grade 4 logs, further supporting a conclusion that Grade 4 logs were misgraded.⁴⁷⁸

274. Dr. Neuberger parts company with Professor Athey on her unproven conclusion that the “bid effect” should offset *all* benefits of misgrading.⁴⁷⁹ Simply put, the core assumptions underlying Professor Athey’s “bid effect” theory are questionable in the context of BC timber auctions.⁴⁸⁰ Professor Athey’s opinions may be reasonable in theory, but her theory has not been tested and it has no tie to empirical evidence in British Columbia. Canada has offered the Tribunal nothing more than a theoretical explanation, unsupported by any evidence that misgraded Grade 4 timber was actually bid and

⁴⁷⁵ C-103 ¶¶ 106-08.

⁴⁷⁶ C-103 ¶¶ 106-07, App. F.

⁴⁷⁷ *Id.*

⁴⁷⁸ C-103 ¶ 107.

⁴⁷⁹ R-150 ¶ 69; C-103, ¶ 10.

⁴⁸⁰ C-103 ¶ 93.

purchased at its true value on both auction and tenure tracts. Canada has provided no sound basis for the Tribunal to make the leap for which it asks.

275. In sum, while there is agreement among the experts on the existence of a “bid effect,” Canada certainly has not established that the “bid effect” fully offsets the benefits of misgrading realized by lumber producers. Canada has not met its burden on this point.

E. The Tribunal Should Reject Professor Kalt’s Methodology And Model To Determine A Remedy For Canada’s Breach

276. In its February 3, 2012 Rejoinder, Canada presented for the first time a complex economic model designed by Professor Kalt that it asked the Tribunal to adopt in calculating a remedy for Canada’s breach.⁴⁸¹ Generally, Professor Kalt designed what he calls a “dynamic simulation model” that, relying on a series of economic inputs (elasticities, etc.) and other disputed inputs, he uses to calculate both the loss to U.S. producers caused by Canada’s breach and the export charge necessary to remedy the breach.⁴⁸²

277. The United States objected to the new model prior to the hearing, observing that the model did not respond to any new evidence or argument in the United States’ Reply and, therefore, should have been presented in Canada’s Statement of Defense.⁴⁸³ Given the prejudice to the United States caused by Canada’s offering the new model only weeks before the hearing, the United States asked that the Tribunal strike

⁴⁸¹ Can. Rej., ¶¶ 250-54, 259-61; R-151, ¶¶ 149-60.

⁴⁸² *Id.*

⁴⁸³ Feb. 17, 2012 letter from McCarthy to Chairman Sachs.

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the model.⁴⁸⁴ The Tribunal directed that “to the extent that Claimant is unable to deal with this model at the evidentiary hearing and cross-examine Professor Kalt on it, Claimant will be afforded sufficient opportunity to do so in written pleadings following the evidentiary hearing and, if required, at a further witness examination of Professor Kalt.”⁴⁸⁵

278. Dr. Neuberger did not have a sufficient opportunity to test the model prior to the hearing; therefore, the United States did not address the model at the hearing beyond noting its objection and advising the Tribunal that we would respond in our post-hearing brief. Following the hearing, Dr. Neuberger performed a limited analysis of the model and Professor Kalt’s results. Dr. Neuberger’s observations and conclusions are included in his post-hearing expert witness report.⁴⁸⁶

279. Dr. Neuberger’s post-hearing analysis demonstrates that the Tribunal should not rely upon Professor Kalt’s new model in this arbitration. There are three reasons: (1) Dr. Kalt’s model is not a simple extension of the model used in LCIA No. 81010; (2) the model is an unreliable tool to measure harm to U.S. producers; (2) the model parameters are the subject of fundamental disagreements among the experts, disagreements that would require additional expert reports and testimony for the Tribunal to resolve.

280. First, Canada’s claim that Professor Kalt’s model is similar to that adopted by the parties in LCIA No. 81010 is incorrect. Professor Kalt admitted as much

⁴⁸⁴ *Id.*

⁴⁸⁵ Feb. 24, 2012 Email from Chairman Sachs to McCarthy and Townsend.

⁴⁸⁶ C-203 ¶¶ 8-32.

in his rebuttal report offering the model, stating that he made numerous changes (Professor Kalt calls them “adjustments and extensions”) to the 81010 model to purportedly adapt it to the allegations in this arbitration.⁴⁸⁷ He stated he added regions, added an entire logging sector, “incorporated trade directly into the model,” and made an unknown number of other changes to, in his words, “eliminate certain unrealistic assumptions.”⁴⁸⁸ He then selected the operative parameters for the model, including the various elasticities, lumber prices, and cost share figures, parameters that control the model’s outputs.⁴⁸⁹

281. Dr. Neuberger assessed the “adjustments” identified by Professor Kalt and concluded “these are not small changes” to the model, nor the only changes Professor Kalt made. Overall, Dr. Neuberger concluded that “the model presented here is significantly different from the model used previously.”⁴⁹⁰

282. The large-scale changes made to the 81010 model by Professor Kalt make clear that (1) the breach alleged in this arbitration is very different from that in LCIA No. 81010; and (2) Canada is incorrect that Professor Kalt simply used an adjusted model to generate his results.⁴⁹¹

283. Second, Professor Kalt’s model employs a narrow view of the effects of Canada’s breach on the U.S. softwood lumber industry. “Lost producer surplus” is a

⁴⁸⁷ R-151 ¶¶ 150-52.

⁴⁸⁸ C-151 ¶ 151.

⁴⁸⁹ C-151 ¶ 152.

⁴⁹⁰ C-203 ¶ 9.

⁴⁹¹ Can. Rej., ¶¶ 251, 259.

measure of the profits lost by U.S. firms as a result of Canada's conduct. However, Dr. Neuberger points out that the U.S. industry likely suffered far more than merely lost profits.⁴⁹² It is true that in a strong market, financial benefits to Canadian companies simply make those companies more profitable at the expense of American companies, who earn less because it costs more than Canadian companies to make their products.⁴⁹³

284. However, in a depressed economy, such as what North American lumber markets have experienced from 2007 forward, Canadian government benefits do not merely deprive American companies of profits. The benefits provided to Canadian producers undoubtedly allowed Canadian firms to keep mills open that otherwise would have closed, to run shifts that otherwise would have been scaled back, and to make investments that otherwise would have been delayed or not made.⁴⁹⁴ To be sure, there have been partial and complete mill closures north and south of the Canadian/U.S. border since 2007, but the benefits provided by BC in the form of fixed, low-price timber was part of the reason that mills in the U.S. suffered disproportionately.

285. In other words, the benefits allowed Canadian firms to better "weather the storm" and to remain ready to take advantage of increased demand as the lumber market recovers. In contrast, American companies remain disadvantaged from greater labor losses and fewer technological investments than their Canadian counterparts, requiring more time and investment in order to benefit from the improved market. This

⁴⁹² *Id.* ¶ 10.

⁴⁹³ C-203 ¶¶ 10-12.

⁴⁹⁴ *Id.* ¶ 10.

disadvantage is not measured in Professor Kalt's model, which limits its focus to lost producer surplus.⁴⁹⁵

286. A remedy based on such a model confined to lost producer surplus would be unjust because Canadian producers would pay back only a fraction of the benefit they received, and only a fraction of the actual harm to U.S. producers. This result is not only unfair, but creates a perverse incentive to breach the SLA during poor economic conditions, with the idea that when the breach is remedied, market conditions likely will be improved and the remedy will be less than what was gained. There is no evidence that the parties intended the SLA to operate in such a manner.

287. Finally, the model's outcomes are controlled by parameters and assumptions that are subject to significant disagreement, rendering the results speculative and unreliable. The model parameters and assumptions include elasticities of supply and demand both inside and outside North America, as well as assumptions as to future exports and market conditions.⁴⁹⁶ These parameters and assumptions are hardly established figures accepted and used by economists universally; to the contrary, they are the subject of significant debate both in the literature and in legal proceedings. The Tribunal cannot simply assume, as Canada would have it, that Professor Kalt's model generates reliable results.

288. Dr. Neuberger demonstrates that changes to these parameters can lead to large swings in model outputs.⁴⁹⁷ Dr. Neuberger also explains that many of Professor

⁴⁹⁵ *Id.* ¶¶ 10-11.

⁴⁹⁶ *Id.* ¶¶ 16-32.

⁴⁹⁷ *Id.* ¶¶ 21, 23-24.

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Kalt's parameters are uncertain and subject to debate.⁴⁹⁸ The Tribunal will see that Professor Kalt has offered no sensitivity analyses, an important deficiency. Given the sensitivity of the model, Dr. Neuberger emphasizes that the results must be subjected to statistical testing to determine if they are meaningful, something that Professor Kalt has not done.⁴⁹⁹ Thus, Professor Kalt has not given the Tribunal an analysis of the range of statistical reliability or significance of the results of the model. Further, Canada's claim that Dr. Neuberger's preferred remedy will over-collect tens of millions of dollars from Canadian exporters is also based on Professor Kalt's questionable model, specifically the model-generated effects of Dr. Neuberger's remedy on lumber prices in Canada and abroad.⁵⁰⁰ Given the many problems with the model described above, Dr. Kalt's calculations of these purported "side effects" are not reliable and cannot be trusted. Under Dr. Neuberger's remedy, the additional export charge ceases when the benefit amount is collected. There will be no over-collection.

289. For all of these reasons, the Tribunal should decline Canada's belated request to use the model proposed for the first time by Professor Kalt in Canada's Rejoinder. Dr. Neuberger's concept of remedy – assessing an additional export charge to collect the amount of the benefits provided in breach of the SLA – is the correct approach and the only approach that produces a reliable result.

⁴⁹⁸ *Id.* ¶¶15-32.

⁴⁹⁹ *Id.*

⁵⁰⁰ Can. Rej. para 241; R-151 para 108 and Fig. 10.

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CONCLUSION

290. The United States respectfully requests that the Tribunal determine that Canada breached the SLA by selling underpriced timber in BC Interior timber. If the Tribunal finds Canada has breached the SLA, the United States respectfully requests that the Tribunal determine a reasonable period of time for Canada to cure the breach, and respectfully requests that the Tribunal also identify appropriate compensatory adjustments to the Export Measures that remedy the breach. The United States requests that the Tribunal choose Dr. Neuberger's preferred remedy as compensatory adjustments, or in the alternative, one of Dr. Neuberger's alternative proposals.

291. Specifically, the United States respectfully requests that the Tribunal find that Canada should apply an additional export charge to softwood lumber products exported from BC Interior to the United States beginning one month after the date of the Award, and continuing until the full amount of the benefit, \$384.4 million (as established in Dr. Neuberger's preferred remedy, including past and continuing benefits conferred until the expiration of the SLA) has been collected. The United States respectfully requests that the Tribunal further find that the additional export charge shall be calculated according to the following table:

**Export Charge Under Preferred Remedy
For Award Dates Between July 2012 And July 2013**

Date of Award	Export Charge For Benefits up to Date of Award	Export Charge For Post-Award Benefits	Total Export Charge
March 2012	8.2%	2.3%	10.5%
⋮	⋮	⋮	⋮
July 2012	9.3%	2.3%	11.6%
August 2012	9.6%	2.3%	11.9%
September 2012	9.9%	2.3%	12.2%
October 2012	10.3%	2.3%	12.5%
November 2012	10.6%	2.3%	12.9%
December 2012	11.0%	2.3%	13.3%
January 2013	11.4%	2.3%	13.7%
February 2013	11.8%	2.3%	14.1%
March 2013	12.3%	2.3%	14.6%
April 2013	12.8%	2.3%	15.1%
May 2013	13.3%	2.3%	15.6%
June 2013	13.9%	2.3%	16.1%
July 2013	14.5%	2.3%	16.7%

Figure 5.

Sources:

- 1) Preferred Subsidy Calculation Workbooks
- 2) Q3 2010 Bid Effect Estimation.xlsx

This remedy stays within the confines of the SLA itself and does not require the Tribunal to determine the economic effects of the breach.

292. With respect to the cure period, the United States proposes that Canada be granted 30 days, the maximum amount of time permitted under the SLA, to cure its breach before imposition of the Export Measures.

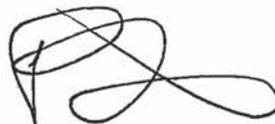
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